

**Lesotho Meteorological Services  
Ministry of Natural Resources**

**CLIMATE CHANGE IN LESOTHO  
A HANDBOOK FOR PRACTITIONERS**

**Prepared by  
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## What is climate change?

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**Climate Defined** Climate is defined as the average prevailing weather conditions over a specific geographical area recorded over a long period of time, usually exceeding 30 years. The elements of weather that are usually taken into account in defining an area's climate include rainfall, temperature, sunshine records, frost occurrence, wind and evaporation.

**Natural Factors** Climate is influenced by a number of natural factors amongst which are latitude, continental/maritime location of an area, altitude, and topography. However, whilst the world's climate has always varied naturally, there is pool of evidence which shows that rising concentrations of greenhouse gases (GHGs) in the earth's atmosphere that have resulted from human activity over the last two centuries are overriding this natural variability, leading to irreversible climate change.

**Human Factors** Since the early 1980's, there have been growing international concerns about climate change. This followed an accumulation of scientific evidence that linked anthropogenic gas emissions with global climate change. These concerns inspired the hoisting of a series of international conferences which issued urgent calls for a global treaty to address the problem.

**Scientific Evidence** In 1988, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Inter-governmental Panel on Climate Change (IPCC) to look into the scientific relationship between climate change and human activity.

Since inception, the IPCC has completed three comprehensive assessments in the years 1990, 1995 and 2001. These reports give a scientific account of the effects of human activities on the global climate system, the potential consequences of climate change for natural and human system, and the effectiveness and costs of response options. The IPCC has also prepared numerous special reports, technical papers, and analytical methodologies on various topics. The latest report has gone further to include a regional presentation of the findings.

In its First Assessment Report in 1990, the IPCC confirmed that climate change was indeed a threat to humanity and called for the

enactment of a global treaty to deal with the problem. The Second Assessment Report of the IPCC was published in 1995. This report confirmed the scientific evidence of a discernible human influence on the global climate. The report pointed out that over the last century, atmospheric concentrations of greenhouse gases had increased by 30% to 145%, mainly as a result of human activity. Similarly, global temperatures had increased by 0.3° to 0.6°C as a result of this increase in the concentration of GHGs.

The Third Assessment Report of the IPCC was published in February 2001. This report has found that human activities, particularly the burning of fossil fuels and changes in the land cover, are responsible for increases in the atmospheric concentrations of greenhouse gases and aerosols which are strongly implicated to have contributed to climate change which was observed during the 20<sup>th</sup> century, and are expected to contribute to further changes in climate during the 21<sup>st</sup> century and beyond.

Projections made in the Third Assessment Report of the IPCC indicate that by 2100, the global mean surface temperature is likely to increase by 1°C to 6°C above that of 1990. Similarly, the mean sea level is projected to rise about 10cm to 80cm, and the global mean precipitation by about 1% to 5%. However, the spatial distribution of these changes will vary considerably from region to region. These findings paint a gloomier picture than previous studies.

#### Possible Impacts

Climate change represents both opportunities and risks for human development. Beneficial effects may be experienced in some regions, e.g. in the form of increased agricultural productivity resulting from warmer conditions and higher rainfall. However, IPCC assessments indicate that most of the parts of the world are likely to experience net negative impacts on food security (e.g. disrupted farming could lead to falling crop yields in many regions), health (e.g. tropical diseases might rise due to increased warming), shortages of water resources, disruptions of physical infrastructure, etc.

While no region is expected to escape the impacts of climate change, the poorer countries, such as Lesotho, whose majority populations are mainly dependent on natural resources for survival, are most vulnerable to the negative impacts of climate change. For these countries, the impacts will directly and /or indirectly affect human welfare and sometimes undercut the efforts to promote sustainable human development and environmental recovery.

## UNFCCC

Following international concerns, the United Nations General Assembly adopted Resolution 43/53 in 1988, which resolution called on the protection of the global climate for present and future generations of mankind. In December 1990, the Assembly further acceded to recommendations of the IPCC by launching negotiations on a framework convention on climate change through the establishment of the Inter-governmental Negotiating Committee (INC) by Resolution 45/212.

After 15 months of work, the INC adopted the United Nations Framework Convention on Climate Change (UNFCCC) by consensus. The Convention was open for signature at the UN Conference on Environment and Development which was held in Rio de Janeiro, Brazil on 4 June 1992 and came into force on 21 March 1994. Today, about 180 countries and the European Community are parties to the Convention. To become a party, a country must ratify, accept, approve, or accede to the Convention.

The UNFCCC defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is an addition to natural variability that has been observed over comparable time periods.

In this regard, the Convention expresses great concerns over the risks that climate change has in store for human development and well being, despite the possible opportunities it offers. Its overriding objective therefore is to prevent dangerous anthropogenic interference with the climate system. The Convention recognises the need:

- To allow ecosystems to adapt naturally to climate change
- To ensure that food production is not threatened; and
- To enable economic development to proceed in a sustainable manner.

