



# Kenya Montane Forest Ecosystem Services and Economy-wide–Project

Dr. Thierry De Oliveira  
UNEP

## Key Policy Questions and Challenges

- Kenya Wants to ensure that it stays within a growth/development pathway attaining certain targets outlined on its Vision 2030 without undermining its natural capital including forest;
- Kenya is highly vulnerable to inflationary pressures when the Kenya Shillings weakens against the currencies of its major partners (exceeded 10% on four occasions since 2000); has an energy sector at the mercy of external shocks (i.e. spikes in oil prices); Last but not least inflationary pressures arises during period of droughts when water-dependent economic sectors come under pressure;
- How to ensure that the five water towers in Kenya that have major positive impact on the economic resilience of the country are well managed given the strong linkages between the forest sector and the rest of the economy?

# The Main Objectives of the Project

- Demonstrate how key economic sectors are dependent on ecosystem services such as forests and forest-related ecosystem services;
- Highlight the contribution of these services to the real economy;
- Construct resource account to supplement national account to monitor and report on forest trends and contribution to national GDP;
- Understand and propose some responses (including policy instruments) that would institutionalize incentives to internalise the benefits of sustainable management of forests.

# What Did We learn About the Contribution of Forestry Sector to Kenya's Economy ?

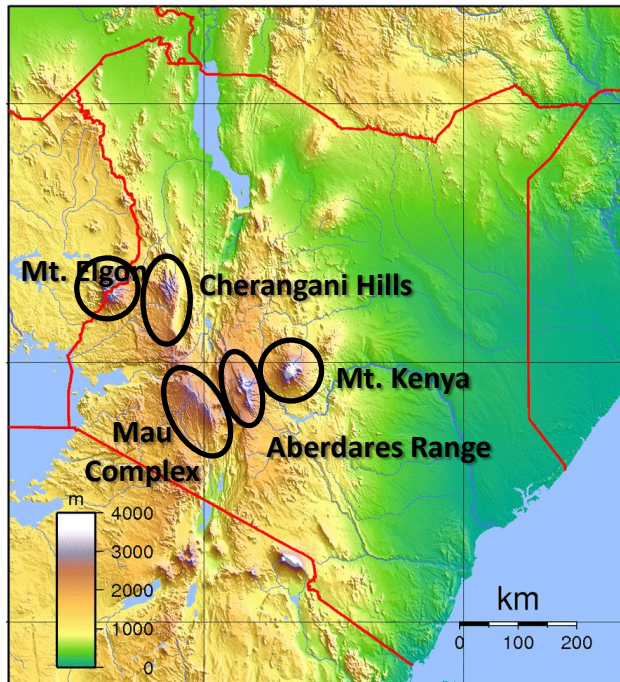
- the value addition to forest products through the manufacturing sector;
- the provision of goods (timber and non-timber) to the subsistence economy (also referred to as the non-monetary economy);
- the supply of a set of cultural services to residents of and visitors to Kenya; and
- the supply of a set of ecosystem services that regulate ecological processes.

## What Did We learn About the Contribution of Forestry Sector to Kenya' s Economy (cont'd) ?

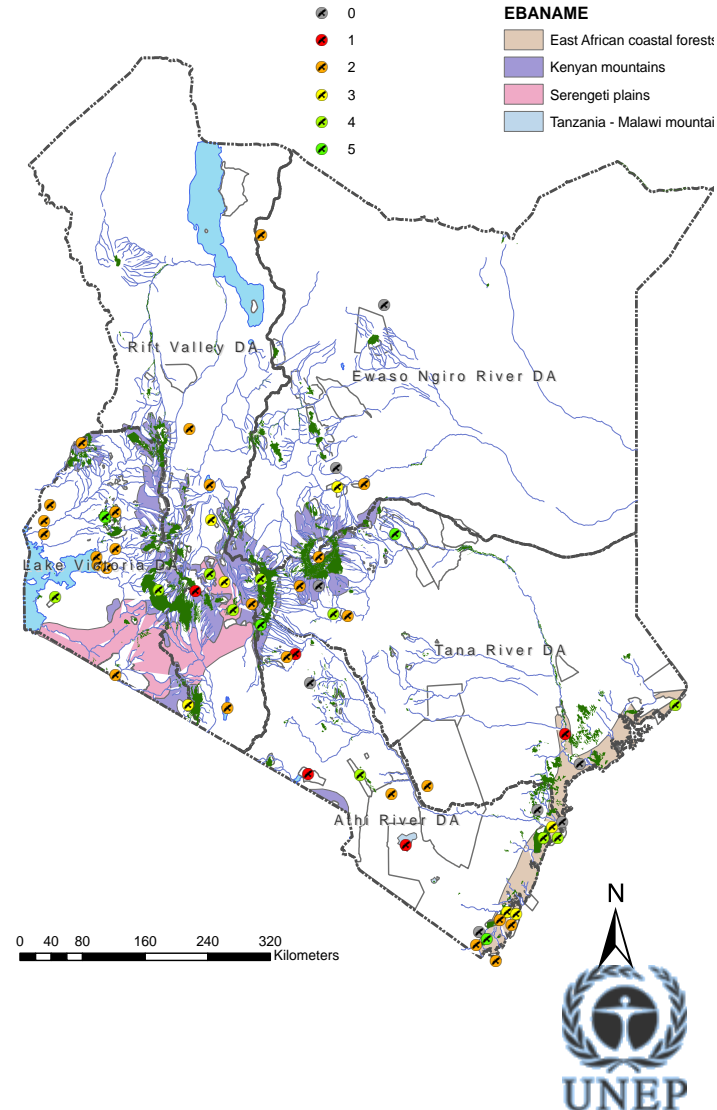
- The forestry sector is indispensable for the Kenyan economy
- Deforestation deprived Kenya' s economy of 5.8 billion shillings in 2010; loss of regulating services was estimated at KSh 3 billion/yr - more than 4 times the cash revenue from deforestation
- Kenya' s five water towers provide more than 15,800 million cubic metres of water per year

