

*Narok's charcoal commodity chain:
land use change and charcoal
production in southwestern Kenya*

Rob Bailis

Asst Professor - Yale School of Forestry

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in a special symposium on

*The role of charcoal in climate change
and poverty alleviation initiatives*

Overview

- Energy in Kenya
- Charcoal and environmental change
- Narok's charcoal supply chain

Charcoal in Kenya

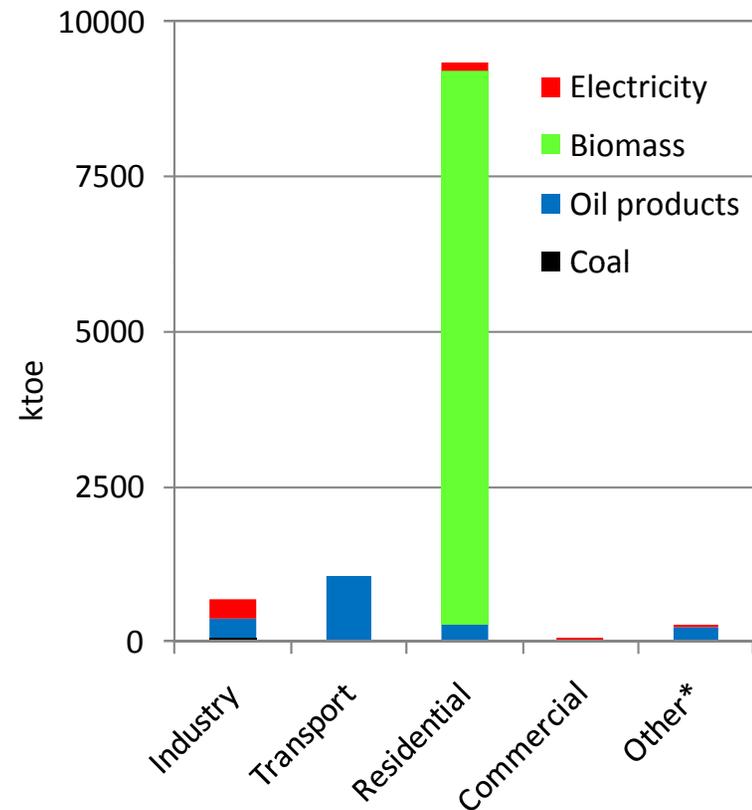
- Largest use of harvested wood
 - ~40% primary energy supply
- Used across all income strata
 - ~50% of HH
- Major source of employment
- At the center of debates over:
 - Modernization
 - Deforestation

Kenya's energy mix

Kenya's energy mix (2008)

- Biomass

- ~78% total
- ~96% residential
 - Split ~50:50 between wood and charcoal



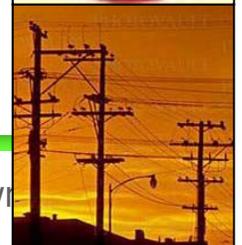
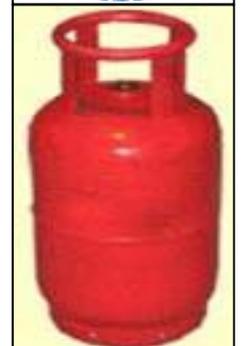
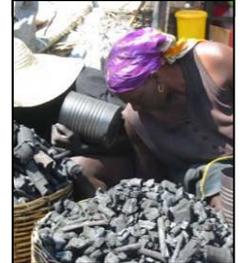
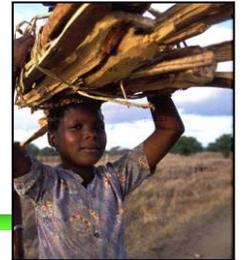
* Includes agriculture, forestry, fisheries and unspecified uses

But at the household level things are more complex...

Kenya's urban and rural household energy mix (Nyang, 1999)

