Land Use Changes in Kenya: 1960's to Present

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APRIL 19-21 2006

Introduction

- **Land use and land cover information is crucial for rural/urban planning**

- **It forms baseline for development and creation of Environmental Information System (EIS)**

- **Important for assessing and mapping of disaster/risk vulnerability including food security, environmental degradation, etc**

Introduction

- **Land use information has multi-faceted application and multi-linkages especially with regard to:**
  - population dynamics
  - poverty variability and food security
  - environmental degradation
  - climate change
  - desertification encroachment
  - anthropogenic practices

Observations

- **Kenya is just developing its land use policy now (ASAL has lagged behind perhaps because of lack of land use policy!!)**

- **Presently, LIS and EIS is limited in Kenya**

- **Environmental related calamities appear to be rampant and on the increase (drought, floods, landslides etc)**

Goals for Developing Land Use Databases

- **Assist in generating database for poverty reduction strategy and sustainable development**

- **Assist to develop environmental policy, land use policy and land use plans**

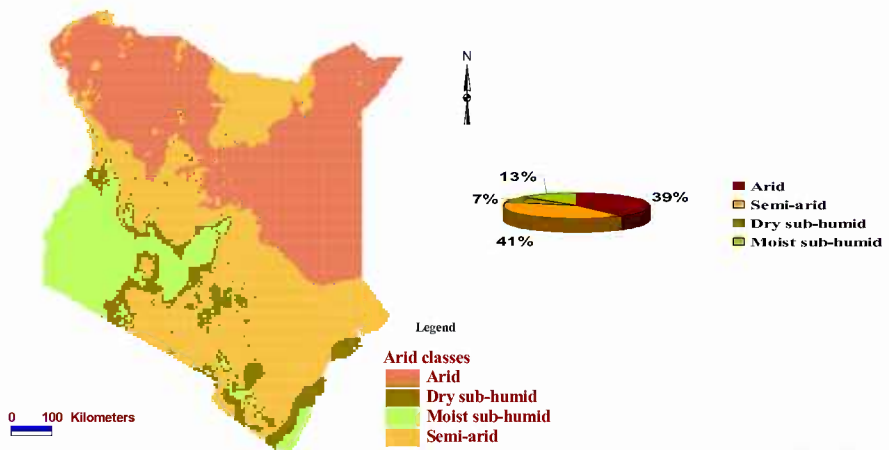- **Form basis for monitoring of conditions and trends of the Land Resource base**

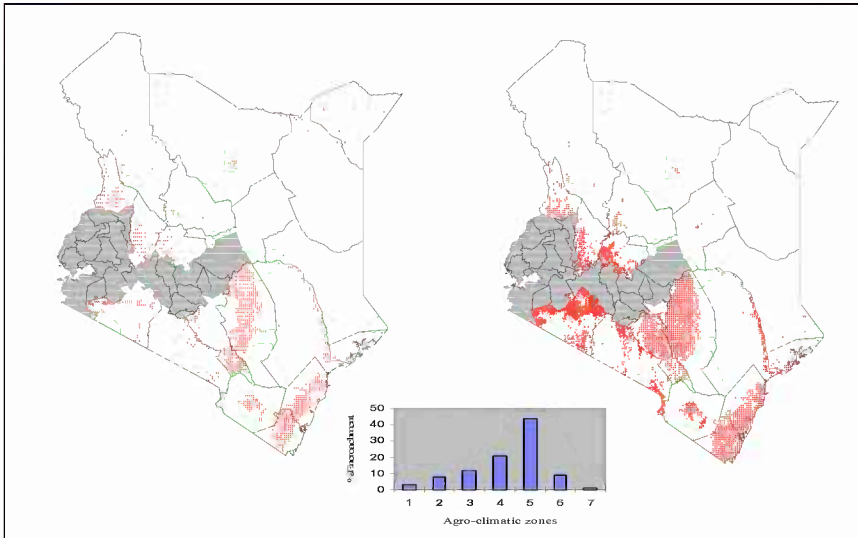# Spatial Distribution of Human Population

