



Republic of Zambia



United Nations Development Programme

ENABLING ACTIVITIES FOR THE PREPARATION OF ZAMBIA'S SECOND NATIONAL COMMUNICATION TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC) PROJECT

Brief Description

The project will enable Zambia to prepare its Second National Communication (SNC) to the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC). The proposed activities of the SNC will build upon what was achieved under the Initial National Communication (INC), on-going activities on National Adaptation Plan of Action process and on lessons learnt that form best practices for the preparation of the SNC. The major activities for this project are: (i) inventory of greenhouse gas (GHG) Emissions, (ii) assessment of potential impacts of climate change on the most vulnerable sectors, (iii) analysis of potential measures to abate increase of greenhouse gas (GHG), (iv) Conducting a technology needs assessments) and (v) capacity development for reporting on climate change. Further the project will enhance the national capacities and raise awareness on climate change issues. It will also contribute to putting climate change issues higher on the national agenda through strengthened cooperation and coordination of activities addressing

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Abbreviations and Acronyms

a.s.l	Above Sea Level
AIJ	Activities Implemented Jointly
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CCC	Convention on Climate Change
CCD	Convention to Combat Desertification
CDM	Clean Development Mechanisms
CEEZ	Center for Energy, Environment and Engineering of Zambia
COP	Committee of Parties
DANIDA	Danish International Development Agency
DAF	Development Assistance Framework
DNA	Designated National Authority
ECZ	Environmental Council of Zambia
ENRMD	Environment Department
ESP	Environmental Support Programme
FDI	Foreign Direct Investment
FINNIDA	Finish International Development Aid
FNDP	Fifth National Development Plan
GCM	General Circulation Models
GDP	Gross Domestic Product
GEF	Global Environmental Facility
Gg	Giga ¹ -grams
GHG	Greenhouse Gas
Gg	Giga-gram
GIS	Geographic Information System
GTZ	German Agency for Technical Co-operation
GWh	Giga-watt hour
HFCs	Hydrofluorocarbons
HIPC	Heavily Indented Poor Countries
INC	Initial National Communication
IPCC	Inter-Governmental Panel on Climate Change
JI	Joint Implementation
JICA	Japanese International Cooperation Agency
kWp	Killo-watt peak
MDG	Millennium Development Goal
MTENR	Ministry of Tourism Environment and Natural Resources
MW	Mega-watt
NAP	National Action Plan for Combating Drought and Desertification
NAPA	National Adaptation Programme of Action
NCSA	National Capacity Self-Assessment
NCCSC	National Climate Change Steering Committee
NCTWG	National Communications Technical Group
NGO	Non-Governmental Organization
NSC	National Steering Committee
NST	National Study Teams
NCWP	National Communications Technical Working Group
NORAD	Norwegian Agency for International Development
NPE	National Policy on Environment
QA	Quality Assurance
QC	Quality Control
SADC	Southern Africa Development Community

¹ Giga stands for 10⁹

SAP	Structural Adjustment Programme
SEED	Support for Economic Expansion and Diversification
SD	Sustainable Development
SF ₆	Sulfur Hexafluoride
SNC	Second National Communication
UNDP	United Nations Development Programme
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention for Climate Change
UNIDO	United Nations Industrial Development Organization
URC	UNEP Riso Center
US\$	United States Dollar
USAID	United States Aid for International Development
USCSP	United States Country Support Programme
V & A	Vulnerability and Adaptation
WB	World Bank
ZAWA	Zambia Wildlife Authority
ZCCM	Zambia Consolidated Copper Mines
ZCCM-IH	ZCCM-Investment Holding

1. Elaboration of narrative

1.1 Situation analysis

One of the critical challenges that Zambia faces is environmental degradation through loss of biodiversity, soil erosion, air and water pollution and poor disposal of solid waste including hazardous waste and industrial discharges. Although natural resources play a major role in most of Zambians' livelihoods, their management has been less than adequate at all levels, from the central government to the communities.

In addition, climate change has become a reality and its adverse impact on natural resources is contributing to environmental degradation. Such degradation and depletion contribute significantly to the low productivity of the primary sectors like agriculture, fisheries, wildlife and tourism, thereby also contributing to Zambia's prevailing extreme poverty which affects more than 68%² of the population. Moreover, as they become more impoverished, poor communities tend to adopt less sustainable practices of production and harvesting from the already declining natural biomass thereby contributing to its further degradation. This creates a vicious spiral where both poverty and resource degradation increase as they mutually re-enforce each other.

This proportion of the population not only has low per capita income but is also the most adversely impacted by the other socio-economic factors including HIV/AIDS epidemic (with high prevalence rate of about 16 %³ among the population age group of 15 to 49); high unemployment levels; and the adverse consequences arising from unequal participation of women and youth in the development processes.

The First Communication on Climate Change originates from the studies conducted in 1990-2001 under the Agriculture Sector Investment Programme (ASIP), which revealed the linkage between climate change, environment degradation, food security and poverty, and urged the Government to start integrating climate change concerns in the development processes. In this view the Zambian Government has ratified the Kyoto protocol and included a strategy for climate change adaptation in the Fifth National Development Plan (FNDP). Although these initiatives are well intended, their full implementation is constrained by, among other factors, the following:

- Limited institutional capacity
- Lack of policy and legal frameworks
- Limited technical capacity to develop and implement climate change related initiatives
- Limited tools for climate change monitoring
- No strategies in place to for public sensitization and advocacy

It is against this background that the Zambian Government would like to initiate the process of preparation of the Second National Communication on Climate Change (SNC) as a building block as well as a complementary activity contributing to development of the national capacity in climate change initiated by the National Capacity Self Assessment (NCSA) and the National Adaptation Plan of Action (NAPA). Further, the SNC process will assist the Government to meet its obligations to the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) by preparing a report in more comprehensive, consultative and coordinated manner.

1.2 Strategy

The national vision is for Zambia to become a prosperous middle country by the 2030. To contribute to this vision the government has developed the Fifth National Development Plan (FNDP) 2006-10 whose

² This is according to Fifth National Development Plan (2006-10)

³ National Strategic Plan for HIV/AIDS 2006-11

theme is ' Broad Based Wealth and Job Creation through Citizenry Participation and Technological Advancement'. The strategic focus of the plan is on economic and human resource development. The plan has recognized that in order to achieve economic and social development, social protection including issues such as environment protection, HIV/AIDS, gender and governance are critical for achievement of sustainable livelihood, job creation and poverty reduction and attainment of MDGs. This holistic approach that incorporates crosscutting issues in national development and encompassing all sectors has been taken to accelerate development from pro-poor pillar. For instance, integrated water resource management programme, cross-sectoral issues such as land use, irrigation, wetland conservation and climate change will be addressed in order to optimize benefits for Zambians. In the energy sector, the FNDP aims at ensuring reliable, affordable, and environmentally sound energy for sustained social and economic development. The focus is to meet energy demand by increasing options and exploitation of Zambia's indigenous energy resources for productive uses.

Specifically for the environment sector, the goal is to reverse environmental damage, maintain essential environmental and biological processes and ensure sustainable use of natural resources. To achieve this goal, one of the strategies is capacity development for domestication of global environmental conventions, also outlined in the National Environment Policy.. Capacity development for domestication will not only assist the Government in meeting its obligations for timely reporting and integration of conventions in legal frameworks but also in strengthening the institutions, processes and systems for the design and implementation of initiatives enabled by the partnership in the convention.

The project is therefore consistent with the national priorities and with the National Environment Policy and, specifically, capacity development for domestication of the convention on climate change. The SNC process is viewed as a building block for the strengthening of national capacity in climate change.

Cooperating Partners Strategy

In order to respond to the Fifth National Development Plan, the cooperating partners have developed the Joint Assistance Strategy for Zambia (JASZ) that will harmonize approaches, reduce duplication of efforts and eventually reduce Government cost for managing aid. In the context of JASZ, the UN system has been delegated to co-lead in governance, HIV/AIDS and health, and lead in environment and gender. Further, the UN System has developed the United Nations Development Assistance Framework (UNDAF) to respond to both the FNDP and JASZ, environment issues are regarded as a cross-cutting issue. Within the framework of the UNDAF, UNDP has developed a Country Programme Action Plan which identifies capacity development in climate change as one of the outcomes of its assistance in the environment sector. Thus the SNC process will be bedrock for achievement of the outcome.

Project Strategy

Zambia is a non-annex I Party to the UNFCCC and is fully committed to fulfilling its obligations under the Convention. The SNC project will enable Zambia to fulfill its reporting requirements under the UNFCCC needed in the preparation of its Second National Communication and contribute to the capacity development for climate change management The SNC will be prepared using the IPCC Good Practice Guidelines of 2006.

The project will build upon the work achieved under the Initial National Communication (INC) and other on-going enabling activities. The National Adaptation Programme of Action (NAPA) which is a road map for the country towards the implementation of climate change adaptation activities will provide inputs into the SNC on issues of vulnerability and proposed adaptation strategies. The National Capacity Self Assessment (NCSA) for Global Environmental Management, which is taking stock of Zambia existing capacities and development needs and priorities related to the implementation of the UN Convention on

Biological Diversity (UNCBD), the UN Framework Convention on climate Change (UNFCCC), and the UN Convention to Combat Desertification (UNCCD) will benefit the SNC process in terms of identification of capacity gaps and capacity development programmes.

The main activities for this project are: (i) inventory of greenhouse gas (GHG) Emissions, (ii) assessment of potential impacts of climate change on the most vulnerable sectors, (iii) analysis of potential measures to abate increase of greenhouse gas (GHG), (d) capacity development for reporting on climate change and (e) preparation of the report

Strategic Results Framework

Intended Outcome: Sustainable management of environment and natural resources incorporated into national development frameworks and sector strategies			
Outcome Indicator: Second National Communication to the UNFCCC prepared			
Current Status: No comprehensive system for mitigation and adaptation to climate change exist; process for preparation of the National Adaptation Plan of Action has commenced			
Project Partnership: (i) Within the JASZ framework, Finland is the lead for environment and natural resources and as such the project will benefit from the coordination / harmonization system under this arrangement. (ii) World Bank is a key player in capacity development for clean development mechanism and in this regard it will augment the efforts of this project (iii) DANIDA – key player in community capacity development for natural resources management and adaptation to climate change in particular for agriculture activities are part of the programme.			
Project Objectives: To strengthen the capacity for state reporting on the climate change			
Intended Outputs	Outputs Indicators	Indicative Activities	Inputs
1. Capacity improved for carrying out Inventories for greenhouse gas emissions	1.1 Mechanism for carrying out the inventories in place 1.2 Guidelines for carrying out the inventories adapted 1.3 Training of trainers 1.4 Report on the inventories on greenhouse gas emissions	1.1.1 Consensus building workshops 1.1.2 Training workshops 1.1.3 Development, testing and administering of questionnaire 1.1.4 Data collection 1.1.5 Review workshops	1.1.1.1. Consultants 1.1.1.2. Resource persons 1.1.1.3. Workshop venues 1.1.1.4. Administering Questionnaire
2. Capacity improved for assessment of the potential impacts of climate change on most vulnerable sectors	2.1 Mechanism for carrying out assessment established 2.2 Guidelines for carrying out the assessments adapted 2.3 Training the researchers Report on the assessments	As above	As above
4. Capacity improved for reporting on climate change	4.1 Institutional for climate change management established and strengthened 4.2 Strategic plan for reporting developed and implemented 4.3 Guidelines for preparing the reported adapted Second national communication on climate change report	As above	As above

1.3 Management Arrangements

The Ministry of Tourism, Environment and Natural Resources (MTENR) through the UNFCCC Focal Point will be the executing agency while ECZ will be the implementing Agency. A Project Manager will be recruited by ECZ and be in charge of day-to-day implementation and will report to the focal point in ECZ. A National Steering Committee (NSC) be established and will guide the implementation of the project as well as providing overall policy advice. The Director of Environment and Natural Resources Management under the MTENR will be Chairperson of the NSC. The Committee shall comprise the lead Agency – MTENR and at least 20 – 25 members drawn from a range of stakeholders from public, NGO and private sector organizations.