Conference of the Parties The Parties to the UNFCCC meet regularly at the annual Conference of the Parties (COP) to review progress at the implementation of the Convention, and to devise additional/alternative strategies to tackle the problem of climate change. The Convention established national reporting requirements for all parties regarding their GHG emissions, potential vulnerabilities, and adaptation options. These reporting

obligations are fulfilled through the preparation of national communications to the COP.

At COP 1 in Berlin in 1995, governments reviewed the adequacy of international commitments to achieve the goals of the UNFCCC and decided that additional commitments were required. An ad hoc group was set up to identify appropriate actions beyond year 2000 and to strengthen commitments through a protocol or other legal instrument. The ad hoc group process culminated with the adoption of the Kyoto Protocol in December 1997.

#### Kyoto Protocol

The Kyoto Protocol provides for industrialized countries (Annex I Parties to the UNFCCC) to reduce their emissions of the 6 main GHGs by 5% of the 1990 levels between 2008 and 2012, the parties to account for the removal of greenhouse gases through sinks which are induced by land use change and forestry activities, emissions trading, increased cooperation between developed and developing countries in the reduction of emissions through joint projects, and a commitment to provide assistance in meeting the adaptation costs for those countries deemed most vulnerable to the adverse effects of climate change.

#### Other Responses

In addition to inter-governmental responses, a number of international bodies, notably the World Bank, the UN Environment Programme (UNEP), the UN Development Programme (UNDP), and the Global Environment Facility (GEF) are also taking up the challenge of climate change. National government responses, on the other hand, have taken on varied forms that include international assessments of climate science, impacts and abatement strategies (USA), the implementation of a legally-binding mitigation policy (Sweden), etc. A number of country studies have been carried out and national communications to the COP compiled.

Responses to climate change have also been recorded on the part of large multinationals and the private sector some of which have set up schemes to help manage clean development, international scientific organizations which have hoisted a series of international conferences and research programmes, and environmental non-governmental organizations which have initiated climate campaigns.

#### Lesotho's Responses

From late 1970s and early 1980s, Lesotho began to implement policy reforms which, although not directly related to climate change, have been found to be having a bearing on both mitigation and adaptation strategies. These include the promotion of

renewable energies, the introduction of biogas projects, the introduction of an afforestation programme, water development, sanitation improvement, the formulation of new agricultural policies, environmental regulation, etc.

Lesotho was one of the countries that signed the UNFCCC at the Earth Summit in Rio de Janeiro in 1992. It eventually ratified the same in 1995. Through the focal point, the Lesotho Meteorological Services (LMS), and the assistance from UNEP and the Global Environment Facility, Lesotho set out to meet her obligations under the Convention by undertaking awareness campaigns throughout the country's vulnerability to climate change, and assessing the current adaptation and mitigation strategies.

Results of the above activities enabled the compilation of the First national Communication to the Conference of the Parties to the UNFCCC in April 2000. The staff of the focal point have been very active participants in activities of the Climate Change Secretariat and other related institutions. The country is now ready to formulate its national plan of action on climate change.

## Chapter Two

# Important milestones

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- 1979  
1980s
- First World Climate Conference
- Accumulation of international scientific evidence linking global climate change with human activities.
- International concerns lead to the hoisting of a series of conferences and workshops to discuss the problem of climate change.
- Urgent calls for a global treaty to address the problem of climate change.
- 1988
- The World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) establishes the Intergovernmental Panel on Climate Change (IPCC) to look into the scientific relationship between climate change and human activity.
- The United Nations General Assembly adopts resolution 43/53 which calls on the protection of the global climate for present and future generations of mankind.
- June 1989
- Lesotho publishes its first national environmental action plan (NEAP), a document which laid down the framework for the conservation and sustainable utilisation of Lesotho's natural resources.
- 1990
- The IPCC issues its First Assessment Report confirming that climate change was certainly a threat and called for a global treaty to address the problem.
- Dec. 1990
- UN General Assembly formally launched negotiations on a Framework convention on climate change by stabling the Intergovernmental Negotiating Committee (INC) by resolution 45/212.
- June 1992
- Adoption by consensus of the United Nations Framework Convention on Climate Change (UNFCCC) at the Earth Summit (the UN Conference on Environment and Development) held in Rio de Janeiro, Brazil.

Lesotho, along with 155 other countries, signs and becomes one of the parties to the UNFCCC at the Earth Summit in Rio de Janeiro. The parties meet annually at the Conference of the Parties (COP) to review progress at the implementation of the convention and devise new strategies to deal with climate change.

March 1994                      The UNFCCC enters into force, with specific responsibilities for both developed and developing countries.

1995                              The Second Assessment Report of the IPCC is published, pointing out that there is evidence of a discernible human influence on global climate.