Human Population Dynamics

Changes in population demography (1948-1999)
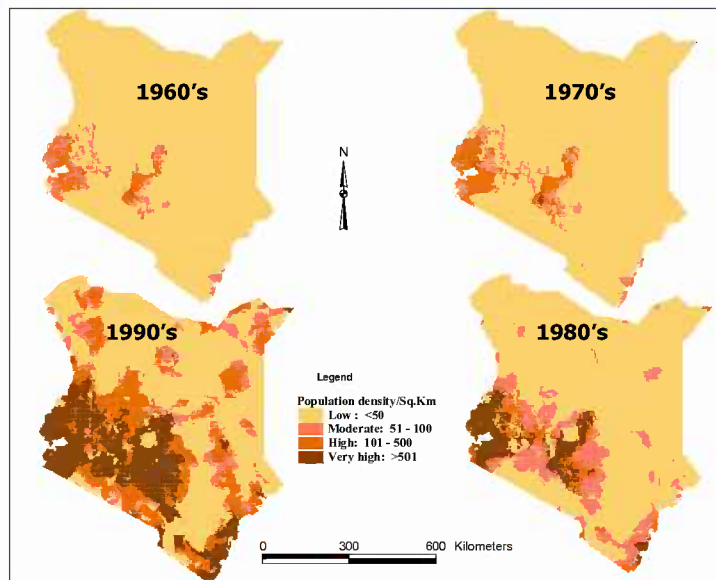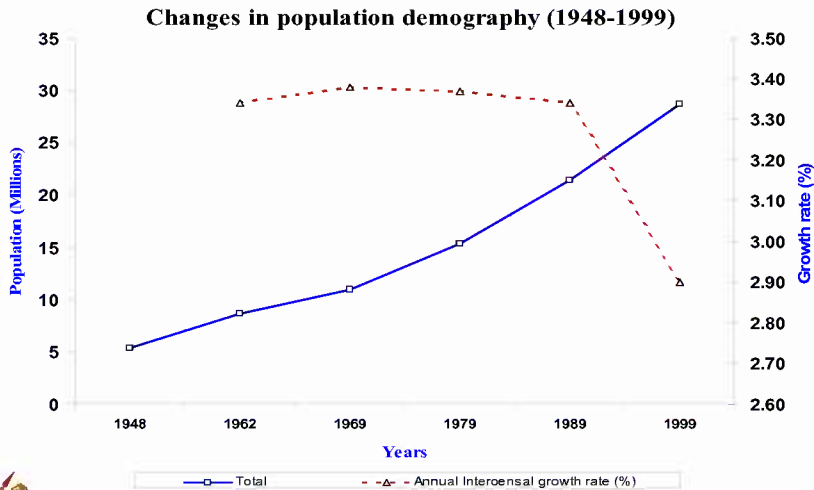
Land Production Potential

