



Greenhouse House Gas Inventories (GHG)

1. Development of GHG constitutes an important component of Communication process. In the Initial Communication, the GHG studies were conducted by a multidisciplinary National Climate Change Study Team on GHG Inventories comprising of local experts from Bureau of Statistics, Ministry of Agriculture, Department of Forestry, Department of Land Conservation, Department of Energy, Lesotho National Development Corporation, Water and Sewerage Authority, Department of Livestock and Rangelands and the National University of Lesotho. The Team applied the IPCC – OECD standard methodologies and adopted 1994 as a baseline year. The studies examined GHG emissions for the four sectors namely Energy, Agriculture, Waste and Forestry and Land Use Change. Emissions results indicated that land use change and forestry accounted for a major share of the total country's emissions, followed by agriculture and energy sectors. The outcome of the studies is a testimony that the country is one of the least forested countries with extensive environment degradation and hence has minimal sink potential. The GHG's considered in the study were carbon dioxide CO₂, methane CH₄, nitrous oxide N₂O, nitrogen oxide NO_x, carbon monoxide CO and non methane volatile organic compounds NMVOCs.

Proposed Activities

2. In accordance with decision 17/CP.8, the project will undertake the following activities:
- i) Institute measures to strengthen capacity of the GHG inventory team – particularly in the application of the IPCC methodology. Train sectoral experts of the National Climate Change Study team on scientific and technical activities of the GHG inventories.
 - ii) Develop formats and standards for data presentation
 - iii) Follow revised 1996 IPCC guidelines, complemented by IPCC good practice guidance and uncertainty management in national GHG inventories, and acquire inventories software for calculating and estimating emissions.
 - iv) Indicate level of uncertainty of GHG data and assumptions.
 - v) Document procedures adopted for national projections.
 - vi) Updated data to 1994 – 2000, this will require use of GIS and satellite information.
 - vii) National emission factors will be derived.
 - viii) Indicate level of uncertainty of GHG data and assumptions.
 - ix) A database for GHG will be developed. Assessment activities will cover GHG not presented in the Initial Communication which includes HFCs, PFCs, SF₆.
 - x) National workshops will be conducted to allow participation of all relevant stakeholders.

Outputs and Indicators

3. The major outputs and indicators of this component will be:
 - i) Established Technical Working Task Forces.
 - ii) GHG Inventory for 2000 for the following GHGs: CO₂, CH₄, N₂O, NO_x, CO, NMVOCs, PFCs, HFCs, SO₂, SF₆
 - iii) Strengthened Capacity building for Task Force Team on GHG Inventories.
 - iv) Development of national emission factors.
 - v) Workshop reports.
 - vi) Comprehensive GHG Report for 2000.

Vulnerability and Adaptation Assessment

4. Under the first communication Lesotho conducted comprehensive climate change vulnerability assessment covering the following sectors: Water Resources, Agriculture, Forestry, Rangelands, Health, Soils, Biodiversity and Culture.
5. The V&A Team was formed made up of sector experts from Department of Forestry, Department of Livestock and Rangelands, Department of Land Use Planning, Department of Crops, Department of Water Affairs, Ministry of Health, NUL. The V&A used baseline data for the years up to 1990. Climate change scenarios were developed for the years 2030, 2050 and 2075, using MAGGIC and SCENGEN models.
6. Various climate change impact assessment models were simulated for the various sectors as indicated below:
 - Water Resources – CLIRUN
 - Agriculture - DSSAT 3.0
 - Forestry – Forest Gap Model and Holdridge Life Classification Zone
 - Rangelands - SPUR
 - For Health, Biodiversity, Culture and Soils expert judgment was applied.
7. Integrated climate change impact assessment matrix for Lesotho was developed.