# Kenya's Water Towers

- Kenya's five Water Towers
  - More than 1 million hectares of montane forests
  - Water yield > 15,800 million m<sup>3</sup> /yr
  - 75% of renewable surface water



Source: Christian Lambrechts, UNEP



# What Did Kenya's Statistics Reported on the Contribution of Forest?

- KNBS reported the contribution of forest at 1% of GDP!!! Or around Ksh15.333 million in 2005

## And the Preliminary FRA told US:

- The sector provides the non-monetary economy with at least Ksh6,988 million per year worth of raw materials. This transaction is not accounted for in the national account;
- The charcoal manufacturing sector, attributing and estimated Ksh12,460 million per year to GDP, is not accounted for in the national accounts. The national GDP of Kenya is therefore understated by approximately 1.4%.

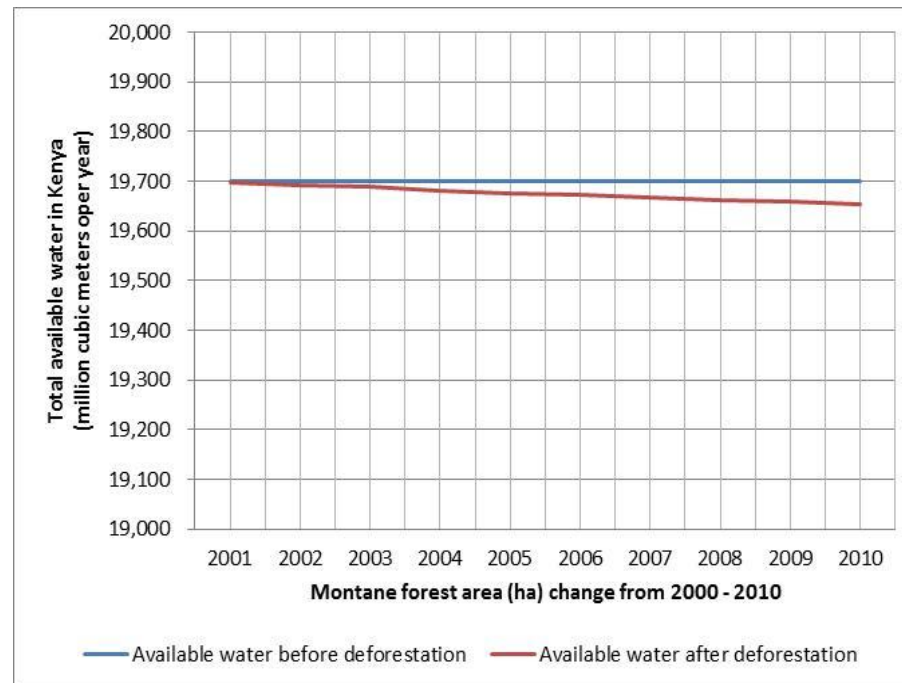


## And the Preliminary FRA told US (Cont'd):

- The forestry and logging sector supplies roundwood to a manufacturing value chain with a combined VAD of Ksh21,587 million. The forestry and logging sector therefore has an economic production multiplier effect of 2.73;
- The VAD contribution to the water sector is Ksh1,287 million per year ;
- The contribution of forestry to the tourism sector and to carbon sequestration was not estimated here due to lack of adequate data.
- In conclusion, the preliminary estimate of the partial contribution of forestry in Kenya to the economy of Kenya, is **3.6% per year**, or Ksh44,441 million.