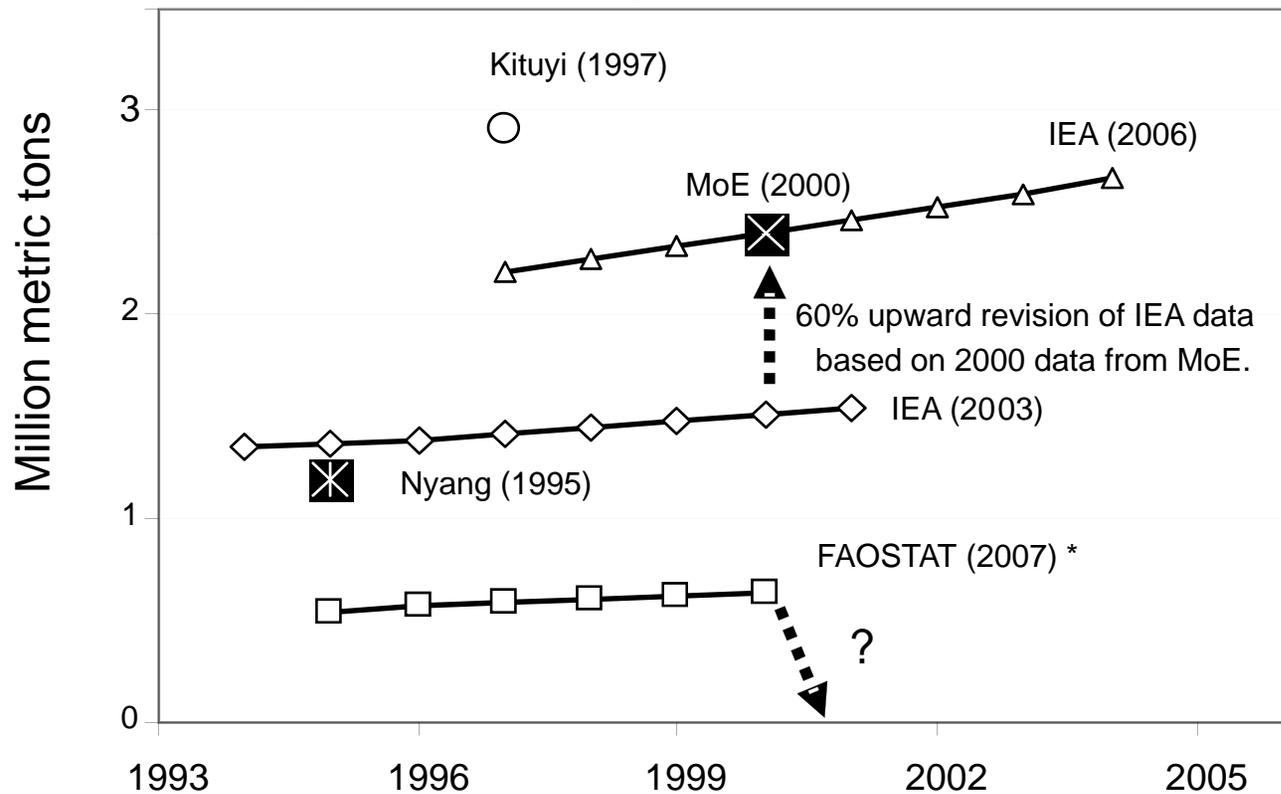
	Household fuel mix	National (%)
1.	Kerosene + Firewood	35.1
2.	Kerosene + Firewood + Charcoal	30.6
3.	Kerosene + Charcoal	9.9
4.	Electricity + Kerosene + Charcoal	8.2
5.	Electricity + Kerosene + Charcoal + LPG	3.4
6.	Firewood only	2.4

...omits 12 additional combinations each used by < 2% of the population



How much charcoal does Kenya *really* use?

Kenya - charcoal production (1994-2004)



* FAOSTAT includes charcoal consumption data up to 2005, but data declines from 650 thousand tons/yr in 2000 to 16,500 tons/yr in 2001 and remained constant at that level until 2008.

Kenya's Charcoal Industry

- 1-3 million tons consumed annually
- >200,000 people directly employed
- \$300 million in annual revenue
- Inconsistent regulations
- Ambiguous legal status



Charcoal, land use, and global change

- Extraction (including LUC)