1.4 Monitoring and Evaluation

Monitoring responsibilities and events: a detailed schedule of project reviews meetings will be developed by the project management, in consultation with the project implementation partners and stakeholders representatives and incorporated in the Project Inception Report. Such schedule will include: (i) tentative time frames for Steering Committee Meetings and (ii) project related Monitoring and Evaluation activities.

Day to day monitoring of implementation progress will be the responsibilities of the Project Manager based on the project's Annual Work plan and its indicators. The Implementing Agency will inform the Executing Agency who will in turn inform UNDP of any delays or bottle necks faced during implementation so that the appropriate support or corrective measures can be adopted in the timely and remedial fashion.

Periodic monitoring will be undertaken by UNDP through quarterly meetings with the both implementing and executing agencies, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely manner to ensure smooth implementation of project activities.

Project Monitoring Reporting: The Project Manager will be responsible for the preparation of report and submission to UNDP for review before forwarding them to UNDP/GEF regional office. The reports that form part of the monitoring process include:

(i) Inception Report

A Project Inception Report will be prepared following the Inception Workshop. It will include a detailed First Year Work Plan divided in quarterly timeframes detailing the activities and progress indicators that will guide implementation during the first year of the project. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months time-frame. The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may effect project implementation.

When finalized, the Inception Report will be circulated to stakeholders who will be given a period of one calendar month in which to respond with comments or queries. The UNDP Country Office will review the Inception Report prior to circulation.

(ii) Technical Reports

Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the study team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent annual project reports. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

(iii) Quarterly Progress Reports

Short reports outlining main updates in project progress will be quarterly to UNDP and the UNDP/GEF regional office by the Project Manager.

Audit Clause

The project will be annually audited within the framework of NEX audit requirements. The audit will be conducted by the Office of the Auditor General or by a commercial auditor engaged by the Auditor General.

1.5 Legal Context

This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement (SBAA) between the Government of the Republic of Zambia and the United Nations Development Programme. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

The UNDP Resident Representative is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments only as set out here in this Project Document.

2. Total Budget and Work Plan

Award Id: 00037244

Award Title: PIMS 3357 CC EA: Enabling activity for the Preparation of Zambia's second National Communication to the UNFCCC

Project ID: 00040749

Project Title: PIMS 3357 CC EA: Enabling Activity for the Preparation of Zambia's second National Communication to the UNFCCC

Executing Agency: Ministry of Tourism Environment and Natural Resources

OUTPUTS	Responsible Party	Source of Funds	Budget Code	Budget Description	Year 1 (US\$)	Year 2 (US\$)	Total Budget (US\$)
Outcome 1. National Circumstances	MTENR/ ECZ	GEF	71300	Local consultants	5,000	5,000	10,000
				Sub-total	5,000	5,000	
Outcome 2. National GHG Inventories	MTENR /ECZ	GEF	71300 71600	Local Consultants Travel	30,000 5,000	20,000 5,000	60,000
				Sub-total	35,000	25,000	
Outcome 3. Programmes containing measures to facilitate adequate adaptation to climate change	MTENR /ECZ	GEF	71300 71200 71600 74500	Local consultants International Consultants Travel Misc. expenses	40,000 5,000 5,000 1,000	40,000 5,000 5,000 1,000	102,000
				Sub-total	51,000	51,000	
Outcome 4. Programmes containing measures to mitigate climate change	MTENR /ECZ	GEF	71300 71600 71200 74500	Local consultants Travel International Consultants Miscellaneous	10,000 3,000 7,000 3,000	10,000 2,000 7,000 1,000	43,000
				Sub-total	23,000	20,000	
Outcome 5. Other relevant information (e.g. research and systematic observation, technology transfer, education and public awareness, capacity building)	MTENR /ECZ	GEF	71300	Local consultants	10,000	10,000	20,000
				Sub-total	10,000	10,000	
Outcome 6. Constraints & Gaps; Related Financial, technical, & capacity Needs	MTENR /ECZ	GEF	71300	Local consultants	10,000	10,000	20,000
				Sub-total	10,000	10,000	
Outcome 7. Technology Needs Assessment	MTENR /ECZ	GEF	71300 71600 71200 74200 74500	Local consultants Travel International Consultants Printing and publication Miscellaneous	15,000 2,000 5,000 0 3,000	15,000 0 5,000 2,000 3,000	50,000
				Sub-total	25,000	25,000	

Outcome 8. Technical Assistance	MTENR /ECZ	GEF	71200	International Consultants	5,000	8,000	13,000
				Sub-total	5,000	8,000	
Outcome 9. Compilation, Production of communication including Executive Summary and its translation	MTENR /ECZ	GEF	71300 74200	Local consultants Printing and publication	0 0	10,000 5,000	15,000
				Sub-total	0	15,000	
Outcome 10. Project Management	MTENR /ECZ	GEF	71400 71400	Project Coordinator Administrative assistant Equipment & Furniture	30,000 6,000 20,000	30,000 6,000 10,000	102,000
				Sub-total	56,000	56,000	
Outcome 11. Monitoring & Reporting			74105	Management and reporting	5,000	5,000	10,000
				Sub-total	5,000	5,000	
				GRAND TOTAL	225,000	230,000	455,000

3. Appendices

Appendix A: Summary Report of Stocktaking Exercise

The main objective of the self-assessment (stocktaking) exercise was to undertake a consultative and participatory needs assessment in order to identify and validate the critical priorities for UNFCCC implementation in Zambia. The self-assessment exercise was carried out using guidelines provided in the GEF Operational Procedures for the Expedited Financing of National Communications from Non-Annex I Parties, the UNFCCC COP decision 17/CP.8 and the User Manual for the Guidelines on the Preparation of NC from non-Annex I Parties prepared by the UNFCCC Secretariat

The stocktaking exercise assisted in identifying and validating critical priorities for further in-depth studies during the preparation of the SNC.

On the basis of the stocktaking exercise and stakeholder consultation, the Zambian Government has prepared and submitted this project, for the preparation of its SNC to the GEF through the United Nations Development Programme (UNDP).

Stocktaking Methodology

The methodology employed for the stocktaking included:

- Identification and validation of stakeholders. Two groups of stakeholders were identified i.e. Key group of stakeholders to be actively involved through out the preparation of the SNC and a secondary group of stakeholders that will be consulted at different stages of the SNC preparatory process as shown in Appendix C;
- Review of relevant documents and literature; and
- Use of a consultative stakeholder workshop to identify and validate critical priorities for further in-depth studies during the preparation of the SNC.

Two consultative workshops were held at Protea Safari Lodge from 9th – 10th and 17th June, 2006 respectively. These workshops were attended by diverse representation drawn from various Government Institutions, UNDP, NGOs and Individual experts on climate change.

Work carried out under enabling activities

Background

Zambia is committed to implementing the Rio Conventions and to ensuring sustainable management of the environment and natural resources in general. Zambia on May 28th 1993 was among the earliest (twenty second) to ratify the convention, which came into force on 21st March, 1994.

In August 1994 the Ministry of Energy and Water Development, with the help of a GTZ grant, commenced work on greenhouse gas emissions and mitigation assessment. Under this project, options for mitigating climate change were identified in the residential and industrial energy sector (charcoal production).

In October 1994, Zambia undertook some climate change studies on greenhouse gas emissions and mitigation assessments as well as adaptation options. This work was performed by ECZ with financial support from USCSP. Later in 1994, Zambia was included in a regional (United Republic of Tanzania, Zambia and Zimbabwe) study on climate change mitigation, supported by the Danish International Development Agency (DANIDA) through the UNEP Collaborating Center on Energy and Environment, at the Riso National Laboratory in Denmark. The emphasis of this study was on capacity - building on the methodological side of mitigation analysis.

In 1998, the Zambian Government received a grant amounting to US\$250,000 from GEF through UNEP to prepare its INC.

Preparation of the INC

The National Climate Change Steering Committee (NCCSC) chaired by the Permanent secretary in the former Ministry of Environment and Natural Resources (MENR) spearheaded the implementation of the INC project through the provision of guidance and direction to the Environmental Council of Zambia, the project coordinator and focal point then. Upon receipt of the GEF grant in 1998, study teams comprising researchers from Government institutions, NGOs and the private sector were constituted to prepare specialized reports on National Circumstances, GHG inventories, mitigation, vulnerability and adaptation assessment, systematic observation and research, education, training and research. In 2000 a stakeholder workshop was convened to review and finalize the draft INC. However, due to weak supervision by the NCCSC, which never met as expected, the INC process was delayed and consequently the INC was finally submitted by the MENR to the UNFCCC Secretariat on 18th August, 2004.

Key studies, assessments, outcomes, constraints and lessons learned during INC Implementation.

National Circumstances

A detailed write up on national circumstances was made to provide for background information requirements for the preparation of the Initial National Communication (INC). Since then information requirements have changed. To this extent there is need to revise the existing information. The review of this section identified gaps and other areas needing updates in terms of information including:

- Geography and climate;
- Socio-economic profile - (the Fifth National Development Plan 2006 - 2011 offers good reference material. The FNDP is a strategic document, which catalogues national goals, policies and strategies aimed at governing developmental programmes over the period 2006-2011. The FNDP focuses on infrastructure development in all sectors namely socio-economic, public safety, and cross-cutting issues such as HIV/AIDS and gender. The FNDP emphasizes the need for proper monitoring and evaluation of programmes supported by the sound institutional framework);
- Political and Decision Making Structure;
- National Resource Profile i.e. Energy, Forests, Agriculture and land use, Water resources, Biodiversity, Wildlife, Fisheries, Health; and
- Cross-cutting issues (Gender, HIV/AIDS).

Greenhouse Gas Inventories

The inventory of GHG emissions is one of the major climate change activities conducted during preparation of the INC. Through these inventories, an assessment was made of greenhouse gas emissions from Zambia's five source categories namely energy, industrial processes, agriculture, land-use change and forestry and waste management. The inventories were prepared using the IPCC Guidelines for 1996. However, where appropriate, local conversion and emission factors for certain fuels were used.

The GHG emissions computed are carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), oxides of nitrogen (NO_x), carbon monoxide (CO), non-methane volatiles (NMVOCs) and sulphur dioxide (SO₂). Total emissions of GHGs using 1994 as base year are shown in Table 3 where the contribution of CO₂ was estimated at 85%.

Table 1 Total Emissions of Greenhouse Gases (Gg) 1994.

	GREENHOUSE GAS SOURCE	CO₂	CH₄	N₂O	NO_x	CO	NM VOC	SO₂
	TOTAL NATIONAL EMISSIONS	72,710.05	735.98	63.14	1,197.84	10,787.82	79.03	6.42
1	Energy (Fuel Combustion & Transport)	2,294.885	64.315	44.40	1,052.807	993.830	77.451	6.335
	A. Fuel Combustion	2,294.885	64.315	44.40	1,052.807	993.830	77.451	6.335
	Oil Refinery	-	-	-	0.0012	0.00187	0.0124	0.0186
	Households	57.046	56.811	39.333	920.176	828.587	63.227	2.6319
	Agriculture and Fisheries	1.231	1.947	1.342	31.50	28.274	2.408	0.1035
	Mining	657.329	0.045	0.1160	1.569	4.384	0.7536	0.8726
	Industry and Commerce	319.488	5.207	3.586	85.660	78.89	6.404	2.1358
	Government Services	48.238	0.0054	0.0077	0.4747	2.130	0.031	0.1937
	Transport	1,211.553	0.1626	0.0177	13.427	51.563	10.651	0.3786
	B. Fugitive Fuel Emissions	-	0.137	-	-	-	-	-
	Coal Mining	-	0.137	-	-	-	-	-
2	Industrial Processes	300.465	-	0.084	0.0881	0.0393	1,5747	0.083149
	A. Cement Production	139.340	-	-	-	-	-	0.083
	B. Lime Production	153.661	-	-	-	0.0393	-	-
	C. Ammonia Production	7.464	-	-	-	-	0.0224	0.000149
	D. Glass Manufacture	-	-	-	-	-	0.0423	-
	E. Nitric Acid Production	-	-	0.084	0.0881	-	-	-
	F. Road Paving	-	-	-	-	-	1.51	-
3	Agriculture		378.04	18.34	133.71	7,814.48	-	-
	A. Enteric Fermentation		76.48	0	0	0		
	B. Animal Wastes		3.04	0.0003	0	0		
	C. Rice Cultivation		0.72	0	0	0		
	D. Savannah Burning		297.29	3.68	132.98	7,803.84		
	E. Agricultural Waste Burning		0.51	0.02	0.73	10.64		
	F. Agricultural Soils		0	14.62	0	0		
4	Land-Use Change & Forestry	70,114.70	226.23	0.311	11.24	1,979.47	-	-
	A. On Site Burning	51,843.18	226.23	0.311	11.24	1,979.47		
	B. Off Site Burning	12,933.57						
	C. On Site Decay	5,337.95						
5	Sinks	-71,504.00						
	A. Managed(Plantation) Forest	958.65						
	B. Natural Forest Regeneration	70,545.35						
6	Waste		67.39					
	A. Solid Waste Disposal		17.81					
	B. Domestic/Commercial Waste Water and Sludge		48.62					
	C. Industrial Waste Water and		0.96					

Source: Adapted from CEEZ (1999).