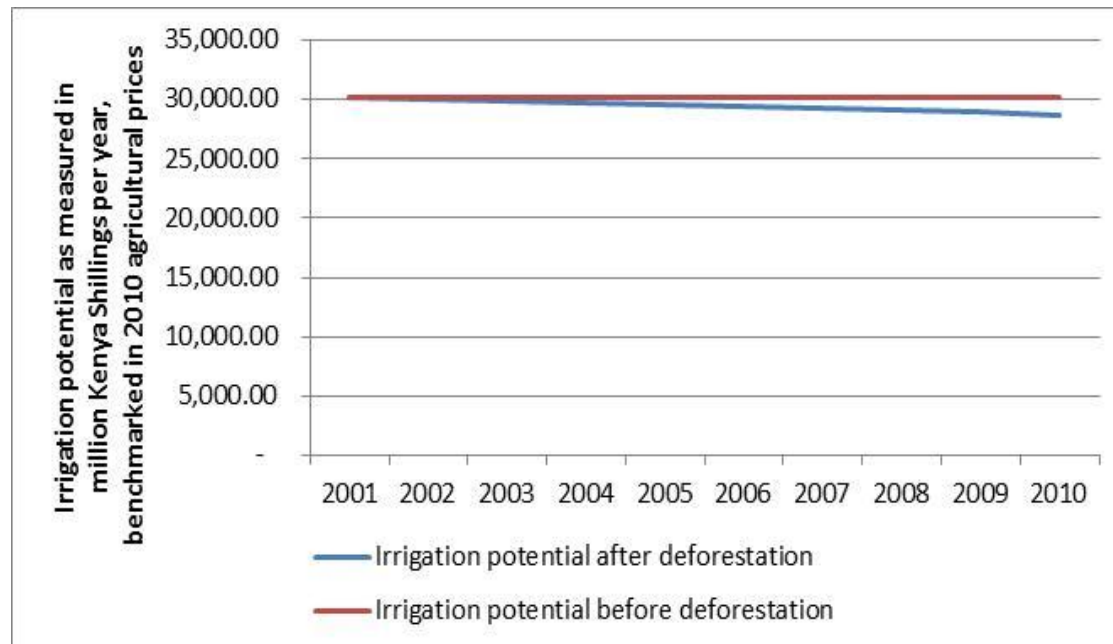
# Effect on water yield

- Based on the reduction in dry season flow resulting from deforestation of montane forests in the Water Towers, the long term water yield in Kenya had decreased by 62 million m<sup>3</sup> per year, by 2010 (Bosch 2011)