~ 2/3 GHG emissions...
if trees are permanently removed



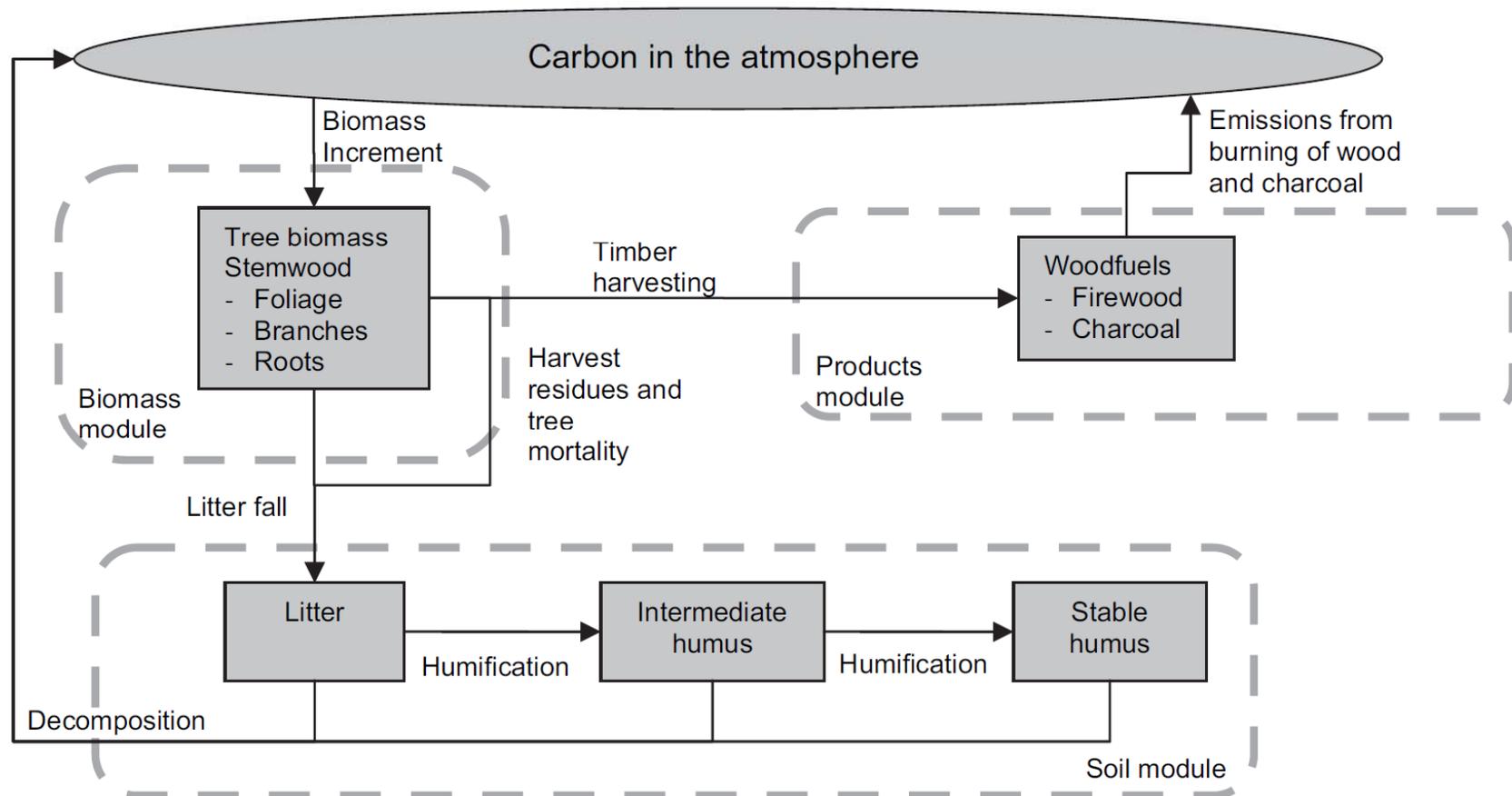
- Transformation



- End use

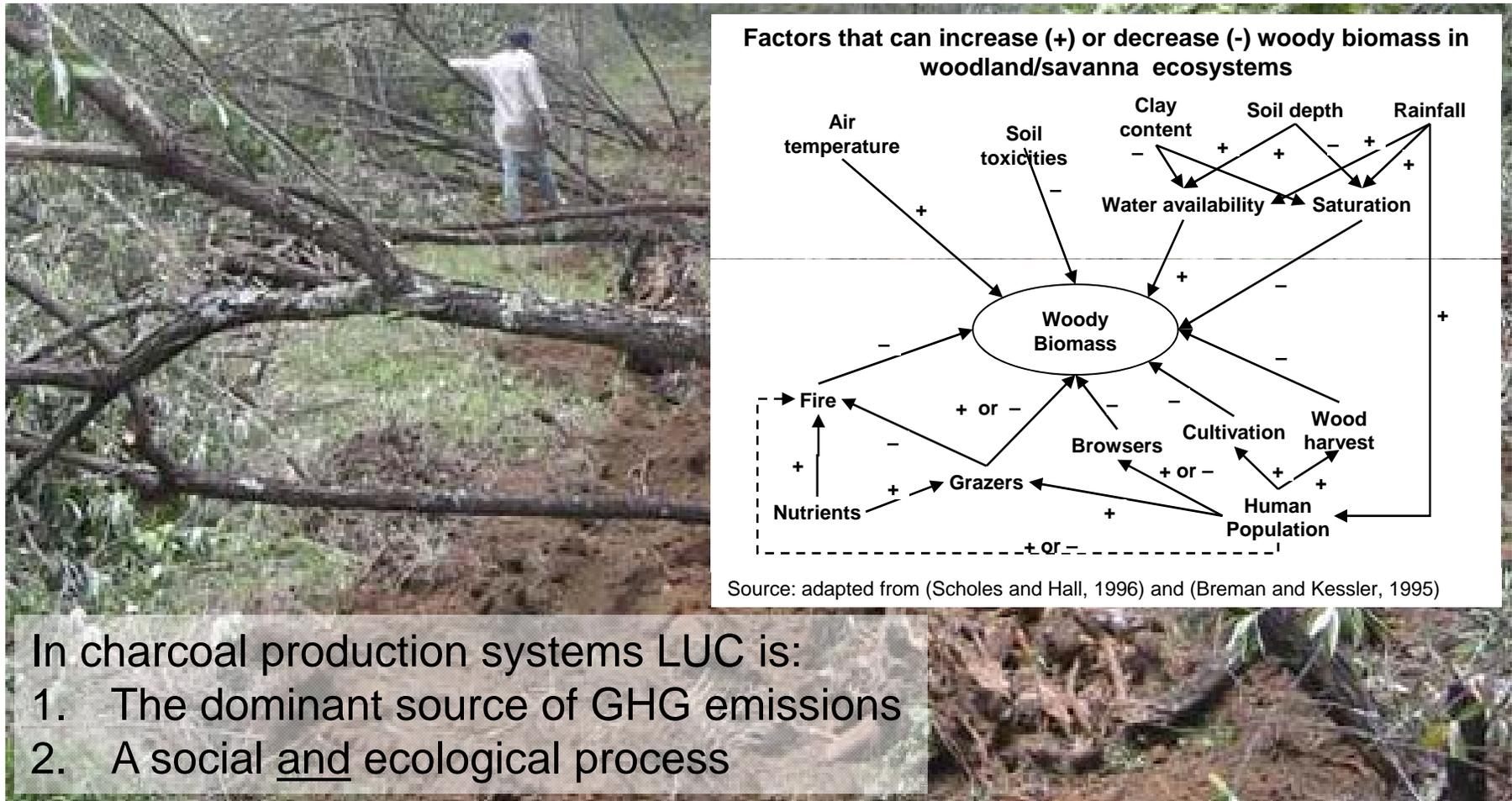


But, LUC involves more than trees...