Comparison of climatic effects due to various gases was made possible by utilizing IPCC Global Warming Potentials (GWPs) for emissions of interest.

Furthermore, the CO₂ final budget for 1994 taking into account CO₂ uptake by the main carbon sinks in Zambia namely re-growth natural forests regenerating after forest clearing and/ or abandonment of managed cultivated land (fallow) and reforestation plantation amounted to 1,206.05 Gg thus making Zambia a net CO₂ emitter as show in Table 5.

Table 3 Zambia's CO₂ Final Budget for 1994.

Emission Source	Carbon dioxide (Gg)
Energy	2,294.885
Industry	300.465
Land-use Change and Forestry	70,114.70
<i>Sub-total</i>	<i>72,710.050</i>
Uptake by Regeneration and managed plantations	71,504.00
Balance	1,206.05

Adapted from CEEZ Report: 1999

The review of the INC in respect of the GHG inventory study identified gaps and other areas needing updates. For instance, in the energy sector there was lack of harmonization between Zambia's energy balance reporting classification to that of the UNFCCC; absence of an assessment of uncertainties and a corresponding QA/QC; lack of reliable biomass activity data and appropriate emission factors for biomass combustion and charcoal production and finally the lack of involvement of industrial and other stakeholders in the generation and provision of data. Non determination of HFCs and SF₆ in the industrial processes sector and use of inappropriate emission factors and unreliable activity data in the Agriculture, Forest and Land-use and Waste sectors did injustice to data quality. A recommendation has been made to address the above-mentioned weaknesses during the implementation of the SNC.

Mitigation Options

Notwithstanding the fact that Zambia's GHG emissions are a tiny fraction of the global total, the country has put into place measures that are aimed at contributing to the solution of the global problem.

Measures to mitigate climate change

Government's policies and programmes aimed at reducing primarily carbon dioxide and methane gases in the energy, manufacturing, mining and transport sectors will require both technical and financial support in order to be implemented successfully. Examples of such programmes extracted from the INC are:

Energy

Supply mitigation options considered include promoting efficient charcoal production, replacing diesel gen-sets by mini-hydros, streamlining operations of the petroleum industry and minimizing spontaneous emissions from coal mining. Energy demand options include promoting use of improved stoves, increasing electrification of households in low-income groups and encouraging use of renewable energy.

In 1997, the Forest Department circulated a manual on improved charcoal production for use by charcoal producers and the former MENR had undertaken an evaluation study to determine the manual's success rate. Community based management of forest resources was also promoted in some districts of Central, Northwestern and Copperbelt provinces under USAID and FINNIDA funding. As regards the commercial energy supply sector substitution of diesel power generation offered the best opportunity for reducing GHG emissions. Provincial Centers/towns that once relied on diesel gen-sets for power generation e.g. Kaoma (Western province), Nyimba (Eastern province) and Solwezi (Northwestern province) have over the last 05 years been connected to the national grid. In the mid-1990s Mutanda Evangelical Center, 35Km West of Solwezi District commissioned a mini-hydro power station to supply electricity to 82 homes. The generator is

rated at 2.5 kWp. The rehabilitation of the Tanzama Pipeline linking the Indeni Oil Refinery in Ndola (Zambia) to the Port of Dar-es-laam (Tanzania) has minimized oil leakages, which hereto had adversely polluted sensitive ecosystems along the route.

On the energy demand side, use of high energy efficient cook-stoves in urban centers has to some extent reduced ground level GHGs. The peri-urban electrification programme launched between 1996 and 1999 in Lusaka and the Copperbelt involving 7,000 and 9,000 housing units respectively was designed to increase accesses to electricity by households in the low income category thereby reducing their dependence on charcoal consumption.

Manufacturing

Major industries in this sector are Nitrogen Chemicals of Zambia, Chilanga Cement Plc, Zambia Breweries, City Breweries and Amanita. All these depend on large supplies of commercial energies for steam generation e.g. coal and petroleum fuels. By 2000, most of these companies had implemented energy conversion and substitution within their factories in order to conserve energy. In 2005, Chilanga Cement Plc replaced the old factory with a smaller one thereby switching from a wet to a dry process of cement production. The installed new boilers and furnaces are more energy efficient and will thus use less coal in the manufacturing process.

Mining

The former Zambia Consolidated Copper Mines consumed 24.29 petajoules of energy resulting into CO₂ emissions amounting to 657.329 Gg in 1994. In that year, rehabilitation of the Nkana Smelter was estimated at US\$80 million yet only US\$27 million had been sourced from the Department for International Development. Other studies on mitigation options within the mining sector had recommended using the Outokumpu Flash Furnance which effect coal or fuel oil reduction up to 60% at an investment of US\$150 million, substituting 13,000 m³ of diesel with 70 Gwh of electricity by electrification of surface and underground vehicles, locomotives and cable belt transportation at an investment of US\$35 million and installing an electric smelting furnance at a capital cost of US\$200 million resulting in eliminating 60,000 and 240,000 tonnes of fuel oil and coal respectively by 200 Gwh of hydroelectricity.

Transport

Zambia is fortunate in the sense that it has a climate and water resources that are suited to the cultivation of energy crops and hence the production of bio-ethanol that can replace lead in gasoline as an octane enhancer. The use of fuel blended with bio-ethanol in the Zambian transport sector is therefore both cost-effective as well being environmentally friendly. It has been shown elsewhere that potentially Zambia's Sugar Plants can produce 19 million liters of bio-ethanol annually, which is sufficient to allow for 10% gasoline blending in the transport sector. By doing so, Zambia would partially meet its obligations under the UNFCCC as well as the Dakar 2001 Declaration, which in case of the latter compels all Sub-Saharan African Countries to phase-out consumption of leaded fuel by December, 2005. Zambia was expected to have met the conditions of the Dakar 2001 Declaration in June, 2006. Most importantly, Zambia has recently revised its National Energy Policy to include consumption of bio-fuels i.e. bio-ethanol and biodiesel.

As noted above, the investment cost in projects listed under mining, manufacturing and the transport sectors are beyond Zambia's financial capacity and therefore the country would be wise to promote in-house adaptation measures as opposed to mitigation options.

Moreover, inadequate stakeholder involvement in developing mitigation programmes and projects caused uncertainty in data collected. Therefore, it has been recommended to conduct baseline studies/analyses for mitigating GHG emissions; carry out technology mitigation assessment and determine CO₂ reduction potential and the cost of carrying out the mitigation options.

Lessons learnt from the implementation of the INC are weak coordination and the lack of stakeholder consultation/participation in project development. Under the preparation of the SNC it is recommended that a study be undertaken to formulate and recommend a formalized institutional arrangement for implementation of future National Communications aimed at providing continuity and sustainability.

Vulnerability and adaptation assessment

The overall objectives of the vulnerability and adaptation studies were to evaluate how climate change affects anthropogenic activities and natural systems, evaluate sensitivities, thresholds and vulnerability of natural systems, as well as identify measures to minimize its effects in agriculture (food crops), livestock, fisheries, wildlife, forestry, Health and water sectors in Zambia.

Agriculture (food crops)

The GCMs, CCCM and GFDL general circulation models were used to create climate change scenarios (2 x CO₂) for the IBSNAT simulation technique. The DSSAT3 (Decision Support System for Agro-technology Transfer) software together with the applications programme (IBSNAST) was then used to simulate crop growing length and yields under rain-fed and irrigation conditions. Water balance and nitrogen availability were also simulated to estimate the vulnerability to climate change of selected crops e.g. three maize varieties (MM 752, MM603 and MM601), sorghum SIMA variety and three groundnut varieties i.e. Natal Common, Makulu Red and Chalimbana. Results of the DSSAT3 simulation model for 1997/78 season showed that MM752 and MM603 maize varieties would not mature due to shortening of the growing season in agro-ecological Zones⁴ II and I respectively. This would in turn lead to widespread yield reduction. Therefore in order to ensure household and national food security, increase income and employment etc adaptation policies namely development of drought- tolerant and early maturing crop varieties, improvement of crop management through information dissemination to farmers and construction of supporting infrastructure like dams for water storage in drought-prone areas of the country, maintenance of all feeder roads to avoid wastage of produce, establishment of a permanent disaster relief fund as an eventuality against climate change and guaranteeing supply of local gene plasm for local seed production and supply to communities have since been translated into programmes with tangible results.

Besides maize, groundnuts and sorghum, it has been recommended to extend the study and include other crops such as sugarcane, tobacco and cotton during implementation of the SCN.

Livestock

The V and A study addressed livestock susceptibility to variations in climatic conditions conducted in Agro-ecological Zone II only due to lack of resources. Focus was on the effect of climatic indicators like temperature, rainfall, relative humidity, solar radiation, day-length and wind speed on livestock production. However, this study was inconclusive given the limited data collected. Moreover, reliance on simple correlations between meteorological variables and livestock population might not provide useful understanding of climate change issues at play in this sector. Adaptation policies in this sector include encouraging farmers to use crop residues of groundnuts, cotton, beans and urea molasses and minerals to supplement livestock nutrition during drought, sinking wells and boreholes at community level to boost water supply in vulnerable areas, restocking in badly affected areas, promoting the rearing of drought-tolerant goats etc. Appropriate programmes are ongoing particularly in the arid south of the country. For better results, use of IPCC models and simulation techniques for data collected from the three Agro-ecological Zones of Zambia has been recommended for the SNC.

⁴ Summary of Agro-ecological Zones of Zambia:

I Annual rainfall about 800 mm, altitudes of 300 – 900 m a.s.l, growing season 80-120 days.

II Annual rainfall about 800 – 1000 mm, altitudes of 900 – 1300 m a.s.l, growing season 100 – 140 days.

III Annual rainfall over 1000 mm, altitudes of 1100 –1770 m a.s.l, growing season 160 days.

Fisheries

The V and A study was conducted in three selected areas representing 3 agro-ecological Zones namely Lake Kariba (Zone I), Itzhi-Tezhi and Kafue river (Zone II) and Lake Mweru-Luapula (Zone III). Only fish of commercial value were considered. Climatic change impact on commercial value fish species was assessed in relation to production, abundance and distribution. The study observed that lower rainfall would reduce nutrient levels in major fisheries leading to reduced fish breeding activities and hence depletion of fish species in the long-term. Commercial fish species e.g. breams, sardines etc. in the drought prone agro-ecological Zone II and I were particularly identified as being most vulnerable to such climatic changes. Conversely, a rise in water levels in river channels would submerge the surrounding swamps and dambos thereby turning them into ideal fish breeding grounds resulting in increased population in the long-term. Adaptation policies include strict licensing to regulate influx of fishermen to fisheries, promotion of fish farming and fish conservation, facilitating development of water harvesting techniques by construction of conservation dams so that during drought years water is available to farmers to ensure that fish farming as a viable and sustainable economic activity at community level. As a result of these policies, Government enforces a fish ban from December to March (fish breeding period), has constructed fishponds at every provincial center for supplying fish fingerlings to the local communities etc. However, lack of appropriate models for data manipulation/ analysis was identified as a weakness. It is thus recommended to address this weakness in the SNC.