Legend

Arid classes
- Arid
- Dry sub-humid
- Moist sub-humid
- Semi-arid

0   100   Kilometers

Habitat loss is responsible for diminished grazing range
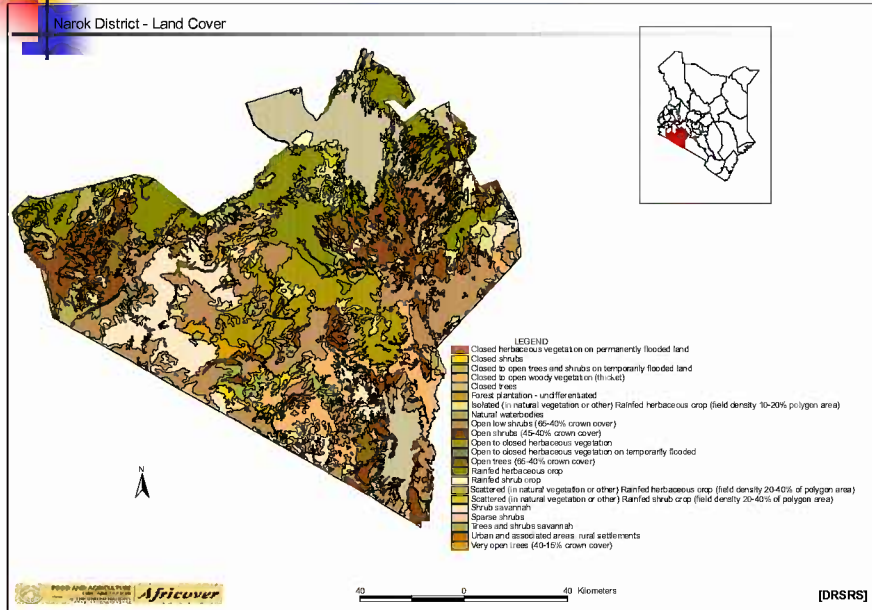

LAND COVER DOMINANCE IN KENYA

The dominant cover classes are: open low shrubs (65-40% crown cover) occupying 32%

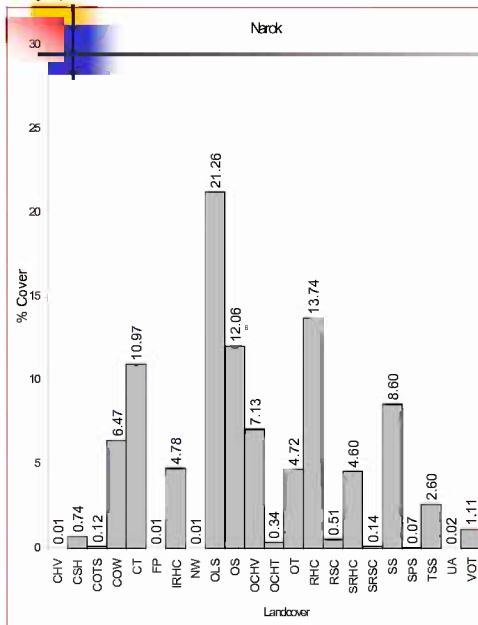This is followed by shrub savannah (17%) of the total surface area

Forest cover is less than 2% of Land area
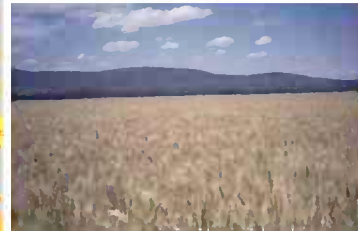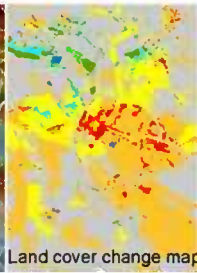
Narok District

Narok District - Land Cover

LEGEND
Closed herbaceous vegetation on permanently flooded land
Closed shrubs
Closed to open trees and shrubs on temporarily flooded land
Closed to open woody vegetation (thicket)
Closed trees
Forest plantation - undifferentiated
Isolated (in natural vegetation or other) Rainfed herbaceous crop (field density 10-20% polygon area)
Natural waterbodies
Open low shrubs (65-40% crown cover)
Open shrubs (45-40% crown cover)
Open to closed herbaceous vegetation
Open to closed herbaceous vegetation on temporarily flooded
Open trees (65-40% crown cover)
Rainfed herbaceous crop
Rainfed shrub crop
Scattered (in natural vegetation or other) Rainfed herbaceous crop (field density 20-40% of polygon area)
Scattered (in natural vegetation or other) Rainfed shrub crop (field density 20-40% of polygon area)
Shrub savannah
Sparse shrubs
Trees and shrubs savannah
Urban and associated areas, rural settlements
Very open trees (40-15% crown cover)