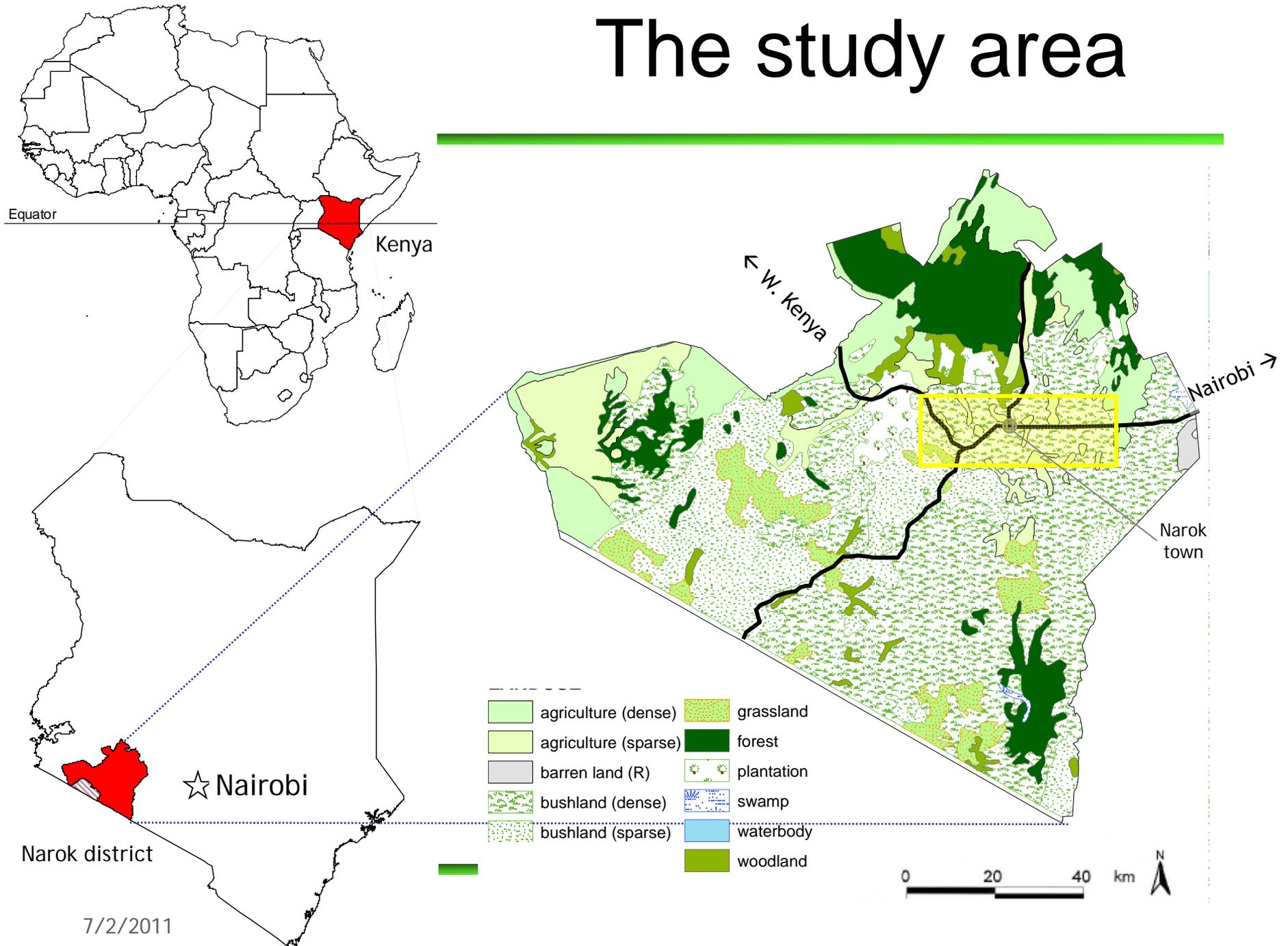
(Bailis, 2009)