Feb. 1995                      Lesotho ratifies the UNFCCC and, through the project *Lesotho: Enabling Activities for the implementation of the UNFCCC*, begins climate change awareness campaigns, institutional strengthening for the climate change focal point, the Lesotho Meteorological Services.

The project also assists the compilation of an inventory of greenhouse gas (GHG) emissions over Lesotho, and the assessment of the country's vulnerability to climate change as well as of the adaptation strategies and mitigation options.

1996/7                          A National Forestry Policy is adopted for the first time in Lesotho. Forests are very important in climate change as they act as sinks of CO<sub>2</sub>.

1997                              The first comprehensive draft environment legislation in Lesotho is completed for debate by stakeholders.

Lesotho's Disaster Management Authority is established by Act of Parliament. Climate related disasters have increased in occurrence in recent years.

The National Livestock Policy is concluded in Lesotho. Livestock numbers and extensive and uncontrolled grazing systems have been blamed for a large part of Lesotho's environmental degradation.

Dec. 1997                      COP 3 adopts the Kyoto Protocol which gives more specificity to commitments of the parties to the Convention.

The protocol establishes 3 innovative mechanisms, namely joint implementation, emissions trading, and the clean development mechanism, which are designed to help industrialized countries



(Annex I Parties) to reduce the costs of meeting their emissions targets by achieving or acquiring reductions more cheaply in other countries than at home.

- 1998 The National Environment Secretariat (NES), which was formed under the auspices of NEAP, is upgraded to a full ministerial status in recognition of the urgency of addressing Lesotho's critical environmental vulnerabilities.
- 1999 Lesotho publishes its first comprehensive state of the environment report which includes a chapter on climate and climate change.
- April 2000 Lesotho publishes its First National Communication to the Conference of the Parties to the UNFCCC, a document which describes national circumstances, details out an inventory of GHG emissions over Lesotho and the latter's vulnerability to climate change, and spells out mitigative and adaptation policies and measures.
- Feb. 2001 The Third Assessment Report of the IPCC finds close links between climate change and loss of biodiversity, desertification, deforestation and unsustainable use of forests, stratospheric ozone depletion, and other global environmental issues. The report paints a gloomier picture on the impacts of climate change than previous assessments.

## Greenhouse gases (GHGs)

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### Definition

Human activity is known to have disturbed the natural balance of gases in the atmosphere since the advent of the industrial revolution in the mid-18<sup>th</sup> century by releasing gases such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), Carbon monoxide (CO), nitrogen oxide (NO<sub>x</sub>), chlorofluorocarbons, water vapour, etc. These gases envelop the lower atmosphere, forming an insulation that traps the heat below a botanical greenhouse, hence the term *greenhouse gases* (GHGs).

Greenhouse gases are defined in the UNFCCC as those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation. The trapping of heat beneath these gases results in *global warming* which in turn, is responsible for climate change.

### Causes

The accumulation of GHGs in the atmosphere has resulted mainly from the reduction of greenhouse gas sinks, increases in the earth's albedo, increases in anthropogenic emissions, and the pollution of oceans.

*Reduction of greenhouse gas sinks* – The depletion of forests and other green vegetation reduces the amount of CO<sub>2</sub> that can be absorbed by plants, allowing more of this gas to build in the atmosphere, hence an increase in the greenhouse effect.

*Increase in the earth's albedo* – The reduction of vegetation cover also increase the earth's surface albedo or the capacity of the earth's surface to reflect radiation back to space. This increases the amount of terrestrial long-wave radiation which is trapped by greenhouse gases, leading to increased global warming.

*Anthropogenic emissions* – Many economic activities lead to direct emissions of GHGs to the atmosphere. These activities include fuel combustion, fugitive emissions from fuel storage, industrial processes, the use of solvents, agriculture (enteric fermentation from animals, manure management, cultivation, agricultural soils, burning of veld and crop residues), and waste handling and incineration.

*Pollution of oceans* – Oceans provide natural CO<sub>2</sub> sinks. However, increased pollution of oceans is reducing the storage capacity of

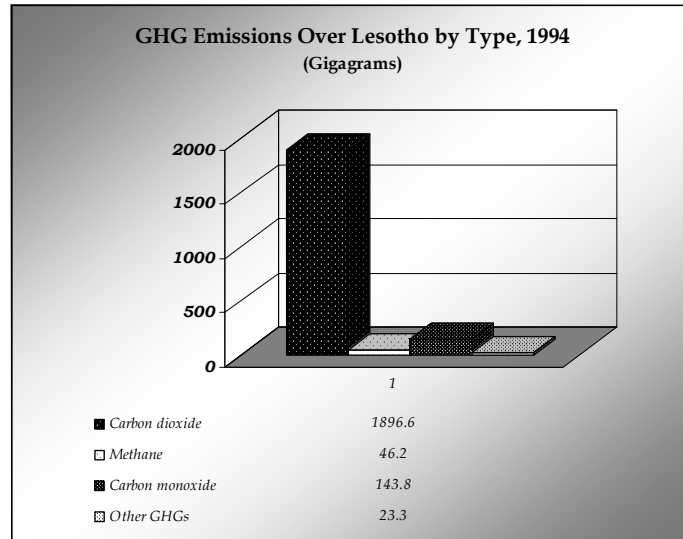
the oceans, causing increasing amounts of CO<sub>2</sub> to be released into the atmosphere.