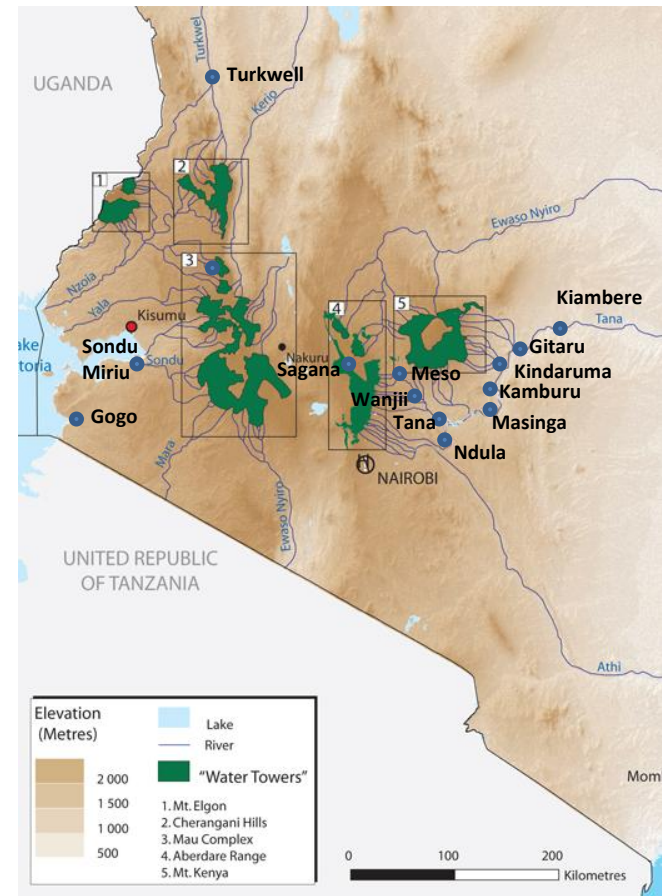
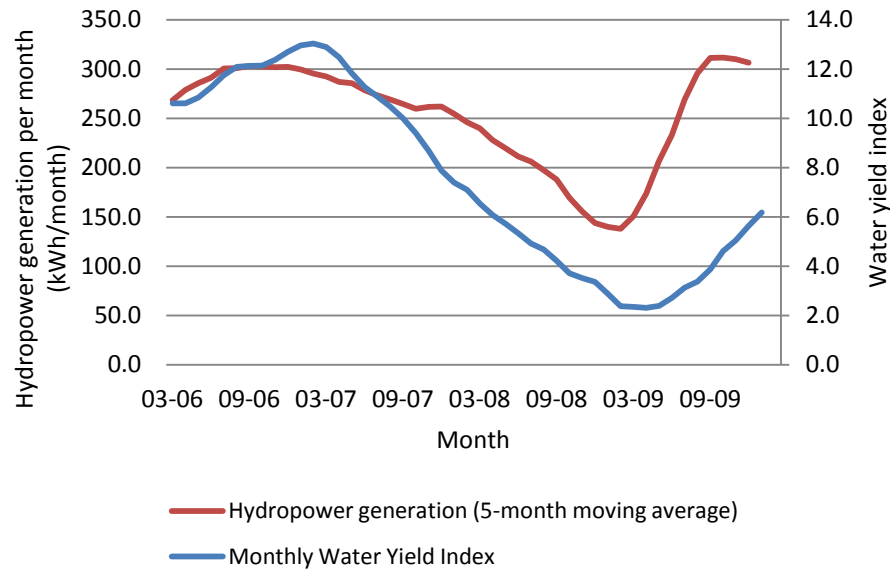


# Effect on Agriculture

- Irrigation potential in Kenya reduces as a result of deforestation. This is because of lower assurance of water supply to irrigation, due to low season reduced runoff from the Water Towers.



# Hydropower and water



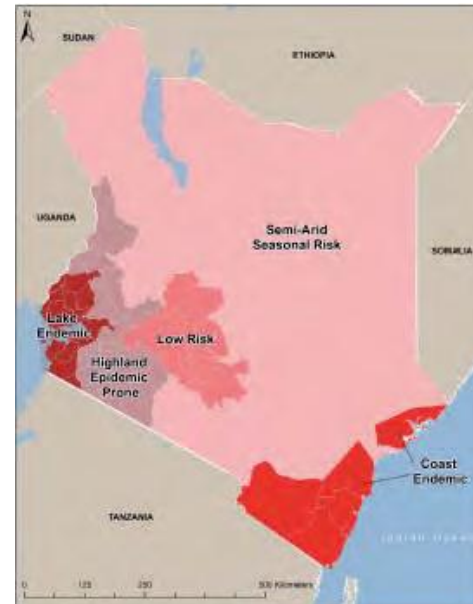
# Health: Malaria

Estimated vectorial capacity of *Anopheles gambiae* mosquitoes in forested and deforested areas, western Kenyan highlands (Source: Afrane et al., 2008)