Wildlife

The V and A study focused on wildlife in protected areas (National Parks, Game Management Areas and bird and wildlife sanctuaries). The effects of climate change on wetland and bush animals were investigated. It was observed from available data sources that under drought conditions reduced soil moisture content would give rise to poor quality fodder, stress and uncontrollable migrations would in turn expose animals to poaching and predation. Under excessive rainfall, wetland animals e.g. puku, lechwe, waterburck etc. would suffer from abnormal inundation of their preferred habitat while bush animals like lion, elephant and buffalo would thrive from abundant food and water resources. Government has implemented adaptation measures that include sinking boreholes to provide water to game during drought conditions, curling of game to create conditions for wildlife sustainability and identifying and protecting migratory routes for wildlife. However, like in the case for livestock and fisheries sectors, the lack of appropriate models for data manipulation/analysis was a drawback. It is therefore recommended to improve data on wildlife and habitat monitoring in the SNC by resorting to application of appropriate IPCC models.

Forestry

The V and A study focused on distribution of vegetation type related to rainfall, temperature and moisture content. All vegetation types were considered, noting that 60% comprised valuable miombo species that are under extreme pressure due to increased charcoal consumption. Adaptation measures include promoting the use of alternative sources of energy e.g. solar and biogas to reduce pressure on miombo woodlands that are predominantly harvested for charcoal production in peri-urban areas. Lack of reliable data on forests was a weakness that shall be addressed under the SNC through improvement of data on forest monitoring using GIS techniques.

Water

Despite Zambia having abundant surface water resources, communities living in arid parts of the country agro-ecological Zone I experience severe water shortages during summer. Moreover, population increases in urban centers have also put pressure on groundwater through sinking of improperly managed boreholes.

The V and A study focused on surface water potential contained in the JICA's Water Master Plan Report prepared in 1995 which estimated surface and groundwater potentials calculated for an average year at 237 million m³/day and 157 million m³/day respectively. Projected surface water demands for the years 2005 and

2015 were then computed using baseline socio-economic scenarios namely population growth rates, agriculture expansion, industrialization and the conservative growth case. The water balances between water demands and the water resources for the drought year with a ten-year return period showed that Southern province is extremely vulnerable and does in fact experience critical water shortages during drought conditions. Groundwater potential was not included in the V and A study due to lack of data. Some of the adaptation policies to date include improvement of water resource management through development and implementation of well-costed and phased integrated river basin management plans and strengthening legal policy and Action Plans as well as Institutional restructuring of the water sector to promote private sector participation.

Lack of data on groundwater aside, stakeholders noted that reference to available data on groundwater potentials for the Copperbelt and elsewhere might help in filling data gaps. An update of methodologies and tools employed in the JICA report in estimating surface water potential from knowledge of water resources available including the potential water demands for the years 2005 – 2015 using baseline socio-economic scenarios is thus recommended for the SNC.

Health

The V and A study using a simple correlation coefficient analysis technique was used to establish malaria morbidity and mortality on the basis of malaria incident rates, distribution and transmission as a function of rainfall, temperature and humidity in three agro-ecological Zones i.e. L/stone and Choma (Zone I), Lusaka (Zone II) and Mansa (Zone III). Climatic variables for 10 years: (1972 – 1982) were used in the study. The *Anopheles gambiae* is the vector of transmission while *Plasmodium falciparum* is responsible for 97% of all recorded cases. Adaptation policy measures include redressing the imbalance created by the Malaria Extermination Act (1964) hence the introduction of the Health Reforms (1992), promoting malaria awareness and prevention through supply of safe net mosquito nets in malaria infested regions.

The National Climate Change Steering Committee

The NCCSC did not deliver to expectations as mentioned earlier primarily for two reasons namely failure by the Zambian Government to ratify the Kyoto Protocol until now (this effectively meant that Zambia could not access CDM financing for climate change related projects) and the absence of an institution with clear mandate to deal with issues of mitigation. In the new restructuring arrangement, the MTENR is the focal point for climate change issues while the Department of Environment and Natural Resources has been mandated to oversee issues of climate change mitigation. The National Steering Committee (NSC) chaired by the Director of Environment and Natural Resources Management has a wide membership drawn from Government institutions, NGOs, Academia and the private sector in order to promote ownership. The establishment of a DNA as required under the UNFCCC is currently being addressed within the MTENR and once established the DNA will review, facilitate and approve future CDM projects.

During the review of the INC, stakeholders were of the opinion that other common diseases like chest infections could be subjected to investigation in the SNC for completeness.

Other information considered relevant to the achievement of the objective of the Convention.

There was no additional support for enabling activities after the INC was prepared. Technology needs assessment was not carried out at national level apart from the needs assessment carried out at SADC regional level. Therefore it would be helpful to carry out Technology Assessment study under the SNC in order to address the shortcoming.

Climate-observing system

Capacity building of the Zambia Metrological Department (ZMD) and ECZ was identified under the INC as one of the key activities to be carried out for climate change in Zambia. It was identified as very important to assess and determine programmes and activities that would address the needs of climate-observing system.

The gaps identified are:-

- Limited number of observation stations in the country;
- Irregular inspection of existing observation stations due to lack of transport;
- Deterioration in observations of the upper atmosphere;
- Shortage of basic equipment and skilled human resources; and
- Lack of an effective data management system.

As a way forward it is recommended to address the gaps progressively into the future.

Updating of other activities reported in INC

Research

On-going research included monthly climatic data on seasonal variations that were provided by the Drought Monitoring Center in Zimbabwe so that SADC member states could use the data to forecast weather trends for timely decision making. Zambia will continue to obtain the monthly data from the Center in Zimbabwe, but at the same time identify and utilize new research initiatives in the region.

Locally, the ZMD was involved in two research studies namely “Concurrencies of dry spells” and “Long-term temperature variations in Zambia”. Collection of data for the two research studies will continue in order for Zambia to showcase the impacts of climate change.

The INC indicated that future research could include:-

- Modeling of vegetation-climate interactions;
- Climate change impacts on crops, fish, game and animal production together with associated economic implications;
- Genetic improvement of crops with higher water use efficiencies and more tolerant to extreme weather events;
- Indirect effects of climate change impacts on human health;
- Wider application of renewable energy resources;
- Improvement on emission factors on land-use change and forestry;
- Development of local specific emission factors in agriculture and waste management; and
- Baseline study and determine the extent of the effect of spontaneous combustion of coal waste at Maamba Collieries on CO₂ and other GHG emissions.

The status of what research among these was carried out would be reported in the SNC. Other areas of research carried out and future research areas to be carried out beyond the SNC would also be reported.

Education, Training and Public Awareness

In the INC, environmental education at primary level was discussed in very general terms without showing the linkages to the subject of climate change. This weakness will be addressed in the SNC.

As part of Zambia's Enabling Activities, the Environmental Council of Zambia conducted a workshop to train journalists on climate change matters and give them necessary skills so that they could develop cost effective public awareness programmes that would assist in disseminating climate change information to the general public and thus increase awareness.

Another training workshop involved Government Planning Officers who it was hoped would mainstream the findings of the various climate change studies into national development plans.

A need to enhance capacity of the National Study Teams (NST) was identified in the INC. In this regard, training was required in the following areas:-

- Climate change assessments (GHG inventories, mitigation, vulnerability and adaptation assessments);
- Linkages of vulnerability and adaptation with climate change variations;
- Developing JI, AIJ and CDM projects;
- Designing government programmes and preparation of national plans for
- Implementing mitigation options and adaptation technologies;
- Activity data and emission factors (default values have been used in most sections of the studies);
- Land-use, change and forestry;
- Policy assessments;
- Macro-economic evaluation of mitigation options;
- Sectoral composition of energy technologies and their energy intensities and cost;
- Energy efficiency, conservation and substitution; and
- Enhancing skills in project proposal formulation, economic, financial and environmental assessments.

The areas where training was required will be revised after carrying out training needs assessment.

Public Awareness activities included discussions, dissemination and consultative workshops on climate change issues, as well as publication of a Climate Change Newsletter. Articles on climate change were also published in the Enviro-line, a magazine published quarterly by the Environmental Council of Zambia. Discussions, dissemination and Consultative workshops will be carried out under the enabling activities for the SNC.

Capacity Building

Priority capacity building issues for the implementation of the UNFCCC were identified in the NCSA Project Document which include among others, the following:-

- Formulation of national policy on climate change;
- Equitable allocation of financial and human resources between central administration and line ministries on the one hand and provincial and local administration on the other;
- Data and information systems are inadequate to support decision making on matters related to climate change;
- Roles of stakeholders on UNFCCC related issues are not clearly defined;
- Dissemination of information on climate change is inadequate for decision making;
- Inadequate communication, linkages, coordination among institutions implementing climate change related activities; and
- Domesticating the UNFCCC.

International consultants will be outsourced if need be.

Constraints and gaps, and related financial, technical and capacity needs

The financing mechanisms of the Climate Change Convention (UNFCCC) offers opportunities for Zambia to access financial resources for implementing the identified and formulated policies, programmes and projects aimed at reducing greenhouse Gases (GHGs). Some of the identified funding mechanisms based on the INC included among others, the following:

- Clean Development Mechanism (CDM);
- Joint Implementation (JI);
- Activities Implemented Jointly (AIJ);
- SADC Climate Technology Initiative (CTI) Needs Assessment;
- Organizations for Economic Cooperation and Development (OECD) countries;
- The Dutch Government through the Directorate General of International Cooperation (DGIS) of the Ministry of Foreign Affairs sent an Identification Mission to Zambia involving consultants of External Technical Cooperation (ETC) Energy;
- Joint Implementation, Proef-Projecten Programma (JI-PPP);
- United States Agency for International Development (USAID);
- Germany Development Agency (GTZ);
- NORAD; and
- DANIDA.

Assessment of whether some of the reported INC constraints or gaps and related financial, technical and capacity needs have been addressed will be reported in the SNC.

Zambia has up-to-date not formulated the National Climate Change Policy. Financial resources through the UNFCCC financial mechanisms are needed for formulating the National Climate Policy as well as building capacity in order to:-

- Prepare a national climate policy;
- Prepare a national research programme on climate change; and
- Strengthening public awareness and education programmes on climate change.

The concept of Joint Implementation through the Dutch Government has, to date, not yet been materialized in the African continent. In order to boost this, DGIS selected a number of countries in Africa in which it wanted to explore possibilities for AIJ namely; Senegal, Ghana, Uganda and Zambia. The identification Mission carried out by the consultants of ETC Energy, explored opportunities for AIJ in Zambia within the framework of the JI-PPP of the Netherlands. During the Mission, the Zambian policy framework was assessed on its supportive characteristics towards AIJ, and on its institutional capacity.

The funds that were allocated to the INC project were not adequate because of the many activities under the original objectives of the project. For example, some of the workshops were held at locations outside Lusaka. This entailed transport and accommodation costs as well as fees for paying the consultants. Good quality workshop reports were also expensive to produce.

There is need to mobilize financial resources from the CCC through SADC Climate Technology Initiative (CTI) in order to enable Zambia conduct the needs assessment on the reduction of GHGs. With the ratification of the Kyoto protocol, developing countries should push for developed country parties to the Convention to take all practical steps to promote, facilitate and finance as appropriate, the transfer of, or access to environmentally sound technologies and know-how to other parties, particularly developing countries. It is also

important that an implementation plan for the market based diffusion of climate technologies and related barrier removal actions in Zambia is prepared.

Zambia has already taken positive steps to replace power diesel gen-sets with mini-hydros/ mains power e.g. in Solwezi, Mwinilunga and Kaoma The use of fossil fuel fired boilers has also been substituted with electric boilers in the industrial sector.