40   0   40 Kilometers

[DRSRS]

Narok District

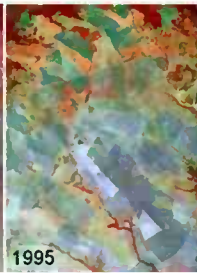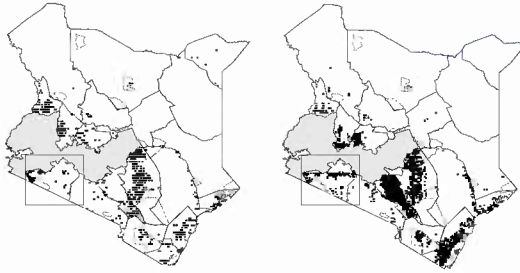

Narok

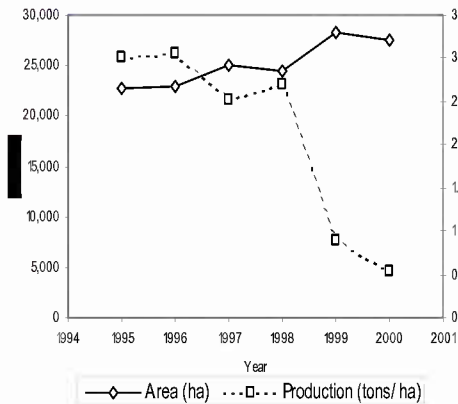| Code	Land cover type
CHV	Closed herbaceous veg. on permanently flooded land
CSH	Closed shrubs
COTS	Closed to open trees & shrubs on temporarily flood land
COW	Closed to open woody vegetation (thicket)
CT	Closed trees
FP	Forest plantation - undifferentiated
IRHC	Isolated (natural veg or other) Rainfed herbaceous crop
NW	Natural waterbodies
OLS	Open low shrubs (65-40% crown cover)
OS	Open shrubs (45-40% crown cover)
OCHV	Open to closed herbaceous vegetation
OCHT	Open to closed herbaceous veg. on temporarily flooded
OT	Open trees (65-40% crown cover)
RHC	Rainfed herbaceous crop
RSC	Rainfed shrub crop
SRHC	Scattered (natural veg / other) Rainfed herbaceous crop
SRSC	Scattered (in natural veg / other) Rainfed shrub crop
SS	Shrub savannah
SPS	Sparse shrubs
TSS	Trees and shrubs savannah
UA	Urban and associated areas, rural settlements
VOT	Very open trees (40-15% crown cover)

Land Cover Change in Narok District
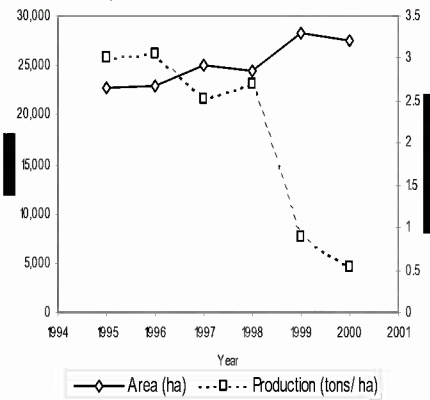# (1975 – 1995)

(I)

1975   1995   Land cover change map   **Mechanised agriculture**

Land Use Systems: Maize

Maize production in Narok District, 1995 - 2000

—◇— Area (ha)   ···□··· Production (tons/ ha)

Maize production in Narok District, 1995 - 2000

—◇— Area (ha)   ···□··· Production (tons/ ha)