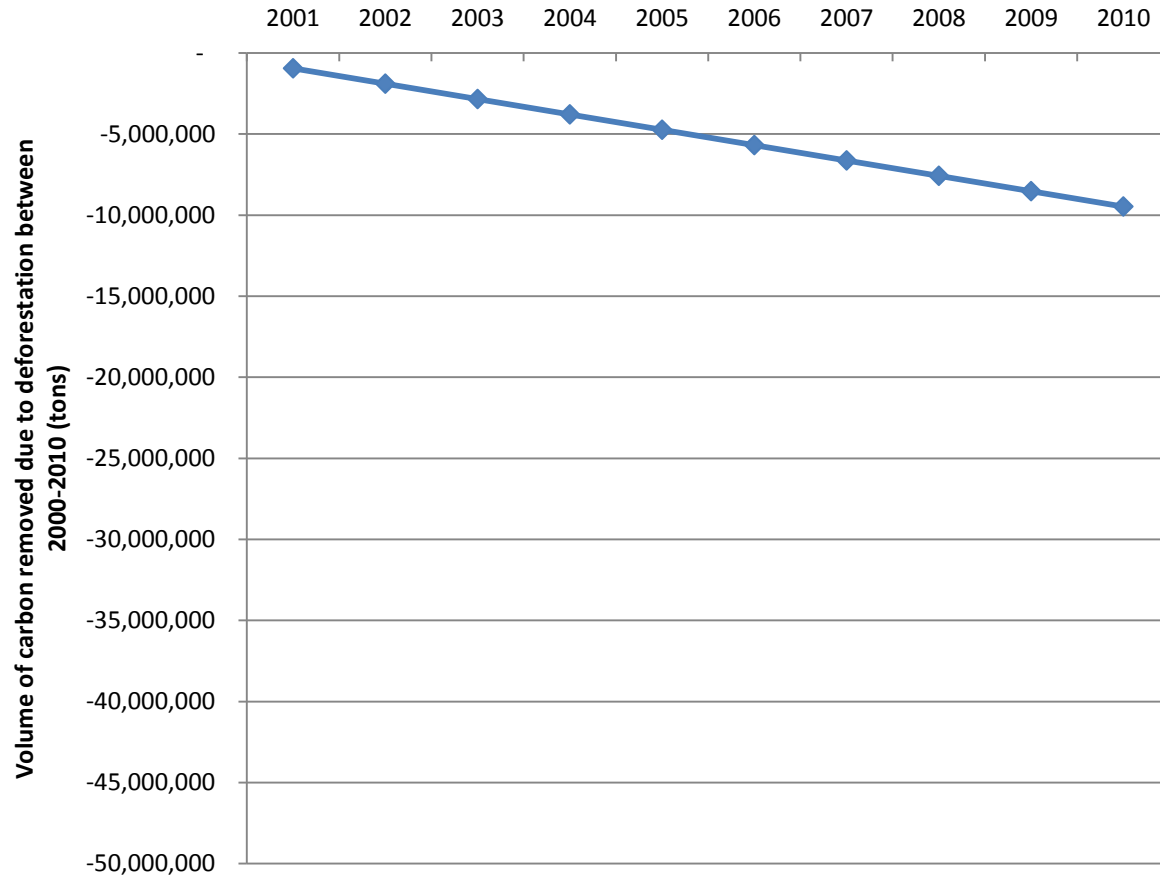
Site	Land use type	m	a	Vectorial capacity
Highland	Forested	3.05	0.198	0.54
Highland	Deforested	4.64	0.233	0.96

\*m, relative density of vectors in relation to humans; a, average no. children bitten by 1 mosquito in 1 day.

$$C = Ma^2p^n / -\log_e p$$



# Carbon



Kenya Shillings per HECTARE	Cash revenue generated by deforestation through the harvesting of timber and fuelwood	Negative effects of deforestation on the economy through changes in regulating services
<b>Total effect (Ksh/ha) (2010)</b>	<b>KSh +272,393 / ha</b>	<b>KSh -763,283 / ha</b>
<i>Growing of crops and horticulture</i>		<i>KSh -512,741 / ha</i>
<i>Forestry and logging</i>	<i>KSh +272,393 / ha</i>	
<i>Fishing</i>		<i>KSh -29,392 / ha</i>
<i>Electricity supply</i>		<i>KSh -2,648 / ha</i>
<i>Water supply</i>		<i>KSh -65,703 / ha</i>
<i>Hotels and restaurants</i>		
<i>Health, public administration and defence</i>		<i>KSh -152,800 / ha</i>
<i>Deforestation effects on carbon sequestration.</i>		<i>KSh -71,768 / ha</i>
<i>Deforestation effects on health (malaria).</i>		<i>KSh -81,034 / ha</i>

# What the Kenya Government Wants to Achieve

- Sustainable use of the forest resources for development and poverty reduction;
- Protection of the forests against uncontrolled settlement;
- Improved management of degraded land;



# A PES Scheme as Incentive

- A PES as an initiative under the REDD+ in Kenya has to be designed in order to:
  - Provide incentives that will compensate for prevented deforestation. In Kenya; deforestation produces a benefit of 272,000 Ksh/ha; Therefore any compensation under a carbon value for instance should be above US\$20/ton in order to prevent deforestation;
- This incentive scheme should be accompanied with:
  - forest conservation measures;
  - road and path planning, design, and maintenance;
  - establishment of crop systems that protect the soil and create microclimatic condition resembling forest conditions as close as possible;

# A PES Scheme as Incentive(Cont'd)

- terracing on steep upstream cropped areas to reduce surface runoff and increase infiltration;
- mulching bare areas to protect the soil, avoid weed growth to reduce soil water loss through evaporation from the soil and through transpiration by weeds;
- tied ridges are very effective in controlling surface runoff and improving soil moisture conditions;

END – Thank you

**KENYA'S WATER TOWERS ADDS REAL  
VALUE TO KENYA'S ECONOMY**