Proposed Activities

8. Building on the work already done under the INC, the following activities will be carried out:
 - i) The V&A Team will be reconstituted and capacity building provided to individual sector experts.
 - ii) Updated versions of impact assessment models will be acquired and training on their use will be conducted.
 - iii) Database for Input baseline data for the years up to 2000 will be developed.
 - iv) Develop climate change scenarios for Lesotho.
 - v) Conduct vulnerability and risk assessment for the following sectors; Water Resources, Livelihoods and Poverty, Agriculture and Food Security, Health, HIV and Aids, Energy, Rangelands and Livestock, Forestry, Biodiversity, Politics and Conflicts, Demography and Economy.
 - vi) Identification and mapping of vulnerable communities and groups.
 - vii) Conduct integrated vulnerability assessment.
 - viii) Downscaling of impacts assessment to simulate impacts at local level.
 - ix) Update climate change scenarios for 2030, 2050 and 2075, and include medium term scenarios up to 2015 and 2020 to evaluate impact of climate

change on the achievement of Millennium Development Goals and Vision 2020, national development aspirations.

9. The following activities will be undertaken by the Technical Working Group on Vulnerability and Adaptation Assessment:

- i) Update National Adaptation strategies.
- ii) Evaluate, prioritise and cost adaptation options, strategies and measures.
- iii) Development of strategies to integrate the NAPA with other national development plans such as Poverty Reduction Strategy and Environmental Sustainability as contained in Vision 2020 and Millennium Development Goals.
- iv) Incorporate adaptation assessment work into national development planning activities

Outputs and Indicators

10. Major outputs and indicators of this proposed activity will be:

- i) Strengthened human, scientific and technical capacity to undertake vulnerability and adaptation assessment
- ii) An established V&A Team
- iii) Climate change vulnerability assessment on Water Resources, Livelihoods and Poverty, Agriculture and Food Security, Health, HIV and Aids, Energy, Rangelands and Livestock, Forestry, Biodiversity, Politics and Conflicts, Demography and Economy.
- iv) National Adaptation Policy Framework /Strategy and Action Plan on Climate Change. This will include review of those analyses of measures and technologies for minimizing negative impacts of climate change.
- v) Revised NAPA and formulation of implementation strategy to address the country immediate and urgent adaptation needs.
- vi) Integrated and Downscaled impact Assessment.
- vii) Minimized impacts of climate change on livelihoods.
- viii) Increased awareness of risks imposed by climate change and variability.
- ix) Finalized comprehensive V&A Report
- x) Least Cost Adaptation options and adaptation technologies
- xi) Workshop Reports

Climate Change Mitigation

11. In the first communication, climate change mitigation programmes were primarily formulated for two sectors – Energy and Forestry and Land Use Change sectors – these sectors account for a major part of the GHG emissions.

12. Lesotho's initial communication placed more emphasis on adaptation due to the country's high vulnerability to climate change. From the stocktaking exercise it was noted that since the first national communication manufacturing industrial activities and vehicle traffic significantly increased, especially in the urban areas.

13. To reduce dependency on diminishing fuel wood energy sources, the country's Energy master Plan recommends a need for a shift from fuel wood, shrubs and crop

residues energy sources into commercial and renewable energy sources. The Government has embarked on rural electrification programmes following the establishment of Lesotho Electricity Authority (LEA) in 2006.

14. Mitigation options in energy and forestry sectors were formulated in a manner that conforms to sustainable development. These included promotion of use of renewable energies. Due to her immense water resources, Lesotho is estimated have about 450 megawatts of hydro power potential. However, only about 16 percent of this potential is exploited at the 'Muela Hydro Power Station.

Proposed activities

15. For the second communication the following mitigation assessment activities are proposed:

- i) Assessment of mitigation options appropriate to the local context. This will require technical information on methodologies and tools related to information technology applications. Models such as LEAP, ENPEP and MARKAL will be applied to undertake mitigation assessment. Effort will be made to explore application of available methodologies and resource material such as Technologies, Policy and Measures for Mitigation Climate Change IPCC Technical Paper I, Green House Gas Mitigation Assessment: A Guide Book by the US Country Study Programme and Climate Change 2001. Mitigation (Working Group III Contribution to Third Assessment Report of IPCC).
- ii) Capacity building for National Study Team on Mitigation to enable acquisition of required skills and technologies needed for undertaking mitigation assessment. Capacity on the use of appropriate technologies, methodologies and tools for the assessment of mitigation options and development of mitigation scenarios particularly in land use change and forestry and energy sectors.
- iii) A national Mitigation Plan will be developed. The Plan will highlight barriers for adopting cleaner technologies, as well as for promoting cleaner production and consumption. Mitigation projects will be identified for bilateral and multilateral funding. Mechanisms will be explored to promote participation of private sector and consumer organizations in mitigation measures through the public private sector participation.
- iv) National Workshops will be held attracting relevant stakeholders and policy makers to promote the identified mitigation options.