Areas which need to be updated on the basis of descriptions provided in the INC

These include both policy strategies and studies listed below:

Policies Strategies

There is need to formulate Climate Change Strategies. There is also need to ensure that relevant policies are climate change responsive.

Studies

Formulate a formalized institutional arrangement for implementation of future National Communications aimed at providing continuity and sustainability, and update sections of the INC as recommended in the Self-assessment exercise report:

I. NATIONAL CIRCUMSTANCES

Update national circumstances in tandem with obtaining natural resources, and socio-economic environments.

II. GHG INVENTORIES

Undertake studies aimed at improving the quality and transparency of GHG inventory.

Energy:

- Realignment of the energy balance to conform to the UNFCCC reporting classification;
- Determination of appropriate emission factors for biomass combustion and charcoal production, and development of reliable biomass activity; and
- Use of IPCC Good Practice Guidelines to include uncertainty assessment, and QA/QC plan.

Industrial Processes:

As for the way forward it is recommended to include HFCs and SF₆ under the SNC.

Agriculture, Forest and Land use:

- Determine reliable activity data for agriculture, forest and land use based on the 2006 guidelines;
- Determine emission factors for agriculture, forest and land use based on the 2006 guidelines;
- Develop land use datasets based on the 2006 IPCC Guidelines;
- Determine livestock populations and feed characteristics;
- Determine activity data and emission factor for croplands and grasslands based on the 2006 Guidelines;
- Use GIS to obtain land use change characteristics; and
- Use IPCC Good Practice on Land use change to include uncertainty assessment and develop a QA and/QC plan.

Waste

- Determine reliable activity data on solid waste management and waste water flow from utilities and industries; and
- Use appropriate emission factors for waste management.

III. MITIGATION

- Studies/analysis for mitigating GHG emissions; and
- Technology mitigation assessment with stakeholder participation involving industry and determination of CO₂.

IV. VULNERABILITY AND ADAPTATION

- Conduct V and A studies/analysis in areas identified under INC and not adequately addressed under the NAPA study.

Capacity Building

Develop institutional and human capacities through the following programmes:-

- Enhance the capacity of the ZMD, ECZ, MTENR and UNZA in order to improve their participation in climate change activities. In particular development of capacity in ZMD will enable the department to undertake national systematic observations related to the global climate observation system through:
 - Increasing the number of observation stations in the country;
 - Conducting regular inspections of existing observation stations;
 - Improving observations of the upper atmosphere;
 - Provision of basic equipment and skilled human resources; and
 - Development of an effective data management system.
- Strengthen public awareness and education programmes on climate change.

V. COMPILATION OF THE SNC

The SNC will be compiled under the following major subheadings:

- National Circumstances;
- GHG;
- Vulnerability and Adaptation;
- Mitigation;
- Climate Observing System;
- Research; and
- Training, Public Education and Awareness.

VI. NEW INFORMATION WHICH NEEDS TO BE REPORTED (NOT PREVIOUSLY COVERED) IN THE INC

There is need to mainstream cross-cutting issues of environment, gender, poverty and HIV/AIDS into the preparation of the SNC.

Appendix B: Technical Components of the project proposal

Background

Refer to the Situation Analysis above.

Project development and main objective

Project Development Objective:

The project will strengthen technical and institutional capacity to assist Zambia mainstream climate change concerns into sectoral and national development priorities.

Project Immediate Objective:

The project will enable Zambia to prepare and submit its second national communication to the UNFCCC and meet its Convention obligations.

Project strategy

Zambia signed the UNFCCC on 11th June, 1992 and ratified it in March, 1993. As a Party to the Convention, Zambia has accepted the commitment to produce periodic National Communications to the Conference of Parties (COP). The preparation of the Second National Communication is a continuation of the process of institutionalizing climate change in national development that was initiated under the INC. It will allow for the further development of expertise in each sector involved in the preparation of the National Communication, enhance the institutional capacity in these fields, and increase the awareness of people and institutions concerning the UNFCCC and global warming issues. The National Steering Committee (NSC) will be strengthened and supported to allow it to guide the project on behalf of the Government. The NSC is broad-based in composition and includes representatives from government, private sector, non-governmental agencies and academic institutions and will be supported by a secretariat or climate change office.

The Government of the Republic of Zambia is fully committed to implementing and fulfilling its obligations under the UNFCCC, and hence the goals and objectives of this project. The strengthening of scientific, technical and institutional capacity of Zambia in the proposed activities, as well as the leading role taken by the ENRD/MTENR to execute the project, would enable the country to fulfill its obligations to the UNFCCC. The project management structure is designed to secure full participation of local experts in all aspects of activities to achieve sustainability. The ENRD/MTENR will provide counterpart staff while the project will facilitate the development of technical competence and expertise in climate change activities.

The SNC project will operate within and support the FNDP 2006 - 2011/UNDAF 2007 -2011, which are to increase livelihoods and food security among most vulnerable groups and to strengthen the capacity of government and civil society institutions to deliver and monitor essential services. The CPP focus areas of poverty reduction, energy and environment for sustainable development, frameworks and strategies for sustainable development, effective water governance, access to sustainable energy services, sustainable land management to combat desertification and land degradation, and conservation and sustainable use of biodiversity are directly or indirectly linked to project components and activities.

Project's activities

Output 1. National Circumstances

The INC chapter on national circumstances will be updated and expanded with the inclusion of national development issues including linkages to the MDGs, the Poverty Reduction Strategy Paper 2002 - 2004,

Transitional National Development Plan (TNDP) 2002 – 2005, the FNDP 2006 – 2011 and UNDAF 2007 - 2011. There is a need for more background information and detailed studies on the climate change linkages with some of key issues addressed in the aforesaid documents/plans.

Activity 1: *Update of national circumstances*

Most of the information reported in the INC remains valid but will be updated as needed.

In the FNDP, a much more holistic approach has been taken, with the strategic focus being infrastructure development in all sectors. A highlight of this focus in all the sectors from the economic sectors to the public safety sector incorporates cross-cutting issues such as HIV/AIDS, which are discussed at the national level. Government's focus in the economic sector is to encourage strong broad based and sustainable economic growth. With the sale of mines, opportunities arose for the other sectors, such as Agriculture and Tourism, to be the main sources of growth and a back-born towards sustainable development in Zambia.

Existing reports by Central Statistical Office, (CSO) indicate that overall poverty in Zambia is 68%. Rural areas continue to experience high poverty level at 72% and the focus on agriculture is aimed at tackling it (poverty level). However, agricultural productivity, competitiveness and production in Zambia is relatively low due to several factors including lack of mechanisms to mitigate climatic risks and inadequate labour due to the negative impact of HIV/AIDS on the productive capacity of households. The Tourism Development Credit Facility (TDCF) established by Government in 2003 through which Zambians are provided with affordable credit to set up businesses in the hospitality industry is an example of Government's efforts to reduce poverty through economic empowerment.

Available information and statistics on these issues will be sourced from the relevant agencies for use in preparing this section of the SNC.

Output 2 Greenhouse Gas Inventory

The studies highlighted below are aimed at improving the quality and transparency of SNC under GHG inventories.

Energy Sector:

Activity 2.1: Realignment of the Energy Balance to conform to the UNFCCC reporting classification.

There is need to revise the Zambian Energy Balance structure so that it is in conformity with the IPCC guidelines in order to improve data accuracy in the SNC. Moreover, data on climate change kept by different institutions need to be standardised so that reproducibility and comparison become easier.

Consultations with energy experts in the Department of Energy, ZMD etc will help narrow the differences.

Activity 2.2: Determination of appropriate emission factors for biomass combustion and charcoal production, and development of reliable biomass activity.

Although emission factors specific to the Zambian situation were utilized severally during implementation of the INC, there is need to refine them so that the use of default values from the IPCC guidelines is reduced. For instance, the local carbon/nitrogen ratio of forest biomass used in the INC is 0.002, which is lower than the IPCC default value of 0.01. Furthermore, the lack of reliable biomass activity data and appropriate emission factors for biomass combustion and charcoal production requires attention.

Researchers from the Department of Biology at the University of Zambia and other tertiary institutions who have been in the forefront of conducting work on biomass activity data and emission factors will be empowered

in order to achieve the necessary results. Use of GIS to get time series biomass deforestation in Zambia is required too in order to improve data accuracy.

Activity 2.3: Use of IPCC Good Practice Guidelines to include uncertainty assessment, and QA/QC plan.

Assessment and management of data quality are tools that improve the reliability of computed GHG emissions thereby ensuring that the inventory represents the best possible estimates of emissions and sinks save for current technological shortcomings. There was lack of data management and uncertainty assessment during the INC.

The IPCC Tier 1 General Inventory Level Quality Control Procedures will be adopted for this purpose.

Industrial Processes

Activity 2.4: Update of GHG inventory of HFCs and SF₆.

It has been established that some of the chemicals containing chlorine and bromide, widely used in the Refrigeration and Air-conditioning as well as the Agriculture sectors worldwide including Zambia deplete the ozone layer.

There is growing indication that there continued use will accelerate depletion of the ozone shield with grave consequences for human health, food production systems and ultimately for the ecosystems that support life on Earth.

The monitoring of Ozone Depleting Substances (ODS) use in Zambia is an ongoing exercise that basically will enable the country meet its obligations under the Montreal Protocol and its subsequent amendments. In 1998 Zambia developed its Initial Refrigerant Management Plan (RMP) for the phase-out of ODS in the country followed by an update of the same in 2004. Based on the survey conducted in 2003, Zambia's ODS burden (inclusive of methyl bromide) was estimated at an annual average of 61.4 tonnes or 0.01 kg per capita between 2000 and 2002.

The GHG Inventory of HCFs and SF₆ during the SNC will start with a review of available data and reports at the Environmental Council of the Zambia the focal point for ODS. Appropriate questionnaires will then be circulated to relevant stakeholders for the necessary input.

Agriculture, Forest and Land use

Activity 2.5: Determination of reliable activity data and emission factors for the sector.

The agricultural sector is critical in poverty reduction and economic development of the Zambian economy and will be the engine of growth for the next decade and beyond. The sector generates between 18% and 20% of the Gross Domestic Product (GDP) and the majority of the rural people derive their livelihood from agricultural related activities. Improved agriculture will thus increase rural incomes thereby reducing overall poverty as well as increasing food security. All this underscores the importance of ensuring sustainable growth in the agricultural sector in order to significantly contribute to Zambia's industrialization and development. As mentioned earlier, the FNDP will promote sustainable agriculture in order to engender food security at both household and national levels.

During the INC, emissions from agriculture namely CH₄, N₂O, CO and NO_x were determined from five sources: domestic livestock (enteric fermentation and manure management), rice cultivation (flooded rice fields), prescribed burning savannahs, field burning of agricultural residues and agricultural soils. Emissions

from Land use change and forestry originate mainly from on site forest biomass burning, from forest biomass decay, and offsite burning of firewood and charcoal.

The shortcomings in the GHG inventory for agriculture sector include lack of activity data i.e. crop production and soil quality, livestock population etc. Variant emission factors were used in this sector while different databases and models were the norm in the Forest and Land use sub-sectors creating uncertainty.

In the SNC there is therefore need for reclassification and determination of emission factors. Use of GIS to get time series biomass deforestation data might improve the credibility of data for this sector too.

In this regard, the GIS databases on forest and land use in the School of Engineering at the University of Zambia and Ministry of Lands (Survey Department) will be updated in order to obtain land use change characteristics. By and large, these studies will contribute towards entrenchment of IPCC Good Practice and development of a Quality Assessment and Quality Control for the sectors in question.

Waste

Activity 2.6: Determine reliable activity data on solid waste management and wastewater flow from utilities and industries

Land contamination from solid waste disposal continues to grow as an environmental problem. Although still a relatively new issue in environmental protection in Zambia, waste management particularly the management of municipal solid waste (domestic, trade and manufacturing and hospital waste) has emerged as serious environmental concerns in urban areas. The extraction and production processes of industries also have negative impacts on the environment, which principally relate to disposal of waste, which generate both on and off-site pollution. Notable polluters include chemical fertilizer plants, textile factories, edible oil factories, tanneries and cement factories. Land dereliction is also a problem in mining areas. The problem occurs and manifests itself as tailing dumps largely un-vegetated and aesthetically unpleasant.