### Targeted GHGs

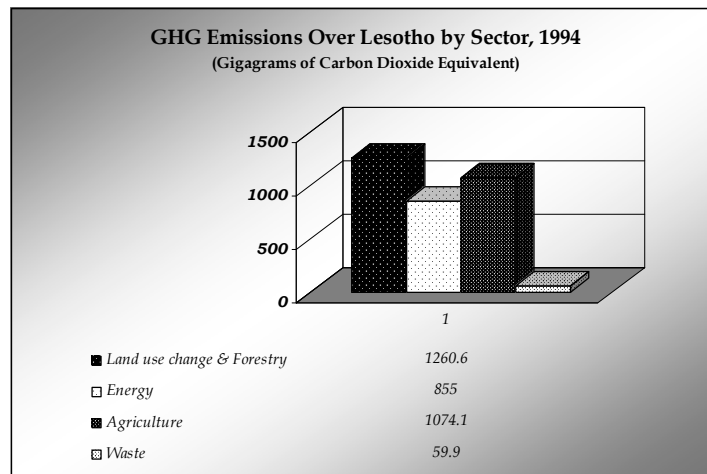
In its endeavour to reduce GHG emissions, particularly over industrialized countries (known as Annex I countries in the Convention), the Kyoto Protocol has targeted emissions of the following 6 main GHGs:

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs), and
- Sulphur hexafluoride (SF<sub>6</sub>)

**Figure 1**



**Figure 2**



Assessing emissions All signatories to the UNFCCC, including Lesotho have made commitments to develop and periodically update national inventories of GHG emissions by source, and removals by sinks, using comparable methodologies that are developed by the COP.

By far the largest amount of GHG emissions comes from the industrialised countries (Annex I countries), notably Germany, Japan, the Russian Federation, the United Kingdom, and the United States of America. For example, in 1990, Annex I countries accounted for 55% of total carbon dioxide emissions. These countries have a very high contribution to global warming, hence they have higher commitments under the Kyoto Protocol.

Lesotho Studies In 1997/98, Lesotho set up a national climate change study team (NCCST) that embarked on an assessment of GHG emissions over the country using various models and methodologies which were developed by the COP. This interdisciplinary team was made up of professionals from the National University of Lesotho (NUL) and from technical departments in Government. The studies were co-ordinated by the LMS and limited their analyses to four sectors: energy, agriculture, land use, land use change and forestry, and waste.

The NCCST report that was compiled in 1998 shows that in the four sectors that were considered in 1994, Lesotho registered 1896.6Gg of emissions of CO<sub>2</sub> (net), 143.8Gg of CO, 46.2Gg of CH<sub>4</sub>, and 23.3Gg of non-methane volatile organic compounds (figure 1). In terms of carbon dioxide equivalent or global warming potential, the four sectors had a 1994 gross emissions figure of 6288.7Gg. The sinks amounted to 3039.2Gg, giving net emissions of 3249.5CO<sub>2</sub> equivalent of emissions in these four sectors.

Figure 2 shows the contribution by 4 selected sectors to total GHG emissions over Lesotho in carbon dioxide equivalents or global warming potential units. It can be seen that in 1994, land use change accounted for 39% total emissions from these four sectors. Agriculture accounted for 33%, and energy for 26%. The least contribution came from waste, a mere 2%.

The Lesotho GHG inventory studies confirmed that small countries with low economic activity have a minimal contribution to global warming, hence the concentration of the Kyoto Protocol on commitments of Annex I countries. However, despite their low global warming potential, these weak countries are more vulnerable to the negative impacts of climate change. On the other hand, their low resource endowments also imply that they are not

likely to quickly adapt and take advantage of positive impacts that may come with climate change.

Approach

In an attempt to assess the extent to which Lesotho is vulnerable to climate change, the NCCST made a detailed review of the current climate, together with an analysis of the intricate relationship which exists between climate on one hand and agro-ecological and socio-economic conditions on the other.

The second stage of the analysis involved the development of a number of climate change scenarios in order to simulate, using general circulation models (GCM models) and professional judgements, likely changes in temperature and precipitation as a result of the doubling of CO<sub>2</sub> in the atmosphere. The potential impacts of these scenarios were then assessed across several socio-economic sectors that were considered likely to be critically vulnerable to climate change.