Charcoal and LUC



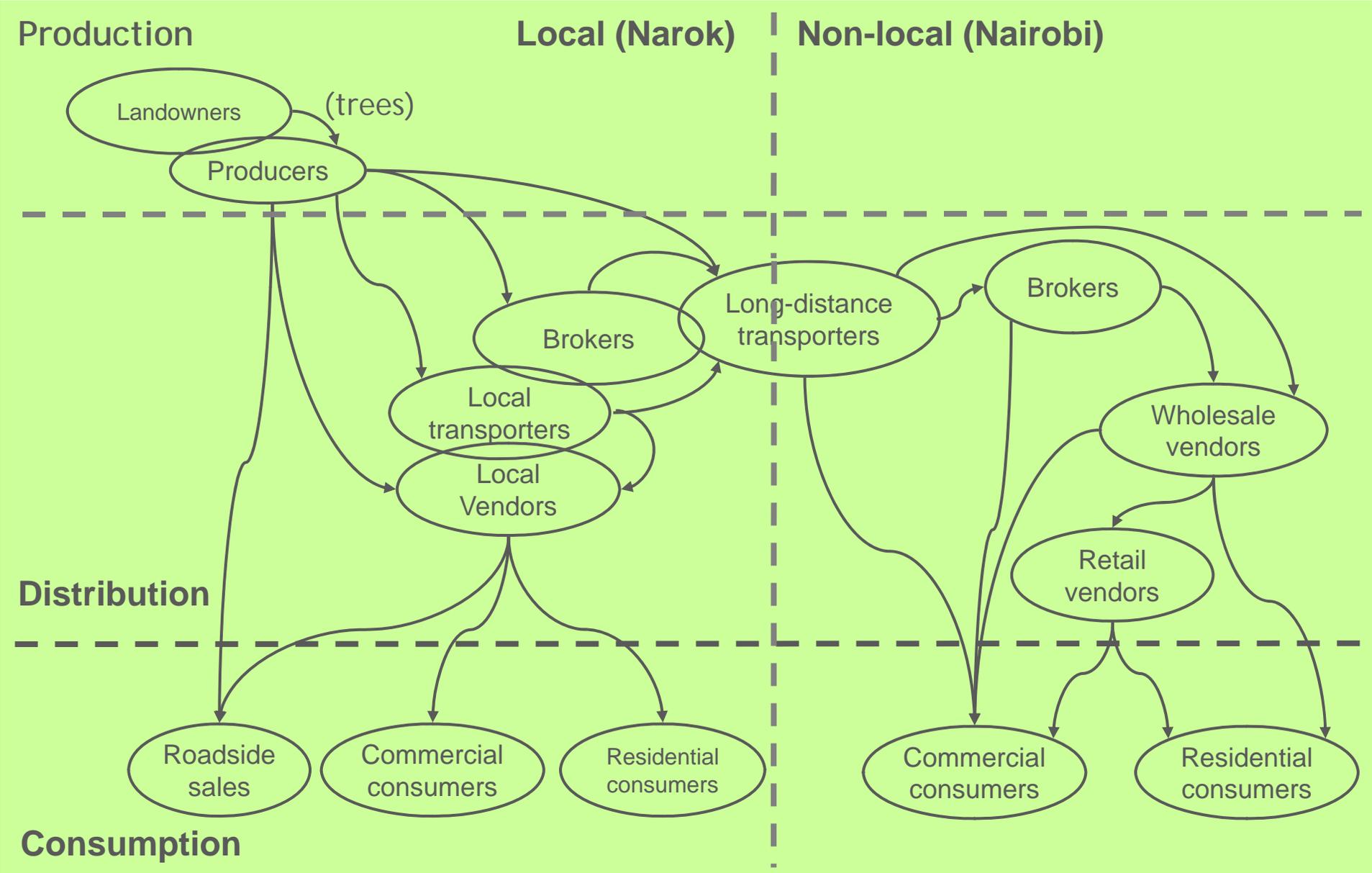
- In charcoal production systems LUC is:
1. The dominant source of GHG emissions
 2. A social and ecological process