Outputs and Indicators

The major outputs of this proposed activity will be:

- i) An established Task Force on Mitigation.
- ii) Strengthened human, scientific, and technical and institutional capacity for mitigation assessment.
- iii) Workshop Reports on Mitigation Options.
- iv) Increased awareness and use of appropriate technology especially in the energy and land use sectors.
- v) National Mitigation Plan.

- vi) A comprehensive Mitigation Report.
- vii) A User Manual Hand Book on Mitigation Options for Practitioners.

OTHER RELEVANT INFORMATION (CROSS-CUTTING ISSUES)

TECHNOLOGY TRANSFER

16. The national policies on technology development in Lesotho have largely remained fragmented in terms of sectoral needs, with each participating government and private sector agencies having their own isolated policies. This was due to the fact that, until recently, there was no institutional focal point that could formulate a consolidated policy. It was not until 1994 that the Department of Science and Technology was established under the Ministry of Natural Resources, with one of the main responsibilities being to formulate and implement national policies and programmes that promote the development of Science and technology, and create an enabling environment in which technological development can make a meaningful contribution to national development.

17. Lesotho recognises that science and technology is one of the key building blocks of an economy in the current global economic order and in the foreseeable future. In 2002, Lesotho through financial assistance from GEF, implemented a project on technology needs assessment with priorities on land use and energy technologies. The country, under its second communication, will review and design mechanisms for acquisition of the required technologies.

Proposed Activities

18. The following activities are proposed for the SNC.
- i) Establishment of technology transfer task force with significant involvement of the private sector
 - ii) Identification and selection of appropriate technologies needs
 - iii) Integrate climate change issues into science and technology policies
 - iv) Develop strategies for technology acquisition
 - v) Integrate technology information into local website
 - vi) Provide and submit information on Lesotho's prioritised technology needs.
 - vii) Networking through information sharing and exchange with collaborating international agencies and institutions.

Outputs and Indicators

21. The outputs and indicators of this proposed activity will be:
- i) Enhanced capacity of Technology Transfer Task Force
 - ii) Efficient technology networking system
 - iii) Increased access to technologies by relevant stakeholders
 - iv) Viable energy and land use technological practices

RESEARCH AND SYSTEMATIC OBSERVATION

The commitment to promote research and capacities for participation in Global Climate Observing System (GCOS) is entrenched under Article 5 (c) that underscores a need to “take into account the particular concerns and needs of developing countries and cooperate in improving their indigenous capacities and capabilities” for research and participation GCOS.

22. Due to the country’s mainly rugged mountainous terrain development of efficient station observation network still remains a challenge in Lesotho. As a result the countries reporting into GCOS remains inconsistent leaving a grey data lack area over the country.

23. The scope of Initial Communication entailed conducting an in-depth review of the national climate and hydrometric station network in the country. Assessment was undertaken to review network distribution, data management, dissemination systems as well as status of equipment and installations. A number of constraints affecting the countries capacities were highlighted. These include absolute and unserviceable observation equipment, low technicians capacities, poor communication facilities, remoteness of the stations and inaccessibility by road transport. The review proposed a number of remedial actions in a form of an action plan to address the situation. It recommended among others, the need for improvement of quality of hydrometric and climate data, including communication links, infrastructure and equipment upgrades.

24. An assessment of the national research capacity in the first communication shows that, other than in the agricultural sector, there was a very little systematic research. In the SNC Lesotho intends to draw up a Plan of Action on the needs of the country to address the required capacities. The country will seek assistance from collaborating partners such as WMO and GEF for the implementation of the Plan.