The FNDP promotes environment management in order to guide the utilization of environmental goods and services and to promote sustainable development in Zambia. The Environmental Protection and Pollution Control Act No. 12 of 1990 and Statutory Instrument No. 71 of 1993 and Water Pollution Control (Effluent and Wastewater) Regulations of 1993 are key in this regard. The National Environmental Policy 2006 recognizes that climate is a fundamental natural resource, which if not well managed, can become a major constraint to socio-economic development. Air pollution should be reduced in order to provide a healthy and sustainable environment for socio and economic development. Greenhouse gas emissions must be reduced and greenhouse gas sinks must be enhanced in order to prevent interference with the climate system. Additionally, the Meteorology Policy emphasizes the need for a systematic climate monitoring system.

In accordance with the Statutory Instrument No. 71 of 1993, the Lusaka City Council has developed a landfill near Matero Compound. Moreover, the National Housing Authority conducted a study on Waste Management in some towns of the Copperbelt province.

Methane (CH₄) is the predominant greenhouse gas from land-waste. Using IPCC methodology, CH₄ was determined from solid waste disposal sites, domestic/commercial wastewater and sludge, and industrial wastewater and sludge. The methodology required data for annual industrial output for each of the following industries in the country: non ferrous metals, canneries, beer, wine, meat packing, dairy products, sugar, oil and grease, coffee, soft drinks, petroleum refining, textiles, coal mining and soap and detergents. This data was obtained from the Central Statistics Office (CSO) and a few companies involved in these activities. Emission factors used were IPCC default figures.

Lack of stakeholder involvement and reliance on IPCC emission factors during the INC created uncertainty in GHG emission data compiled. In the SNC a deliberate attempt will be made to involve key stakeholders as well as using appropriate emission factors for waste management.

Output 3 Mitigation

Activity 3.1 Technology mitigation assessment

Greenhouse gas emissions in Zambia namely carbon dioxide, methane and nitrous oxide are relatively low. However, despite low greenhouse gas emissions, the threat of climate change looms in Zambia. Results of the INC showed that Zambia was a net carbon dioxide emitter amounting to 1,206.05 Gg in 1994.

The National Environmental Policy 2005 and The National Energy Policy 2006 are in part focused on ameliorating the effects of GHG emissions in the country. In particular the NEP 2006 takes account of important issues such as the high incidence of poverty, the HIV/AIDS epidemic, gender, environment and household energy, rural electrification and role of bio-fuels in Zambia's future energy mix. The consumption of gasoline blended with ethanol in the transport market in particular will to some extent ameliorate GHG emissions in the country.

The LEAP Model will be used to develop baseline and GHG emissions reduction (mitigation) scenarios and their respective projections in economic sectors of interest up to the year 2030. Based upon the energy and GHG emission characteristics of the baseline scenario the mitigation scenario will be constructed using alternative technologies, which have the potential to reduce emission either through improved efficiency or fuel substitution. The selection of these alternative technologies will be based on whether or not they meet the following criteria:

- Potential to reduce GHG emission;
- Applicability and affordability within the Zambia socio-economic and environmental conditions; and
- Conformity with the national development goal of poverty alleviation.

Stakeholders from the industry will be involved in this study in order to promote ownership.

Activity 3.2 Assessment of cost of GHG emission reduction e.g. CO₂ saved per dollar invested.

Following the screening of the GHG mitigation options with the above-mentioned criteria, the selected technologies will then be subjected to GHG abatement costing analysis using the GHG Abatement Costing Model (GACMO). This model will facilitate the assessment of the GHG reduction potential and costs associated with the mitigation scenario. Cost adjustment based on the prevailing tax regime at a 10% discount rate will be applied.

Output 4 Vulnerability Assessments and Adaptation Measures

The INC showed that Zambia's agriculture and livestock, wildlife, forestry, water and health sectors are highly sensitive to impacts due to climate change. The arid south, under the agro-ecological Zone I, is adversely affected and is characterized by less rainfall, poor soils and prolonged high temperatures.

This realization has led Government to develop appropriate policies with supportive programmes to adapt to these impacts albeit with little success as the result of limited human and financial resources. No wonder therefore that despite reaching the HIPC completion point in April 2006, the deteriorating environment due to wide spread poverty and the HIV/AIDS scourge continue to put pressure on Government's limited resources and hence Zambia's inability to adequately prepare herself for adaptation.

In 2005, Zambia launched the National Adaptation Programme of Action (NAPA) project with support from the United Nations Development Programme (UNDP) and the Global Environmental Facility (GEF). This project is designed to assist Zambia develop a home grown programme of action that identifies as well as addressing urgent needs and concerns of the country for adaptation relating to the adverse effects of climate change in economic sectors that are most vulnerable e.g. agriculture. Phase-one of the NAPA, which attempted to provide an analysis of climate, and climate change/variability in Zambia under baseline (1970-2004) and projected (2010-2070) scenarios and establish a “Climate Change Information and Data Unit” (CCIDU) aimed at providing baseline and projected data to enable Sector Consultants undertake empirical studies and expert judgments required to formulate adaptation and implementation strategies is almost complete. It is hoped therefore that the NAPA project document together with the Self-assessment report are useful inputs into the preparation of the SNC.

The studies recommended under the SNC are equally supportive of strategies and programmes highlighted in the FNDP. For instance, under the agriculture sector the following programmes in the FNDP are climate change related: *Irrigation Development Support, Livestock Production, Training and Extension and Agricultural Seed Support*. Similarly under the water sector the overall goal of the Water Resources Management Sub-Sector Programme is to manage and allocate the water resources *for equitable economic growth, food security and poverty alleviation*.

Activity 4.1 Conduct Vulnerability and Adaptation Studies in areas identified under the INC and not adequately addressed in the NAPA

The stocktaking workshop observed that there were serious shortcomings in V & A studies undertaken for the INC reporting primarily due to inadequate data and limited scope of coverage. This was true for all the sectors except agriculture. It is necessary therefore to address these shortcomings but mindful of the outcome of phase one of the NAPA where for instance Participatory Vulnerability Assessment in agriculture and health was adopted. Without exception, the V & A studies for the SNC shall be extended to agro-ecological Zones II and III.

The consultants undertaking the V & A studies will be guided by the IPCC Guidelines, UNDP Adaptation Policy Framework and, NAPA Guidelines.

The V&A section will address the following areas:

Policy and institutional issues

1. Identify the key policy issues the V&A study of the SNC project aims to address to ensure that the studies address the priorities areas. Activities include:
 - a. scope the scale of risks associated with projected climate change;
 - b. identification of priorities for adaptation;
 - c. build on the NAPA outcomes to ensure the development of a coherent national adaptation strategy.
2. Design an implementation strategy in consultation with the relevant stakeholders to ensure that impacts assessment at the sectoral level for the priorities identified take into account the needs of the most vulnerable population and regions. Thus the adaptation strategies will include policies, programs and, where appropriate, project ideas to facilitate their implementation in the short and long terms .
3. Develop a clear strategy to link the V&A outputs to national development planning. This would include, among others:
 - a. assessment of institutional arrangements/stakeholders engagement required to facilitate linking the outcome of the V&A studies to sectoral or national planning;

- b. framework for assessing how the above linkage can be monitored and measured in the short and long terms, for instance through the development of practical indicators.

Technical issues

Scope of the V&A study

4. Elaborate on the scope (geographic, thematic, sectoral coverage, time horizon) of the V&A study, e.g.,
 - a. designing a strategy to build on but advance what was done within INC and the NAPA project;
 - b. elaborating on the scope of studies to address sectors/regions identified as sensitive/vulnerable to climate change;
 - c. designing a strategy, as applicable, to link the V&A studies with previous and ongoing related projects/activities (e.g., land degradation, biodiversity, international waters.)

Methodological framework

5. Elaborate on the overall methodological framework for the V&A study ensuring that:
 - a. The methodological framework is the most appropriate given the need to address policy concerns, the characteristics of the study (e.g., sectoral focus, spatial and temporal scales, stakeholders involved, and data requirement, etc.), and data availability;
 - b. In-country expertise required to carry out the studies are adequately trained, as needed.

Scenarios development

6. The studies will identify and develop the climate change scenarios required to conduct the V&A assessment, e.g., climate, socio-economic, sea level, adaptive capacity, etc.
7. Identify the temporal and spatial resolution needed for these scenarios (e.g., national, sub-national, watershed, community, farm level, multi-decadal average, annual, monthly, daily, mean conditions, extreme events, etc.). In doing so, the expert should justify the choices.
8. Develop the strategies for developing such scenarios, e.g., model-based, expert judgment, etc.

In the preparation of the scenarios development strategy, the SNC will assess the data and capacity needs for developing these scenarios. If data and technical capacity constraints are not feasible to address in the context of the SNC, alternative options to running regional climate models will be explored..

Sectoral assessment

9. Identification of the appropriate methods and tools to undertake sectoral assessments, considering the research questions, characteristics of the study, and requirements of data and technical expertise of these methods/tools.
10. Assess in-country expertise required to apply the selected methods/tools and prepare training/technical backstopping strategy as required.
11. Develop a strategy to integrate findings from sectoral assessment, as needed. For instance, by applying an integrated model, synthesizing sectoral information, etc.

Outcome 5 Creation of enabling environment to the achieve the objective of the Convention

Zambia has adequate policy frameworks to adequately adapt to the predicted effects of climate change and global warming or to support full and effective participation in the Convention. However, with a few

exceptions the country lacks institutional, human and technical capacities to deliver on its obligations under the UNFCCC. The country is however committed to develop and enhance its capacity and capability but these must be linked to its national development mechanisms and processes. The NCSA and other assessments have addressed issues under capacity building. Synergies and cooperation between government, private sector and civil society and between Rio Conventions will result in increased efficiency in implementation and allocation of limited financial and human resources. The MTENR is committed to achieving the goal of mainstreaming climate change into national development and policy efforts such as the FNDP and Vision 2030.

Activity 5.1 Formulation of institutional framework for implementation of future national communications

Although, the project management structure for the SNC appears sound, past experience calls for the formulation of an institutional framework responsible for implementing future national communication among others. The proposed institutional framework is required in order to provide continuity and sustainability.

The MTENR will hire a consultant who is qualified in policy and institutional framework development to prepare the required document.

Activity 5.2 Development of national climate change policy strategy and action plan

A Climate Change Strategy and Action Plan will be developed to give meaning to the National Environmental Policy and other relevant policies.

A consultant qualified in policy development will be hired to prepare the necessary strategy and action plan.

In order to become effective, the strategy and action plan will be presented to the MTENR for onward submission to Cabinet.

Activity 5.3 Institutional and Human Capacity Building

It has been proposed to build both human and institutional capacities during implementation of the SNC project in order to create a pool of future experts in climate change issues. The beneficiaries are the Zambia Metrological Department (ZMD), the MTENR, Environmental Council of Zambia and the two Universities.

Capacity building in the ZMD is designed to improve observations of the upper atmosphere and to develop an effective climatic data management system. Capacity building at UNZA and CBU will focus on improvement of GIS facilities in place.

Capacity building in Government departments/agencies will be through an attachment arrangement whereby the nominees will work along side technical institution (s) hired to implement the SNC project.

Activity 5.4 Education and public awareness

The teaching of environmental science in primary schools is devoid of climate change issues. In order to inculcate the understanding of climate change issues at an early age, the content of the primary science syllabus will be revised and broadened to include some relevant topics. Support to the Enviro-newsletter of the ECZ and the hosting of climate change workshops involving parliamentarians, journalists, NGOs, CBOs and the general public will be promoted.

Outcome 6 Constraints and gaps, and related financial, technical and capacity needs

One of the major gaps identified in the INC is inadequate funding which made it difficult to formulate policies/strategies and/or implement programmes/projects aimed at reducing GHG emissions. This anomaly is

worsened by the fact that at the end of the INC process Zambia did not receive Top-Up funds for Technical Needs Assessment.