**Climatological Cond.** Lesotho's climate is classified as temperate continental, with characteristics which are quite favourable for many economic activities. However, the geographical location of the country on a plateau of the tapering Southern African sub-continent exposes Lesotho to significant influences of both the warm Indian Current from the Indian Ocean and the cold Benguela Current from the Atlantic Ocean.

Weather patterns which result from Lesotho's location combine to modify the usual conditions that are created by the annual movements of the inter-tropical convergence zone, introducing wide variability in both rainfall and temperatures. Climate change is therefore introducing another dimension to the unreliability of weather patterns in Lesotho. It is likely responsible for the increase in the frequency of both periodic droughts and crop failures that have been observed in recent years.

**Agro-ecological cond.** The most important agronomic factors are sunlight, water supply (the product of rainfall and evaporation), soil/terrain characteristics, and the climate regime. While sunlight is generally not a limiting factor, the other three factors, particularly climate variability, place severe limits on crop production and land productivity in Lesotho.

The choice of crop, cultivar, ecological region, and planting date need to be decided upon in the light of the above factors. However,

erratic climatic conditions, limited arable land, and fragile soils with a low water holding capacity have proven to be detrimental to crop production in Lesotho, with the result that agriculture has become an increasingly risky economic activity in recent years.

Socio-economic cond. Climate has been found to be intricately related to many indicators of poverty in Lesotho, particularly that both the incidence and depth of poverty are higher amongst rural and farming communities. About 85% of the households live in rural areas, and over 70% derive all or part of their livelihood on agriculture, implying that this sector is of critical importance in the determination of socio-economic conditions in the country.

However, Lesotho's limited arable area, together with a mountainous topography, variable climate, and severe soil erosion are constraining the agricultural sector to generate adequate levels of employment and incomes to support a rapidly increasing population. As a result, there has been an increase in both absolute and relative poverty over time. About 49% of the households are classified as poor, while 26% are classified as ultra-poor.

Lesotho in 2075

In the 1997/98 NCCT studies, GCM simulations of future (up to 2075) climate change scenarios for Lesotho were generated using historical data for the years 1961 to 1994. Most of the 6GCM models that were used in the simulations predict warmer future climatic conditions over Lesotho, lower precipitation, and a gradually increasing precipitation in autumn.

This possible shift in future weather patterns over Lesotho has serious implications for future agro-ecological and socio-economic conditions in the country as the growing season shifts forward and is, perhaps, shortened. An increase in precipitation in winter could result in heavier occurrences of snowfalls and strong devastating winds which often bring disasters and human suffering.

Crop Agriculture

In general, variables such as area under cultivation, production, and yields in staple food crops in Lesotho are very erratic and closely related to rainfall conditions. This is more so that the country is dominated by maize mono-crop which claims more than 60% of the area planted to staple food crops in any one year. The country is heavily dependent on food imports to satisfy local consumption.

According to GCM simulations for 2075, the general performance of all the staple food crops is likely to dramatically improve in relatively drier years, with a possibility of reducing imports.

However, this potential will only be realised if several intractable obstacles that currently face agriculture are removed, and if the country acquires resources to adapt to new production technologies that will include irrigation in order to minimise the adverse impacts of dry conditions.

#### The Rangelands

Lesotho is dominated by communal grazing systems that have largely been blamed for overgrazing which is currently estimated at 50%. The rangelands are presently classified as either in poor (25%) or in fair (75%) condition. Future predictions of reduced and delayed precipitation under climate change implies a possible loss of nutritious climax grass varieties, with serious consequences for livestock productivity in a sub-sector which contributes an average 55% to 65% of agricultural output in any one year.

#### Water Supply

GCM models predict a gloomy picture for the water sector. Lower precipitation under climate change is likely to result in a reduced surface and subsurface runoff, implying that at the current population growth rate and levels of service, stress levels in water supply could be reached earlier.

Lower runoff is likely to translate itself into an ecological disaster, and also lead to the closure of many water-based socio-economic activities, the drying up of springs and wells, lower water tables and higher borehole costs, reduced yields of many water sources, and severe water stress, particularly for rural communities who are mainly dependent on ground water for drinking and cooking.

#### The Forestry Sector

Although there is very low tree cover in Lesotho, indigenous trees and shrubs remain a major source of energy for rural communities. They are also an important source of construction materials, medicines, forage and shelter.

Future climatic conditions under climate change are projected to impact positively on afforestation programmes. They show potential for a widespread occurrence of subtropical dry and temperate moist forest cover, leading to improvements in biomass production in the country. The impact of these positive impacts of climate change could be felt throughout the economy provided the current constraints that face afforestation programmes are relaxed, and the necessary development programmes are implemented.

#### Soils

Although the majority of the population in Lesotho derive all or part of their livelihood from agriculture, the suitability of the country's soils are adversely affected by rugged topography, a highly variable pattern, animal and human pressure, the cultivation



of marginal lands, and poor management practices. These factors combine to expose the country to one of the most spectacular forms of soil erosion in the world.