The study area

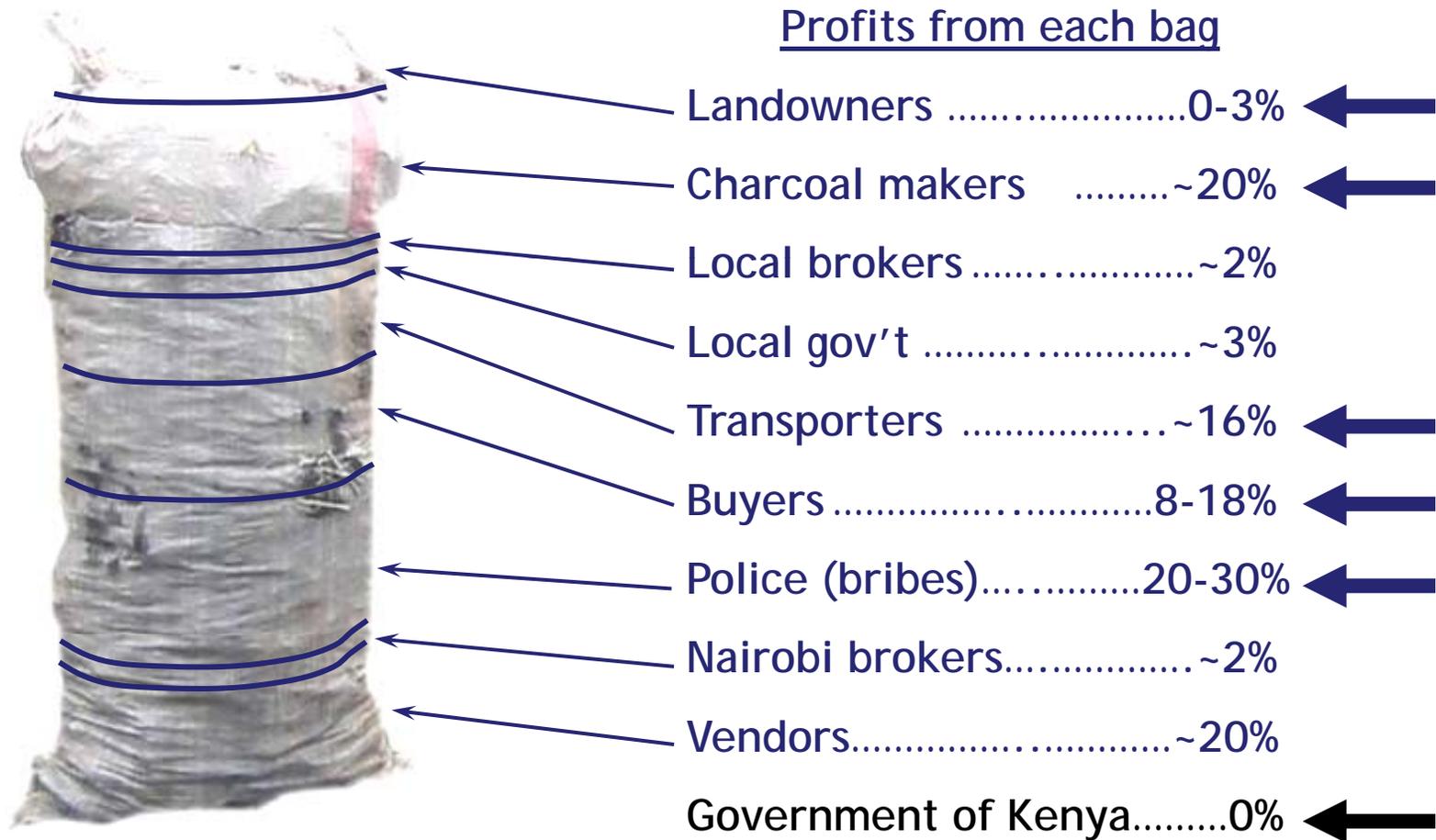




Diverse actors in the charcoal “commodity chain”



Distribution of benefits from charcoal produced in Narok and sold in Nairobi



Promoting a sustainable charcoal supply in East Africa

- Legalization and regulation
 - Innovative finance?
 - RD&D?
- More transparent market conditions
 - Monitoring?
 - Accountability

Thanks!

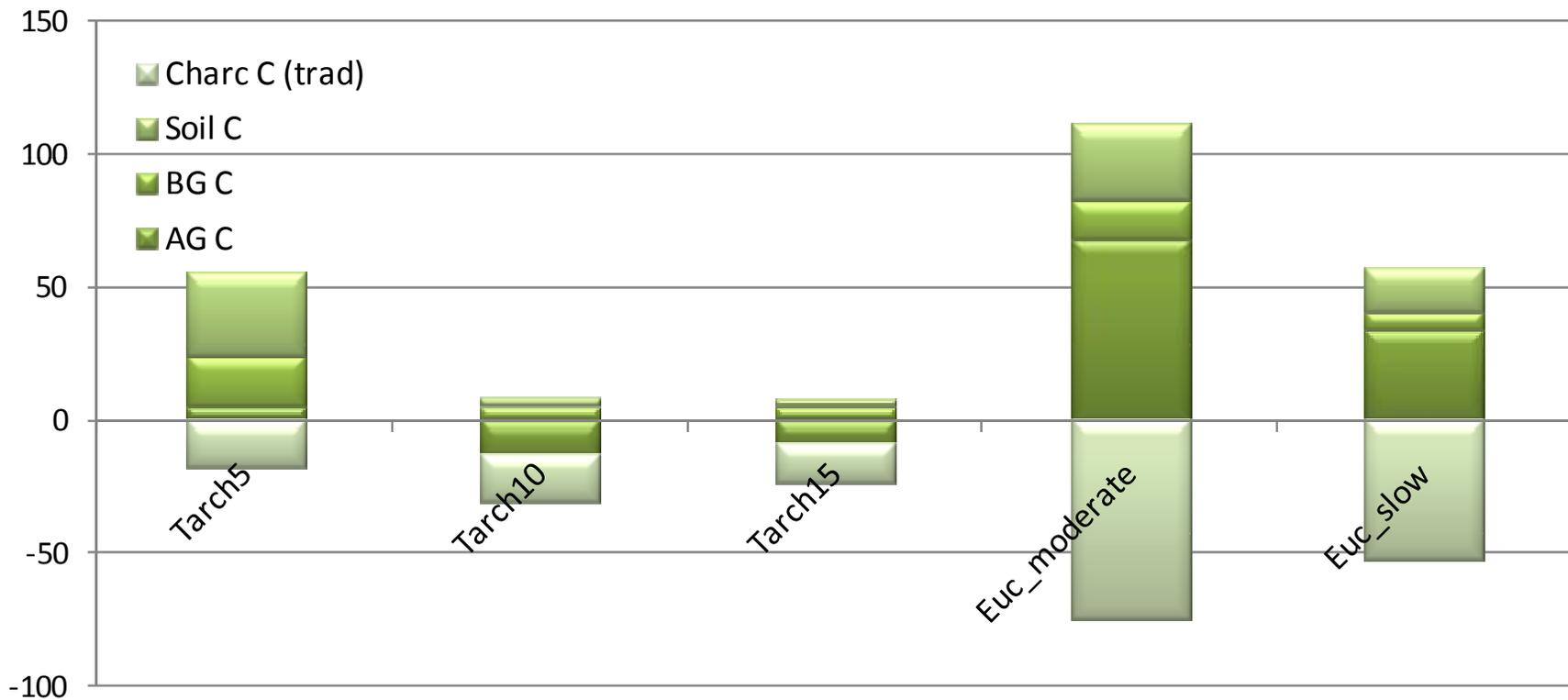
Especially to Adrian, Tuyeni and Kim!