However, with the ratification of the Kyoto protocol, Zambia like other non-Annex 1 Parties are eligible to receive financing under the UNFCCC and therefore implement some of the identified GHG mitigation programmes. A number of CDM projects in the energy sector have already been developed. The next step is to develop CDM projects in other sensitive sectors of the economy e.g. agriculture. Technical assistance will be required to achieve this.

Activity 6.1 Development of projects in sectors other than energy

An international consultant will be required to hold a workshop on CDM financing in Lusaka and on the Copperbelt. Ideally these workshops will create capacity and future business development in the new carbon market. A list of projects proposed for financing will be reported in The SNC.

Outcome 7 Technology Needs Assessment

In order to provide the means to integrate the key elements of climate change technologies and opportunities into the overall sustainable development agenda, a Technology Needs Assessment (TNA) is to be undertaken as part of the key activities of the SNC. The TNA process is expected to reflect national response to climate change technology needs which are informed by the private sector, the general public and other key stakeholders in the economy. The key activities to be undertaken include:

Preparation of Preliminary Overview of the Sectors: This shall involve the collection of existing data and information that pertains to the Sector, which may be based on a combination of sources of information: national communication, vulnerability and adaptation assessments, and national/sectoral development plans, among others. This shall be divided into the two:

- (a) ***Mitigation:*** For mitigation, the sectoral overview shall include:
 - Review of GHG Inventories to establish the major GHG emitting sectors, as well as any data gaps in the emission inventories;
 - Identification of key sectors to provide the interrelationships between emission sectors to identify synergies options and optimization technology options; and
 - Review of plans to identify and chronicle development plans and policies in the identified sectors, in order to provide an understanding of the expected future growth.
- (b) ***Adaptation:*** For Adaptation, the sectoral overview shall include the identification of vulnerable sectors, with respect to obtaining relevant information regarding
 - Extent and specific sector vulnerabilities
 - Cross-cutting issues and indirect impacts on other sectors, together with socio-economic implications
 - Adaptive capacity of vulnerable sectors.

Identification of Technology Criteria for Assessment: This shall use the three basic criteria for selecting technologies, namely (a) contribution to development goals, (b) contribution to climate change mitigation and adaptation, and (c) market potential, to establish the criteria for identifying appropriate technologies, based on a combination of procedures for assessment, including expert judgment, government policies and broad stakeholder consultations. For the mitigation technologies, this shall

- (a) ***Mitigation:*** For mitigation, this shall include:
 - Preparation of list of sectors to construct the criteria for selecting sectoral and technology options for mitigation.

- Review of technology options and resources that are applicable to GHG mitigation in the key sectors identified.

(b) **Adaptation:** For Adaptation, this shall involve the analysis of the environmental and cultural impacts of technology. This is to involve detailed assessment of environmental technology impact assessment, and the potential benefits to food security, health care improvements, and protection from natural and human induced disasters, among other socio-economic and cultural issues.

Prioritization of sectors and Selection of Key Technologies: The process of prioritization shall have the following components, (i) sectors with potential for benefiting from technology development and transfer, (ii) access and availability of the technology options; and (iii) policies which would support the adoption of technologies and processes identified.

(a) **Mitigation:** For mitigation, this shall involve the compilation of prioritized mitigation technology list, which is to include specific information on the technology itself, the criteria for selecting it for a specific sector or mitigation activity or set of activities, and the prioritization issues, such as the analytical tools used.

(b) **Adaptation:** For Adaptation, this involve:

- Prioritization of vulnerable sectors which shall involve extensive stakeholder consultation in addition to reviewing relevant national development data, and development plans to establish how these impact on identified sectors.
- Identification of sectoral characteristics, which could include geographical locations, strength and weakness of institutions, resilient features, competing interests and uses, and how these overlap with other sectors and opportunities for synergy.
- Compilation of response list, which is to address key identified vulnerabilities, which may include elements such as how response measures are to use technologies in an indirect manner.

Identification of Barriers and Policy Needs: This identifies the potential barriers militating against the implementation of selected technologies for the priority sectors identified. Stakeholders are considered very vital in the identification of barriers and policy needs.

(a) **Mitigation:** For mitigation, the identification of barriers and policy needs centers around the assessment of capacity needs for applying the prioritized technologies, as well as improving the understanding of how these affect the environment in various dimensions.

(b) **Adaptation:** For Adaptation, this centres around conducting an environmental technologies impacts assessment specifically for adaptation because of the scale of applications, and the need to avoid or minimize the risk of implementing mal-adaptation option which would eventually be very expensive or difficult to reverse.

Definition and Selection of Options: This step starts from re-visiting the priorities earlier identified based on barrier analysis, and selecting technology options based on a number of criteria, which shall include (i) win-win options that deliver both climate and other development objectives at low or even negative costs, (ii) promising long-term technology options which are not necessarily win-win options, but which in the long-run offer very significant promise in addressing climate change and the attainment of national sustainable development objectives. These shall be undertaken for both mitigation and adaptation technology options through a wide range of stakeholder participation, which shall be used in ranking the identified technologies for application selection in different mitigation and adaptation sectors.

Preparation of Synthesis Report: The preparation of a synthesis report provides the framework for coherent articulation of all identified TNA needs into an overview report which shall form the basis on which decisions are to be taken. This report is to be viewed as the beginning of of an on-going process that would be integrated

into a wider technology transfer activities to improve the flow of climate response and environmentally sound/sustainable technologies. It would contain elements such as:

- Key sectors affected
- Types of criteria applied
- Ranking and selection of process applied, and
- List of technologies that emerged as an output of the process, among others.

Identification of Actions and Opportunities for Implementation: The identification of actions and opportunities would document the framework to be adapted at national level to make the TNA process operational in order to deliver the expected outcomes to the economy. Some of the key issues required for implementation of TNA recommendations include:

- Assessment of Adequacy of Funds and proposition of effective financial mechanisms to support TNA implementation.
- Setting up of time frame and clear milestones to monitor progress.
- Identification of the various ways to improve the implementation strategies, especially by drawing-up of synergies with related programmes.
- Identification of institutional and policy framework to reduce barriers.
- Sustainable stakeholder involvement, and
- Continuous revision of plans as needed.

A draft report on the implementation mechanism shall be made available at the end of the activity, which shall be made to undergo stakeholder review and adoption.

Outcome 8 Preparation of Second National Communication

The SNC will be compiled under the following major subheadings:

- National Circumstances;
- GHG Inventory 2000;
- Vulnerability Assessment and Adaptation;
- Mitigation Analysis;
- Technology Needs Assessment
- Climate Observation System and Research;
- Training, Education and Public Awareness; and
- Implementation Mechanisms on Climate Change.

A thorough review of the FNDP 2006 -2011, UNDP-DAP 2007 – 2011 and MDGs Status Report 2005 will provide useful input and credibility to the SNC as mentioned earlier.

A preliminary Work Plan is shown in Table 2.

Detailed Work Plan

Output/Activities	YEAR 01				YEAR 02			
	1 st Q	2 nd Q	3 rd Q	4 th Q	1 st Q	2 nd Q	3 rd Q	4 th Q
1. National Circumstances								
2. GHG Inventory								
<i>Realignment of the Energy Balance to conform to the UNFCCC reporting classification;</i>								
<i>Determination of appropriate emission factors for biomass combustion and charcoal production, and development of reliable biomass activity.</i>								
<i>Use of IPCC Good Practice Guidelines to include uncertainty assessment, and QA/QC plan.</i>								
<i>Update of GHG inventory of HFCs and SF₆.</i>								
<i>Determination of reliable activity data and emission factors for agriculture, forest and land use sector</i>								
<i>Determine reliable activity data on solid waste management and wastewater flow from utilities and industries</i>								
<i>Calculation of GHG emissions in all sectors</i>								
<i>Design of an inventory management system to facilitate the sustainability of the inventory project</i>								
3. Programmes containing measures to mitigate climate change								
<i>Mitigation assessment methodologies and strategy to carry out the studies</i>								
<i>Development of business as usual and mitigation scenarios</i>								
<i>Assessment of cost of GHG emission reduction e.g. CO₂ saved per dollar invested.</i>								
<i>Prioritization of mitigation options and development of mitigation strategy</i>								
4. Programmes containing measures to facilitate adequate adaptation to climate change								
<i>Identification of methods and tools and detailed strategy to carry out the V&A work</i>								
<i>Development of climate and socio-economic scenarios</i>								
<i>Conduct Vulnerability and Adaptation Studies at the sectoral level</i>								
<i>Development of adaptation strategy</i>								
<i>Development of V & A Projects ideas</i>								
5. Technology Needs Assessment								
<i>Identification of methodological framework based on the scope of the mitigation and V&A assessment</i>								
<i>Compilation and analysis of appropriate technological options</i>								

<i>Assessing technology needs on the basis of the mitigation and V&A findings</i>								
<i>Prioritizing technology needs</i>								
5. Creation of enabling environment to the achieve the objective of the Convention								
<i>Formulation of institutional framework for implementation of future national communications</i>								
<i>Development of national climate change policy strategy and action plan</i>								
<i>Institutional and Human Capacity Building</i>								
<i>Education and public awareness</i>								
6. Constraints and gaps, and related financial, technical and capacity needs								
<i>Development of project ideas in sectors other than energy</i>								
7.Preparation of SCN								

Institutional Framework and project Implementation

The MTENR will appoint a project coordinator whose function is to administer the project on a day-to-day basis.

The ECZ will constitute a National Communications Technical Working Group (NCTWG) drawn from key relevant stakeholders. The function of the NCTWG is to ensure quality of study reports and monitor progress on deliverables.

Institutions with sufficient technical and professional capacity in climate change issues, which can either be a government agency or any reputable institution will be appointed by MTENR in order to carry out studies related to the communication process.

Each technical institution so appointed, will build a multi disciplinary core team from experts with relevant experience to undertake in-depth studies in accordance with the terms of reference that will be prepared by the ENRMD in consultation with the NCTWG.

To develop capacity in relevant institutions for future national communication reporting, one or two persons will be nominated from such institutions to work with the core team through learning by doing.

The UNDP based in Lusaka being the GEF implementing agency for this project, will provide technical support as well as advisory services to the project.

Assessing Project Impact

Provision has been made to conduct an end-of-project evaluation a few months after the completion and submission of the SNC. A short-term consultant will be for this purpose. The UNDP country office may decide to utilize the UNDP Environmental Outcome Evaluation to determine the impact of the project.

At the beginning of the project, a practical framework to assess capacity development and the potential impacts of the national communication process will be developed. The framework may look into five strategic areas: 1) Capacity to conceptualize and formulate policies, legislation, strategies and programmes; 2) Capacity to implement policies, legislation, strategies and programmes; 3) Capacity to engage and build consensus among all stakeholders; 4) Capacity to mobilize information and knowledge; 5) Capacity to monitor, evaluate, report and learn will be included in the framework.

The framework will identify a few practical indicators to assess the impacts of the SNC in incorporation climate change concerns into development and sectoral planning, as appropriate. The National Communications Support Programme (NCSP) would provide guidance on developing an impact assessment framework, linked to the different components of the SNC, and the possible indicators that may used to assess impacts.

In developing this framework, capacity development impacts may be given special attention. In general, capacity development can be assessed at three levels:

a) At the individual level - the process of changing attitudes and behaviors, most frequently through imparting knowledge and developing skills through training, learning by doing,

participation, ownership, and processes associated with increasing performance through changes in management, motivation, morale, and levels of accountability and responsibility.

b) Capacity development at the organizational level - overall performance and functioning capabilities, such as developing mandates, tools, guidelines and information management systems for the ability of the organization to adopt change.

c) At the systemic level - creation of enabling environments i.e. the overall policy, economic, regulatory and accountability frameworks within which institutions and individuals operate, relationships and processes between institutions.

It is important to note that the development and adoption of such a framework would be a country-driven exercise that seeks to bring the SNC process closer to development priorities in the context on national policy-making. Under the guidance of the NCSP, Zambia would design an impact assessment framework that meets the country's needs and priorities in terms of facilitating the linkage between the SNC and development issues.