Under climate change, GCM models predict future conditions that will have an incremental effect on the rate and magnitude of soil erosion in Lesotho. Higher temperatures, lower rainfall, frequent droughts, rainstorms, strong winds, etc are all likely to increase soil loss far above current levels, further weakening the capacity of the soils to support the country's agro-ecological and economic well-being.

#### Biodiversity

The mountain region of Lesotho is known to be having a rich biodiversity with very specific endemism. However, there has been a rapid loss of some of this biodiversity in recent years due to protracted droughts, siltation and drying up of many rivers and their sources, the disappearance of many wetlands, marshlands and sponges, soil wash and accelerated loss of soil fertility, the rapid spread of invader species, and reduced vegetation cover.

Since GCM models forecast warmer conditions over Lesotho in future, it is likely that the species diversity will improve either through natural migration or through improved adaptation of imported species. This is likely to be the case with those species which thrive in dryland areas, particularly herbal, floral and reptile species. However, unless changes are gradual and special efforts in conservation are made, climate change may not allow the current species genetic makeup to adapt to drier conditions, leading to extinction.

#### Health

So far Lesotho is free from many climate related diseases that are common in tropical areas. However, warmer future climatic conditions that are predicted by GCM models could lead to invasions by tropical diseases for which the country is ill-prepared. On the other hand, drier conditions and severe winters that are predicted by these models are likely to exacerbate the problem of respiratory tract infections, particularly in rural areas where energy resources are scarce.

#### Basotho Culture

Present climatic trends have severely dented some of the facets of Basotho culture which, like many rich cultures in the world, is intricately intertwined with biodiversity. The Basotho diet, medicine, architecture, sports, crafts and religion have all been affected by environmental degradation and loss of biodiversity.

Climate change scenarios that are predicted by GCM models seem to give hope for some cultural revival in Lesotho. Future improvements in biodiversity and biomass that are predicted by these models, if realized, could increase the availability of medicines, construction materials, fuelwood, and materials for crafts and religious practices.

## Conclusion

This chapter has shown how Lesotho is highly vulnerable to climate change. With an erratic climate, the country has been experiencing an increasing frequency of natural disasters in recent years. The fragile soil/terrain characteristics and difficulties in realising the full potential of agro-ecological conditions are responsible for growing levels of poverty which is estimated at close to 75% of the households, and at the relative deprivation of the mountain region which makes up 60% of the country.

To the extent that Lesotho is critically vulnerable to the adverse effects of climate change, it qualifies to be given special consideration under the UNFCCC (Articles 4.8 and 4.9) with regard to the funding of adaptation programmes and technological transfer.

## Chapter Five

### Lesotho's Interventions

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**Government Policies** Although Lesotho joined the international community in expressing concerns about the negative impacts of climate change by signing and ratifying UNFCCC and the Kyoto Protocol, there is yet no coordinated national policy to deal with the problem. However, there are a number of policies and measures in various sectors which are closely aligned with the objectives of the UNFCCC, and the country has become increasingly aware of its obligations under the Convention.

Lesotho has closely followed international guidelines and principles in drawing up policies on the environment, waste management, energy, land use, health and sanitation, water development, agricultural reform, etc. An analysis of these policies reveals that most of them are bound to assist the country to adapt to the impacts of climate change, while others promote, to a limited extent, the abatements of GHG emissions.

Despite the articulation of climate change related policies and measures in various sectors, Lesotho faces severe challenges in the implementation of these due to resource constraints. A number of initiatives have thus been introduced with massive injections of donor assistance.

Considering the country's status as a poor and critically vulnerable small country that is not only landlocked but has a fragile ecosystem that is very prone to natural disasters, it is clear that Lesotho's ability to implement climate change policies and strategies will continue to depend on the support the country gets from Annex I countries.

There is a general recognition that Lesotho's vulnerability to climate change largely emanates from the wide prevalence of poverty in the country. Poverty alleviation has been adopted as an important national objective in national plans. A number of programmes have also been designed for poverty alleviation in the form of social funds, special employment schemes, and restoration and resettlement schemes for people who have been affected by development activities. The country has also improved its disaster management strategy.

**Mitigation Policies** Lesotho's experience with the mitigation of GHG emissions has been limited not only by financial and technological constraints, but because the country, being a poor underdeveloped nation, is a

marginal contributor to total global GHG emissions. Most of the mitigative measures have therefore emerged as by products of other policy objectives.

For example, the need to meet energy needs of rural communities and to contain soil erosion resulted in the formulation of projects and programmes to promote renewable sources of energy, to promote energy efficient domestic devices, to encourage some energy switch to cleaner sources, and to embark on afforestation and reforestation programmes. Those interventions which are in the energy sector assist in the reduction of GHG emissions, while those which are in the forestry sector effect improvements in CO<sub>2</sub> abatements by expanding sinks. As a result, there is now an intention to introduce effective control over biomass fuel consumption.