Proposed Activities

25. The following activities are proposed:

- i) Analyse the existing barriers fro development of observation systems and research.
- ii) Assess existing systems for early warning on extreme events including disaster management, preparedness and response.
- iii) Develop national information on research and observations.
- iv) Carry out an assessment of capacity building activities for efficient climate monitoring.
- v) Promote collaboration and linkage between local research institutions with their regional and international counterparts.
- vi) Collect, synthesize and provide information on research and systematic observation systems.
- vii) Prepare Climate Change Research and Systematic Observations in accordance with UNFCCC guidelines.
- viii) Incorporate comments from stakeholders on Climate Research and Systematic Observations.
- ix) Conduct workshops and training seminars for weather and hydrological observers.

Outputs and Indicators

26. Major outputs and indicators of this activity will be:
- i) A detailed chapter on Research and Systematic Observations.
 - ii) National Action Plan and Report on Research and Systematic Observations.
 - iii) Strengthened human and institutional capacity.
 - iv) Improved networking between local research institutions and their regional and international counterparts.
 - v) Improved climate and hydrometric station network.
 - vi) Improved participation in GCOS activities.

EDUCATION, TRAINING AND PUBLIC AWARENESS

27. In the implementation of Agenda 21 education and training have a major role to play in promoting knowledge on environmental issues, particularly climate change. As a developing country Lesotho recognises the role of education and training in enhancing capacity in dealing with issues related to climate change. This is evident in national environmental policies. However, since the first national communication, little has been achieved in incorporating climate change into formal and non-formal education programmes. With the advent of international education for sustainable development (ESD), addressing climate change issues in education and training is more relevant than ever before.

Proposed Activities

28. During the stocktaking exercise, it was agreed that for the preparation second communication the following activities will be undertaken:

- i) Integration of climate change into formal and non formal curricular at all levels of education and training through a participatory approach involving all stakeholders (National Curriculum Development Centre, Lesotho Association of Non formal Education, teacher training institutions and outreach divisions). This integration will be informed by a comprehensive curriculum audit.
- ii) Promotion of collaboration between local and international training institutions on the subject of climate change through networking and exchange programmes
- iii) Preparing public awareness materials on climate change. These will include pamphlets, posters, brochures, monthly newsletters, press release and radio programmes. These will be disseminated through mass media (radio, TV, news papers, internet etc), district councils, public gatherings and local libraries. The general public, including students will also be encouraged to compose songs and poems on climate change. The information provided by the IPCC, UNEP & IUC and UNFCCC Secretariat through web pages will be used to enhance information, particularly for outreach programmes. This activity will take advantage of the existing structures in Lesotho for education, training and public awareness initiatives, more especially on environmental awareness.
- iv) Establishment of local website on climate change. There will be a dedicated ITC officer, who will be assigned to manage the website. This

website will promote information dissemination, and sharing of experiences and lessons learned among professionals and members of the entire community.

- v) Development of education and public awareness programmes, which will include roving seminars and public gatherings across the ten districts of the country to convey and disseminate information on climate change, targeting mainly parliamentarians, the vulnerable rural communities and local councillors and local chiefs.

Outputs and Indicators

- 29. The second national communication will report on the following outputs:
 - i) National capacity building on climate change issues. This will enable the country to have local experts that will take part in the various programmes and activities on climate change for sustained future communications and participation in related international programmes such as IPCC and to serve in the roster of experts manned by UNFCCC Secretariat.
 - ii) Revised education and training curriculum sensitive to climate change issues
 - iii) Public awareness materials in Sesotho and English
 - iv) Established national climate change website, which will promote access and use of information technology (Internet).
 - v) Workshop and seminar reports
 - vi) Sensitised political commitment and will at national level

CAPACITY BUILDING

The process of the preparation of the INC has highlighted limited human, scientific, technical, technological, organizational, and institutional and resources capabilities in Lesotho for fulfilling its commitments, including the reporting requirements. Based on the results of a survey, special capacity building needs have been identified in the INC, TNA, NAPA and other climate change projects.

30. This component will aim to address the specific needs that have been identified in the INC and other relevant climate change projects, taking into consideration of decision 2/CP.7. Building on the work already done under the INC, and the following activities will be carried out:

- (i) Identification of the specific needs, options and priorities for capacity-building such as those identified in the INC and phase II enabling activity projects, and the national capacity self-assessment,
- (ii) Promotion and level of involvement of a wide range of stakeholders (governments, national and international organizations, civil society),
- (iii) Status of activities relating to the coordination and sustainability of capacity-building activities,
- (iv) Dissemination and sharing of information on capacity-building activities,
- (v) Capacity-building activities aimed at integrating adaptation to climate change into medium- and long-term planning,
- (vi) Promotion of synergy in the implementation of the UNFCCC, CBD and UNCCD.