Research support and assistance in Kenya:

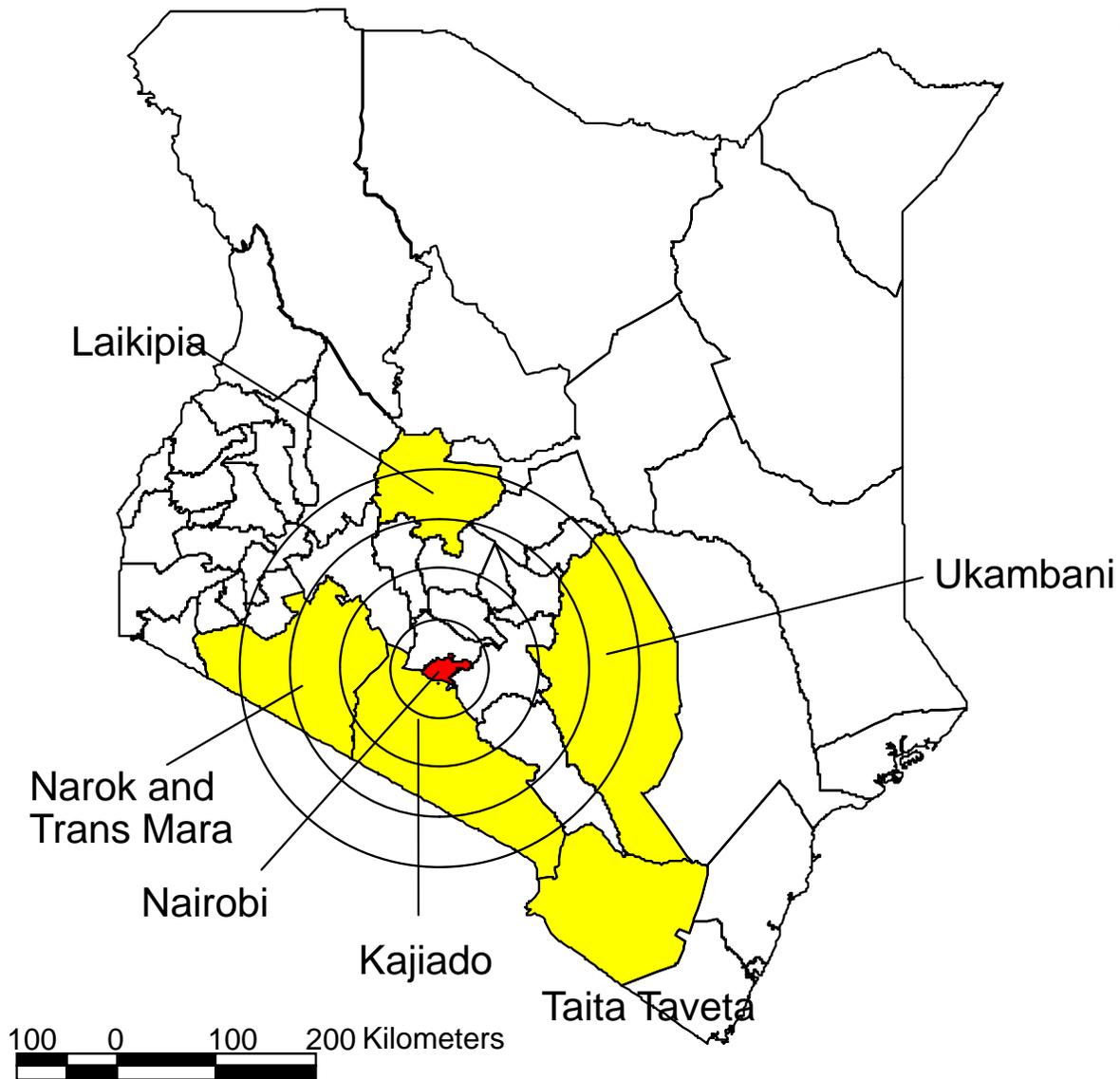
ACTS, ICRAF, Evans Kituyi, Fridah Mugo, Florence Njeri, Max Kinyanjui, Francis Kage, and the charcoal producers and transporters of Narok...

LUC is more complex than simply removing trees...