The mitigative strategies which are now targeted for future interventions involve placing a ban on the importation of coal and applying strict controls on the emission pollutants from the transport sector, including encouraging the consumption of unleaded fuels. However, a lot of groundwork still needs to be done in this direction.

**Adaptation Policies** A number of programmes that are designed to reduce human suffering in Lesotho have been found to be very appropriate as measures to assist the country to adapt to the impacts of climate change. These measures are found in several sectors of the economy including agriculture, water and sanitation, health, and land use and forestry.

However, Lesotho's national aspirations in this direction are severely limited by resource constraints and the weak institutional framework. The success and sustainability of many measures is therefore largely dependent on the availability of donor funding.

**Agriculture** In response to persistent droughts that have hit the country in recent years, Lesotho's Agricultural Research Department has been developing drought resistant crops and cultivars although adoption by farmers remains a formidable problem. Amongst other strategies of improving adaptation in agriculture has been the promotion of crop diversification, irrigation, soil liming, and crop intensification, including mixed and double cropping, and intensive livestock rearing. If implemented, these strategies will go a long way to counteract the potential for climate change to adversely affect the performance of the agricultural sector in future.

Water and Sanitation Following the International Drinking Water and Sanitation Decade (1980 – 1990), Lesotho adopted a long-term action plan for the provision of sustainable safe water supply and sanitary disposal of waste throughout the country. The plan involves the development of a national drought policy, rationalization and development of sectoral institutions, review of existing and proposed water resources and projects, and the development and implementation of legislation for regulating water use and pollution. Substantial progress has already been made in most of these policy areas.

In an attempt to increase the coverage of rural communities with access to improved water supplies, mainly through the construction of gravity-fed systems and hand pumps, the government is intensifying efforts at institutional rationalization, and improving the operation and maintenance of existing water supply systems. In urban water supplies, actions have centred on institutional rationalization and human resources development, improvements in financial management, pollution control, and improvements in technical operations.

Substantial proportions of rural communities in Lesotho, particularly in the mountain region, still have no access to toilet facilities. In order to meet its health objectives, the government is expanding coverage through the Rural Sanitation Project which supplies latrine components at subsidized prices, offers sanitation education to village communities, and trains local latrine builders who offer their services to local communities at low cost.

## Health

In the 20 years since the adoption of primary health care (PHC) as a strategy for health services provision, Lesotho has made impressive gains in the improvement of health status of her people. Most notable is the development of Public health programmes, including HIV/AIDS Prevention and Control. Substantial achievements have been recorded in the areas of nutrition, maternal health, and general access to health services. Basic and essential health care is now available to many remotely placed rural areas through the introduction of a network of nurse clinicians and close to 6,000 community health workers.

The above are some of the major problems that confront the Lesotho health sector in the face of possible future challenges, the government has embarked on bold sectoral policy and institutional reforms that include a clear definition of a district health package, improvements in financial management, human resources development, further decentralization of health

services, restructuring of pharmaceuticals, improvements in the coordination of donor efforts, and the development of health infrastructure, including that which is owned by the Christian Health Association of Lesotho.

Land use and Forestry As was shown in the previous chapter, Lesotho has severe environmental problems that emanate from the escalating negative impacts of increased exploitation of natural resources. These manifest themselves in various forms of land uses; maintenance of large numbers of livestock, over-harvesting for firewood, expansion of human settlements into agricultural lands and the latter into rangelands, etc.

The above activities have been blamed for the severe loss of vegetation cover, leading to increased runoff, soil erosion, land degradation, loss of biodiversity, and low agricultural production and productivity. It is the result of these conditions which led Lesotho to adopt a National Environmental Action Plan in 1989. This plan emphasises the use and conservation of the environment and natural resources for the benefit of both the present and future generations, conservation of Lesotho's biodiversity, and preservation of the cultural heritage.

The above principles were entrenched into Lesotho's constitution in 1993. They also formed the framework for Lesotho's environmental policy which was developed into a draft legislation for a debate by stakeholders in 1997. The government is now examining the possibility of formulating and implementing land use plans that will promote the efficient utilization of land resources, and of implementing far-reaching land reforms.

Efforts are also underway to operationalize the National Livestock Policy Implementation Plan of 1990, rationalizing settlement structures, expanding afforestation and land rehabilitation programmes, and zoning some areas for the conservation of natural resources.

Conclusion Although Lesotho does not currently have a consolidated policy of responding to challenges that are posed by climate change, there are a number of sectoral development policies and measures that go a long way to assist the country to meet its obligations under the UNFCCC. These sectoral initiatives are integral parts of the national development strategy.

What is clear from current initiatives is that Lesotho, being one of the most critically vulnerable developing countries, does not on its own have the resources and capacity to either take full advantage of new opportunities and potential that may come with climate change, or totally avert the human suffering that may result from the adverse impacts of the same.