Appendix C: Terms of Reference for project staff

TOR for Project Coordinator

General:

Under the supervision of the Director - Environmental and Natural Resources Management and in consultation with the ECZ the Project Coordinator (PC) shall be responsible for day-to-day management, co-ordination and supervision of the implementation of the above-mentioned project. Specifically, his/her responsibilities are (but not limited to) the following:

Duties and Responsibilities:

- Supervises and ensures the timely implementation of the project activities as scheduled in the annual work plan;
- In consultation with the NSC and UNDP, prepares annual work plans for the project;
- Drafts terms of reference for contracts and subcontracts;
- Develops the scope of the work and other procurement documentation required to facilitate recruitment of experts and consultants;
- In consultation with the NSC and UNDP, identifies and facilitates the hiring / contracting of the national and institutions required to assist with project implementation;
- Supervises project support staff and consultants;
- Organizes and facilitates, as required, workshops and training sessions;
- Liaises with the relevant GRZ ministries, NGOs, and other institutions and stakeholders to support project activities, and to gather and disseminate information relevant to the project;
- Prepares the required periodic reports on project implementation;
- Monitors project expenditures and ensure adequate management of the resources provided for the project;
- Summarizes and synthesizes the results of the project;
- In consultation with the NSC and UNDP, identifies follow-up activities and mobilizes resources to the extent possible for implementation;
- Coordinates and facilitates cooperation and synergy with other relevant programs, projects and activities;
- Coordinates the finalization of the Second National Communication with guidance from the NSC, GRZ personnel and national experts;
- Ensures that the SNC process is implemented in accordance with the guidance provided by the COP of the UNFCCC and the GEF;
- Participates in local and international meetings and conferences on climate change, including UNFCCC events;
- Serves as secretary to the NSC; and
- Collaborates with relevant stakeholders and partners to ensure their involvement in the SNC.

Qualifications and Experience:

- At least master's degree in environment / natural resources related studies, management or other related disciplines;
- Good understanding of the Zambia environment/development issues;

- Six to eight years experience relevant to the project including relevant climate change and global warming issues experience;
- Demonstrated experience in project management;
- Demonstrated experience in working with government, donors and the United Nations Development Programme;
- Relevant experience working with NGOs and private sector;
- Substantial involvement in the preparation of the Initial National Communication is mandatory;
- Good understanding of government ministries and department's operational procedures;
- Familiarity with and participation in the international negotiations and processes under the UNFCCC;
- Excellent communication, drafting and writing skills in English; and
- Familiarity with computers and relevant software.

TOR for Administrative Assistant

General:

Under the direct supervision of the Program Coordinator, the Administrative Assistant will assist the Project Coordinator in the coordination and administration of daily activities of the Project. The AA shall serve as the administrative assistant to the Climate Change Office (CCO).

Duties and Responsibilities:

The AA will have the following duties:

- Manages the day-to-day operations of the CCO, particularly with respect to the provision of technical services and support;
- Ensures that necessary financial, procurement, disbursement and related matters are adequately addressed in line with UNDP and GRZ procedures;
- Compiles and/or prepares the documentation necessary for the procurement of services, goods and supplies under the project;
- Maintains the project's files and supporting documentation for procurements and payments;
- Assists the PC in the preparation of internal and external correspondence for the CCO as required;
- Maintains files, assists in the preparation of documentation in advance of and following all meetings, and prepares minutes as required;
- Assists with the organization of workshops, training sessions and other related activities for the project;
- Maintains correspondence and information exchange between project participants and other institutions;
- Co-ordinates and assists in travel arrangements for project personnel and activities;
- Assists the PC in the preparation of documents related to project activities; and
- Undertakes any other administrative/financial/technical duties as requested by the PC or the Director of Environmental and Natural Resources Management.

Qualifications and Experience

- At least a first degree, preferably in Business Studies or equivalent;
- Minimum of 5 years of working experience in the area of project administration/accounting;
- Demonstrable skills in Information Technology, including use of Word Processing, spreadsheets, PowerPoint, email and internet.
- Experience in Government and project management procedures;
- Familiarity with environmental issues, the UNFCCC and other Conventions;
- Fluent written and oral communication in English. Working knowledge of Zambian local languages will be an advantage;
- Strong time-management, organizational and inter-personal skills.

TOR for National Steering Committee (NSC) on Climate Change in Zambia

Background:

The Government of the Republic of Zambia signed the Rio Conventions⁵ in 1992 and has since then ratified them all. For Zambia to be able to meet its obligations and benefit from the conventions, several activities have to be undertaken. It is for this reason that the establishment of a National Steering Committee (NSC) to oversee the implementation of the Rio Conventions and other Multilateral Environmental Agreements (MEAs) is vital.

The Ministry of Tourism, Environment and Natural Resources (MTENR) with support from the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) has embarked on implementing two cardinal projects in the Ministry. These are the National Capacity Self Assessment (NCSA) project and National Adaptation Programme of Action (NAPA).

The NCSA project is aimed at strengthening Zambia's capacity for effective implementation of the International Environmental Agreements Conventions that the country has ratified, particularly the ones related to Biodiversity, Desertification, and Climate Change. Raising the country's capacity at individual, institutional, and systemic levels in these thematic areas, is expected to contribute to sound management of the country's environment and natural resources for sustainable development and poverty reduction. The NCSA will analyze Zambia's capacity strengths, constraints and needs, and recommend capacity development actions to address them. In addition, the NCSA will also identify crosscutting issues and foster synergies among the MEAs.

The preparation of the NAPA, on the other hand is a consequence of the decision of the seventh session of the Conference of the Parties (COP 7) to the United Nations Framework Convention on Climate Change (UNFCCC). The COP 7 in November 2001 decided that Least Developed Countries (LDCs) for which Zambia is a member should be assisted in preparing their NAPAs. Thus, the main aim of the project is to develop a realistically achievable country-driven programme of action and priority activities addressing the urgent and immediate needs and concerns of the country for adaptation relating to the adverse effects of climate change and variability in key sectors such as agriculture (Food security), water and energy, wildlife and forestry, and human health. The preparation of NAPA document, which is a blue print prescribing adaptation strategies and mitigation to impacts of climate change and variability, will be achieved through a wider stakeholder and participatory process.

Justification

The implementation of the NCSA and NAPA projects will require a fully functional steering committee to be put in place as soon as possible. In order to avoid duplication as the same members might be invited to sit on the committee (s), it is desirable that only one steering committee be established to handle all natural and environment issues including climate change related projects in the Ministry. The establishment of the steering committee in the Ministry is now fully recognized and is more urgent with the coming into force of the Kyoto protocol in February 2005 and the adoption of the Marrakech Accords in Montreal at the COP11 and the 1st Meeting of the Parties to the Kyoto Protocol (COP11/MOP1) in November/December 2005.

⁵ The Rio Conventions comprise the following: United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), and the Convention on Biological Diversity (CBD). These conventions were proposed at the Rio Summit held in Rio de Janeiro in 1992.

The established committee will provide the guidance needed for better coordination and integration of national natural, environmental and climate change issues. The committee will also spearhead capacity development efforts for the country to respond to all environmental issues related to different areas but all mainly related to the three conventions and other convention obligations and agreements. If deemed necessary, the mandate of the committee can further be expanded to ensure that Zambia does not only meet its obligations under various conventions but also fully benefits from her participation.

Mandate of the NSC:

The NSC in partnership with key relevant stakeholders will be responsible for giving guidance, advice for mainstreaming, and general oversight of all projects dealing with natural, environment and climate change related issues in the MTENR. In general terms and in liaison with the Director – ENRMD, the committee will have the powers to approve projects and coordinate the implementation of activities. It will also be used as a catalyst for translating national strategies into desirable action while supporting national sustainable development initiatives. Specifically, the NSC will have the crucial role of spearheading the development of environment and climate change related projects in the Ministry. The roles and responsibilities will include, but not limited to the following:

- Provide strategic oversight and policy guidance to all projects in the MTENR that have a bearing on climate change in Zambia;
- Provide the necessary liaison between programs and key political leadership;
- Approve workplans, budgets, and assign and provide oversight of technical work programmes of such projects/programs;
- Periodically (quarterly and other meetings as directed by the chair) review progress of the project through monitoring and evaluation;
- Lead and be responsible for the coordination of the development of all strategic and policy documents on climate change;
- Guide implementation of all projects to ensure wider and active stakeholder participation and consultation in developing National Action Plans;
- Oversee smooth transition of project activities into programmes for future follow-up and how they integrate in the National Strategic Plans and UNFCCC frameworks;
- Spearhead a timely response and implementation of the UNFCCC (including its Kyoto Protocol), and other conventions;
- Review national progress and experience to date in the implementation of the National Biodiversity and Action Plan and the National Action Plans under the UNCCD and UNFCCC;
- Guide preparations for a national workshop to launch the relevant projects strategy and action plan;
- Oversee the implementation of the Clean Development Mechanism (CDM) through the Carbon trading markets and other clean environment programme initiatives and;
- Facilitate mobilization of resources from cooperating national and international partners.

Appendix D: Key Groups of Stakeholders to be Actively Involved Throughout the Preparation of the SNC.

Environmental Council of Zambia
Ministry of Tourism, Environment and Natural Resources
Ministry of Energy and Water Development
Department of Energy
Zambia Meteorology Department
Ministry of Commerce, Trade and Industry
Center for Energy, Environment and Engineering in Zambia
Zambia Consolidated Copper Mines-IH
Ministry of Finance and National Development
Njuwe Consultants Limited
Ministry of Transport and Communications
Department of Mechanical Engineering (UNZA)
Department of Electrical and Electronic Engineering (UNZA)
Department of Physics (UNZA)
Department of Environmental Studies (CBU)
Zambia Association of Chamber of Commerce and Industry
Ministry of Agriculture and Co-operatives
Ministry of Foreign Affairs
Bankers Association
Nakambala Sugar Estates
Kafue Sugar Estates
Kalungushwi Sugar Estates
Department of Forestry
Ministry of Health
Office of the Vice-President – Disasters Department
National Economic and Advisory Council
Chamber of Mines
Energy Regulation Board
National Institute for Science and Industrial Research
Wildlife and Conservation Society of Zambia
Zambia Wildlife Agency
The World Wide Fund for Nature
Zambia Farmers Union
ZESCO Ltd

Secondary Group Of Stakeholders That Will Be Consulted At Different Stages Of the NSC Preparatory Process

- Municipalities
- Industries
- NGOs
- CBOs

Appendix D: Endorsement Letters:

Endorsement Letter - GEF Focal Point/UNFCCC Focal Point

SIGNATURE PAGE

Country: Zambia

UNDAF Outcome(s)/Indicator(s):
(Link to UNDAF outcome. If no UNDAF, leave blank)

Expected Outcome(s)/Indicator (s):
Sustainable management of environment and natural resources incorporated into national development frameworks and sector strategies

Expected Output(s)/Indicator(s):

1. National circumstances
2. GHG inventory
3. Programmes containing measures to facilitate adequate adaptation to climate change
4. Programmes containing measures to mitigate climate change
5. Creation of an enabling environment to achieve the objective of the convention
6. Constraints and gaps, and related financial, technical and capacity needs

Implementing partner: Ministry of Tourism Environment and Natural Resources

Programme Period:	2007 to 2009
Programme Component:	Energy and Environment for Sustainable Development
Project Title:	PIMS 3357: Enabling Activities for the Preparation of Zambia’s Second National Communication to the UNFCCC
Project ID:	
Project Duration:	2 years
Management Arrangement:	National Execution

Budget	455,000
General Management Support Fee	
Allocated resources:	
• Government	In kind
• Regular	
• UNDP	
Total budget:	455,000

Agreed by:

<u>On behalf of:</u>	<u>Signature</u>	<u>Date</u>	<u>Name/Title</u>
Government of Zambia			Mr. Emmanuel Ngulube, Permanent Secretary, MFNP
Implementing Partner /Executing Agency			Mr. Russell Mulele, Permanent Secretary, MTENR
UNDP			Mr. Aeneas C. Chuma, Resident Representative,