Land Cover in Kajiado District

| Code	Land cover type
BA	Bare areas
CHV	
CSH	Closed herbaceous veg on permanently flooded land
COTS	Closed to open trees and shrubs on temp flooded land
COW	Closed to open woody vegetation (thicket)
CT	Closed trees
FP	Forest plantation - undifferentiated
IHC	Irrigated herbaceous crop
IRHC	Isolated (in natural veg or other) Rainfed herb crop
NW	Natural waterbodies
OLS	Open low shrubs (65-40% crown cover)
OS	Open shrubs (45-40% crown cover)
OCHV	Open to closed herbaceous vegetation
OCHT	Open to closed herbaceous veg on temp flooded
OT	Open trees (65-40% crown cover)
RHC	Rainfed herbaceous crop
SRHC	Scattered (in natural veg or other) Rainfed herb crop
SS	Shrub savannah
SPS	Sparse shrubs
TSS	Trees and shrubs savannah
UA	Urban and associated areas, rural settlements
VOT	Very open trees (40-15% crown cover)

Livestock and Wildlife Populations

- **Kenya rangelands cover more than 80% of the total land area and supports 10% of human population**

- **Supports more than 50% of livestock population, 80-90% of large wildlife species (Parks, reserves and private ranches and communal areas)**

- **Over 70% of wildlife species reside outside protected areas**

Status of Large herbivores in Kenya Rangelands
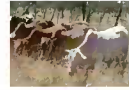
- **Large herbivores in the rangelands:**
  - **Declined by 40-60% between 1977 and 1994**

- **Rapid decline in species population and pattern of spatial distributions:**
  - **Attributed to drought, land use change, disease, poaching, competition for forage and water resources**

- **Drought and land use change:**
 - **Probably responsible for the abrupt extermination of large populations of animal over wide areas.**

What is a forest ?

Kenya's forests

There are hundreds definitions of forest

FAO: forest = land with a tree canopy of more than 10 percent and area of more than 0.5 ha

UNEP: closed forest = land with a forest cover of trees with their crown interlocking and a canopy density of 40 percent or above
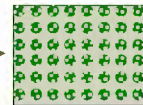
Webster's dictionary: forest = a large thick growth of trees and underbrush

How much forest is in Kenya ?
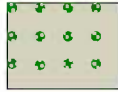
17.10 million ha (30 % of the total land area)
Source: FAO (2000): Forest Resources Assessment Report.

0.98 million ha (1.7 % of the total land area)
Source: UNEP (2001): An Assessment of the Status of the World´s Remaining Closed Forests.

KIFCON

1.24 million ha (2.17 % of the total land area)
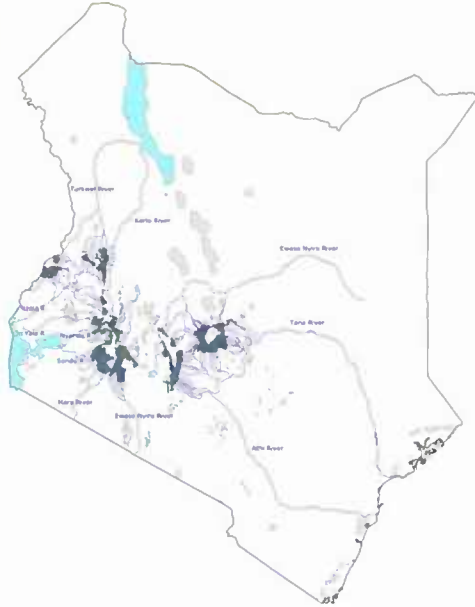*Source: Wass, P. (1995): Kenya´s Indigenous forests: Status, Management and Conservation. IUCN – The World Conservation Union.*

?

Location of Kenya's protected forests

Map of Kenya

Land use

Forests
Lakes / Bogs
Arid zones
Semi-arid zones
Perennial cropland
Arable cropland
Improved grazing land
Woodlands / Riverine forests
Flooding zones
Swamp areas
Moorlands
Settlements

N

Kenya's forests

Major "water towers"

The five main montane forest blocks: - Mt. Kenya
- Aberdare Range
- Mau Complex
- Cherangani Hills
- Mt. Elgon
cover less than 1,6 percent of Kenya total land area.