## Chapter Six

# Our Future Options

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### The Problem

Since future climate change scenarios that were created using GCM models predict possibilities of human deprivation of unprecedented proportions throughout the whole world, there is a need for every country to adopt and implement effective interventions that will reduce this vulnerability, hence the continuation of negotiations for effective international conventions.

Although Lesotho is a very active member of the community of nations that are very concerned about the possible adverse impacts of climate change, and despite the signing and ratification of international conventions, the subject has not yet drawn sufficient national attention to influence both political decisions and resource allocation. This is because there are constraints facing the country, the most serious being budgetary limitations, institutional and cultural rigidities, and technological limitations.

In order for Lesotho to take her position amongst the community of nations and meet her obligations under the UNFCCC, therefore, the country will have to count on the continued support of the international community. Future actions will, however, put more emphasis on the formulation and implementation of adaptation strategies in order to tap future potential of positive impacts and minimise the vulnerability to adverse impacts of climate change.

### The national agenda

Lesotho does not as yet have a consolidated national adaptation programme of action (NAPA) on climate change. Some of the adaptation measures which could form part of such a plan are found scattered in various sections of the national development plans (NDPs). A number of programmes and projects which are either on-going or in the pipeline could form part of NAPA.

For Lesotho to make periodic qualitative assessments of progress towards the formulation and implementation of strategies aimed at adapting to climate change, as required under the UNFCCC, it will be necessary to define the national agenda on climate change, which agenda will eventually be consolidated into NAPA.

### NAPA

The national adaptation programme of action (NAPA) on climate change represents the culmination of a process of multi-level



consultations on the most effective and affordable adaptation options that need to be adopted and implemented in Lesotho with the main objective to realise sustainable human development even under conditions of climate change.

This process essentially requires an isolation and review of those strategies and options which are already contained in sectoral and national plans in terms of relevance and effectiveness, and the formulation of additional adaptation options in those areas where the country is deemed most vulnerable.

This process of consultation will involve awareness campaigns and the mobilization of policy level institutions, rural communities, community-based organizations, non-governmental organizations, donor organizations, and the private sector in order to give the adaptation strategies a national character. Since climate is a major input in the formulation of adaptation options, the focal point for climate change, the Lesotho Meteorological Services, is the coordinator of the NAPA process.

#### Sectoral inputs

The development of NAPA represents a multi-sectoral approach to a common problem even if climate change will exert varying impacts on each of the economy's sectors. The multi-sectoral approach will ensure that solutions in one sector do not pose headaches on other sectors. It will also ensure that a prioritization of adaptation options and enable a rationalization of the allocation of scarce resources. At the conclusion of the NAPA process, the resultant people-oriented and implementable adaptation programmes should be integrated into both sectoral and national plans.

#### The time frame

The NAPA process has been given a time frame of 6 to 8 months (table 1). December will see the activation of the climate change coordinating committee and study groups. This will be followed by awareness campaigns to prepare district level institutions and communities to fully participate in the formulation and implementation of NAPA.

After a review of vulnerability assessment in January, the next step will be to review current measures and to identify barriers to the implementation of adaptation programmes during the period February to April before the formulation of new adaptation options in the period May to June. The consolidation of NAPA will take place during the period July to August.

Table 1 Time Frame for the NAPA Process

<b>Period</b>	<b>Planned Activities</b>
December	Activation of the climate change co-ordinating committee and study groups
January – April	Institution of district-level and national awareness campaigns with the objective to broaden participation in the formulation and implementation of NAPA
January	Review of vulnerability assessment
February – April	Review of current adaptation measures and identification of barriers that limit the implementation of adaptation policies and programmes
May – June	Formulation of new adaptation options, including policies, programmes and capacity-building measures
July - August	Development of a consolidated National Adaptation Programme of Action

Financial Mechanism Adaptation to climate change will be a costly exercise. Many activities will be beyond the scope of national resources of many developing countries. These limitations have been noted by the Parties to the Convention, hence there is a provision in the UNFCCC for developed countries to finance the additional costs to developing countries of adaptation options and technological transfer through bilateral, regional, or multilateral channels.

The UNFCCC has established a financing mechanism to provide grants or concessional funds to help developing countries to implement their obligations under the Convention. The Global Environment Facility which was established by the World Bank, UNDP and UNEP in 1990 was assigned the role of operating this financial mechanism. The policy guidelines that are used in the operation of the latter are provided by the Conference of the Parties.

The Kyoto Protocol has made an additional provision where developed countries can meet their emission reduction targets/ obligations by financing emission reduction projects in those developing countries that are particularly vulnerable to the adverse

effects of climate change. These “clean development” projects, as they are popularly known, assist developing countries in their efforts to adapt to climate change. However, they require some independent certification of emissions reduction. The mechanism clearly promotes cooperation between developed and developing countries in the implementation of climate change projects.