31. Every effort will be made to address some of the priority areas relating to the preparation of national communication (GHG inventory, V&A assessment, technology transfer, mitigation, research and systematic observation) as identified in the initial scope of the capacity building framework of the UNFCCC.

Outputs and Indicators

32. The major outputs and indicators of this component will be strengthened human, scientific, technical and institutional capacity at all levels on major aspects relating to climate change.

ENVIRONMENTAL POLICY AND LEGISLATION

33. 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 regulations etc.

34. The following are key milestones in the country's effort to address developmental issues related climate change:

- *June 1989:* Lesotho publishes its first national environmental act plan (NEAP) a document which lays the framework for the conservation and sustainable utilization of natural resources.
- *June 1992:* Lesotho, along with 155 other countries, signs and becomes one of the parties to the UNFCCC at the Earth Summit in Rio de Janeiro. Lesotho takes part in the annual meetings of the Conference of Parties (COP) to review progress in the implementation of the convention and devise new strategies to deal with climate change.
- *March 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 compilation of an inventory of 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 for CO₂.
- *1997:* The first comprehensive draft environment legislation in Lesotho is completed for debate by stakeholders.
- *1997:* Lesotho Disaster Management Authority (DMA) is established by Act of Parliament. Climate related disasters have increased in occurrence in recent years.
- *1997:* The National Livestock Policy is concluded. Livestock numbers and extensive and uncontrolled grazing systems have been blamed for a large part of Lesotho's environmental degradation.
- *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 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 of 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 mitigation and adaptation policies and measures.

35. The environment act adopted in 2001 is rather skewed on issues of climate change. Therefore, Lesotho is in the process of establishing environmental standards to regulate environmental pollution. Currently the act provides for a developer to conduct an environmental impact assessment (EIA). The second national communication will facilitate the process of formulating climate change regulations under the environment act.

CONSTRAINTS/ GAPS, AND RELATED FINANCIAL, TECHNIAL AND CAPACITY NEEDS

36. In the INC constraints and gaps encountered were not synthesized. Issues relating to constraints and gaps were discussed during the GEF Review mission in the country and were also considered by the National Stocktaking exercise. During the preparation of the INC the concept of climate change was still new for the participating stakeholders and hence this put a lot constraints at both technical and coordination levels. In the preparation of the INC constraints were centred mainly on the low human and technical capacity and low budgetary provisions.

37. During the preparation of SNC, new constraints and gaps relating to financial, technical and capacity needs will be encountered. Particular attention will be paid to identify gaps and needs relating to implementation of climate change enabling activities, the NAPA process and adopt stocktaking exercise as a permanent feature of the enabling process. Mechanisms would also be drawn to address the identified constraints. Efforts will be made to empower Technical Task Forces and the Implementing Agency to tackle emerging constraints in a timely manner in order for the project to run smoothly. It is noted that the different constraints and gaps need varied time to address. Some low challenging constraints would be addressed immediately while those that are more challenging can only be addressed on a longer time scale and would need capacities.

Proposed Activities

38. Based on the previous activities, the following activities are proposed:

- i) Promotion and level of involvement of a wide range of stakeholders.
- ii) Dissemination and sharing of information on capacity building activities.
- iii) Review constraints and gaps (Financial, technical, institutional, methodological, and capacity) identify from the previous climate change

studies with a view of ensuring that future National Communications are of a better quality and they can also be prepared in on a continuous basis.

- iv) Compile and analyse information on financial resources and technical support provided by GEF, Annex II Parties, bilateral and multilateral institutions for activities related to climate change.

Outputs and Indicators

39. The major outcomes and indicators of this proposed activity will be:

- i) Strengthened human, scientific, technical and institutional capacity at all levels on aspects related to climate change.
- ii) Report on status of constraints and gaps including new emerging constraints.