They are the upper catchments of all main rivers of Kenya (except Tsavo River).

Hydropower generation covers 70 % of Kenya total electricity output.

Observations in Kenya

- **Deforestation has been noted to be on the increase and yet data from stakeholders is quite varied**

- **Poverty and environmental degradation has been linked to poor land use practices**

- **Food insecurity is now higher than before**

- **The issues of Land Use conflicts are quite common in parts of Narok, Laikipia, Mt. Kenya and Kitengela just to mention but a few**

EXAMPLES

- **1**. MAU FOREST
- **2**. MT. KENYA FOREST

South Narok 2000

South Narok 2003
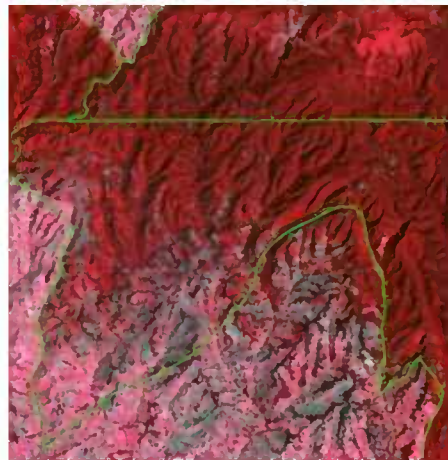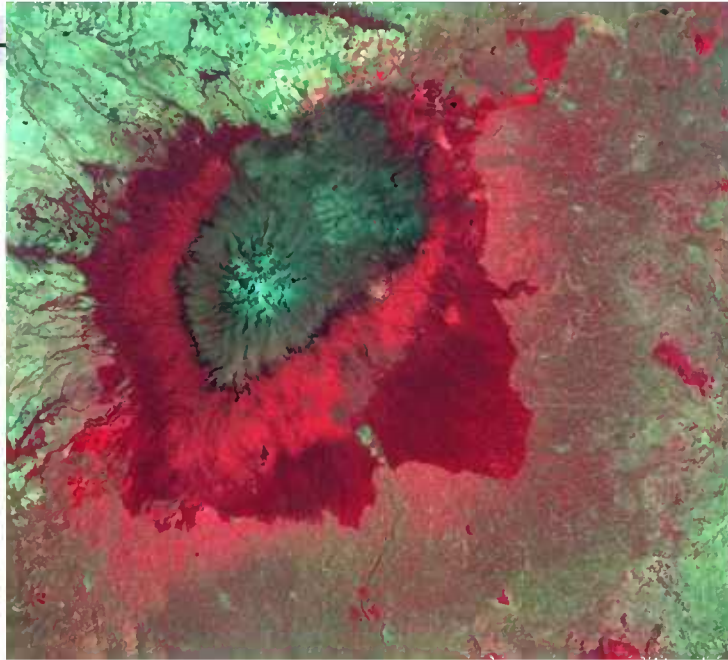
Kuresoi 2000
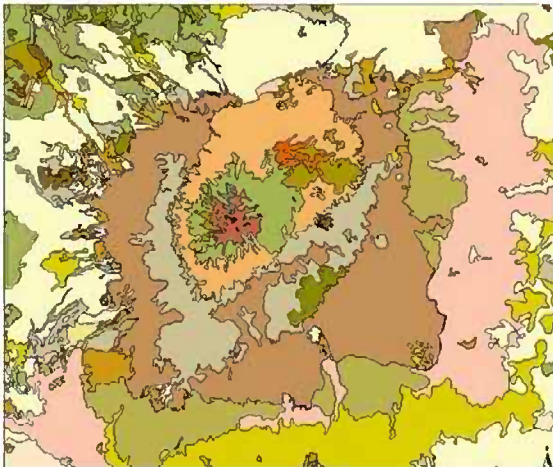
Kuresoi 2003

Kuresoi 2000

Kuresoi 2003
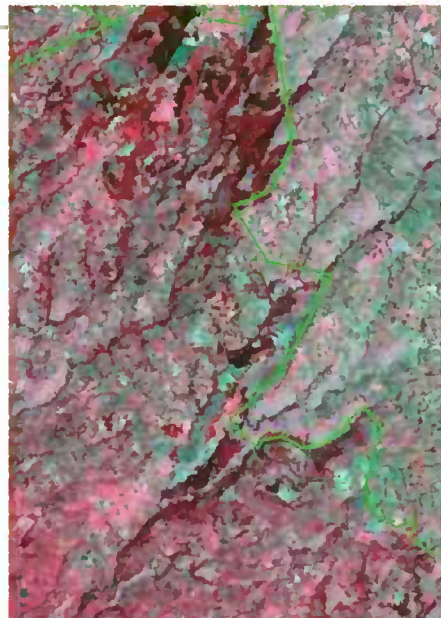
MT. KENYA 2000 TM IMAGE

LAND USE/LAND COVER MAP
OF MT. KENYA AREA

Emission Inventories of GHG in Gg in 1994

	CO (Gg)	CO_2 (Gg)	CH_4 (Gg)	N_2O (Gg)	NO_x (Gg)	NMVOC (Gg)
Energy	1645.3	6167.3	344.8	2.61	46.7	-
Industry	2.04	990.1	-	-	0.55	5.997
Agriculture	0.048	-	575.632	-	-	-
LUCF	9.4	28261	11.00	0.1	2.7	-
Wastes	-	15.185	-	-	-	-
TOTAL	1656.8	-22751	750	1.4	50.9	6.0

The gaps and needs identified by First National Communication of Kenya in the context of UNFCCC included lack of:

- Activity data

- Emission factors in all sectors,

- Best practices and the methodologies applicable

- Institutional arrangement and networking and capacity building.

However, institutional resources such as hardware, software and accessories among others are already available.

Factors hampering development of reliable GHG inventories and emissions

- Lack of local emission factors
- Inconsistencies of data sets from various sources
- Unsuitable data classifications and formats
- Difficulty in the management of uncertainties
- Lack of comprehensive data storage and management system

Proposed Activities

The preparation of the Kenya's second national communications document, with respect to greenhouse gas inventory will entail the following tasks:

- Estimation of national GHG inventories for 1994, and 2000
- Formulation of cost effective programme to develop country specific emission factors and activity data
- Description of arrangements to collect and archive data to make inventory preparation a continuous process
- Information on the level of uncertainty associated with inventory data

The reference year for the inventory

The reference year for the inventory will be 2000 in line with the guidelines provided under decision 17/CP.8. Furthermore, in performing the above tasks, the studies will identify, explore and evaluate cost-effective strategies to:

- · Improve on collection and storage of climate related activity data
- · Improve on development of reliable GHG inventories and emission factors
- · Improve on institutional collaboration especially in the area of data exchange
- · Undertake training to build competencies and capacity in various GHG inventory aspects
- · Identify relevant institutions handling climate related information including their roles
- · Recommended funding of project steering committee to make it more effective with regard to national communication

Deliverables

- Reconstituted Technical Working Group Review of previous GHG inventory work.

- Development of a data collection strategy including description of arrangements for data collection and archiving and establishment of a continuous sustainable well managed system for improvement for GHG inventory database.

- Generation of activity data, including quality assurance and control and Inventory system documented and described
- Development of Emission factors and new inventory data from all the source categories.
- Estimation of uncertainty.
- Updated and improved GHG inventory database.
- Emission trends and forecasts for the period up-to 2020.
- Updating GHG inventory report including technical annexes that detail the inventory procedures and calculations that will be published.
- Identification of further needs, constraints and gaps.
- Workshop reports and National Inventory for the year 2000.

The End
Thank you