Change in Carbon stocks relative to baseline at 30-years



Nairobi's supply zones

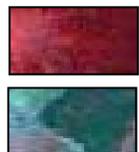


	Source of charcoal	
	Generally n=29	Most recent n=27
Narok	44%	70%
Ukambani	38%	22%
Kajiado	5%	4%
Laikipia	10%	0%
Other	4%	4%

Linking Charcoal to LUC in Narok

- Before subdivision, some communal land was leased for wheat production
- After subdivision, wheat expansion continued, but only by wealthier landholders.
- Since the late 90s, charcoal has enabled less well-off landholders to clear their land
- By 2002, 25% of arable land had been cleared (111 kha)

Legend



Natural vegetation

Mechanized agriculture

Landsat image showing the expansion of mechanized farming in Narok.

From Serneels and Lambin (2004)



Linking Charcoal to LUC in Narok

Historically - a pastoral area

1963 -1989

- Land tenure transformed from communal trust land to “group” tenure
- Many non-Maasai came to work or settle

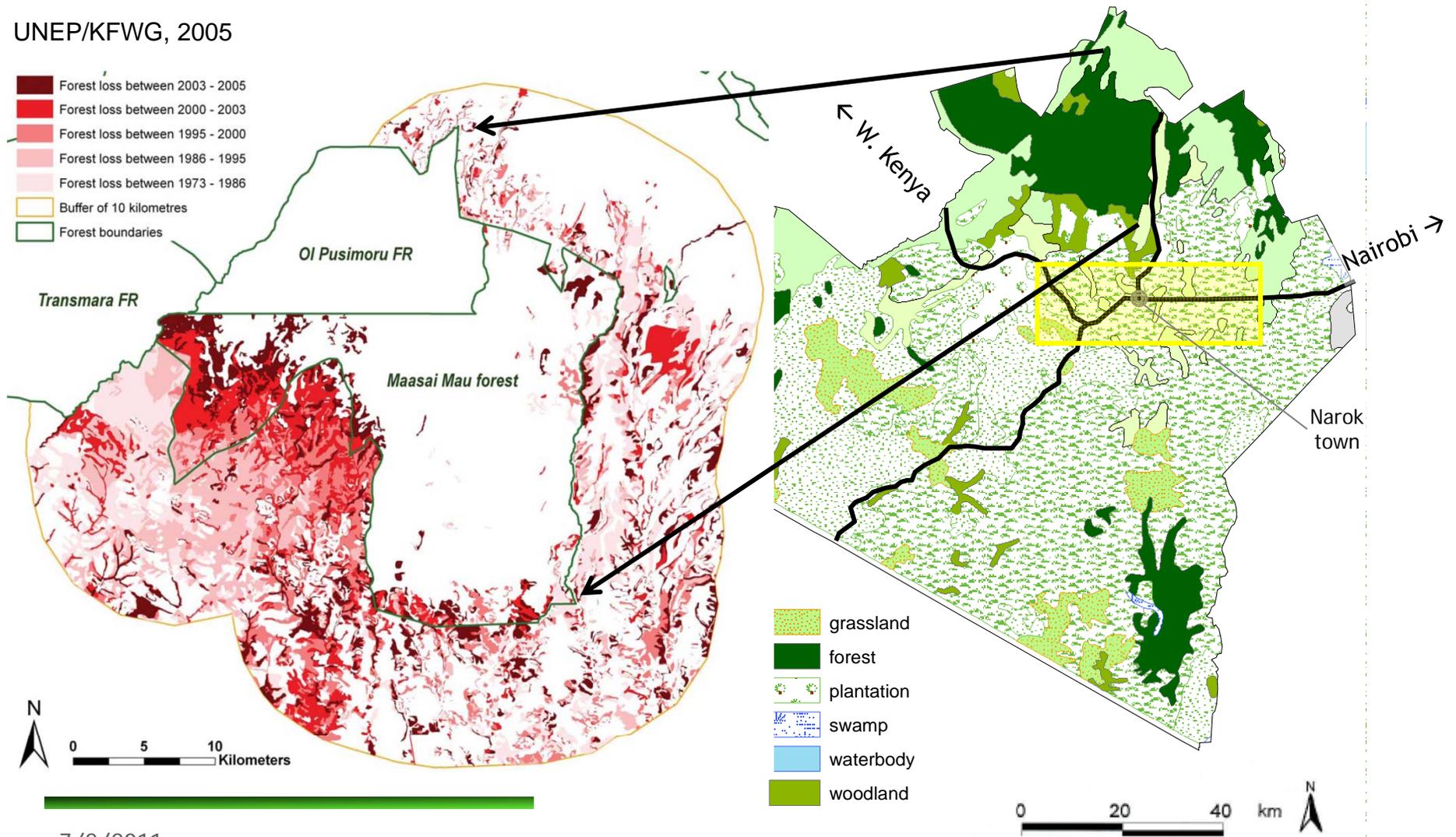
1989 - 2000s

- Group holdings subdivided into large freehold parcels (20-200 ha) and distributed among Maasai residents **
- Expansion in production from purely pastoral to mix of pastoralism, smallholder cultivation, land leasing, and commercial grain cultivation

The study area

UNEP/KFWG, 2005

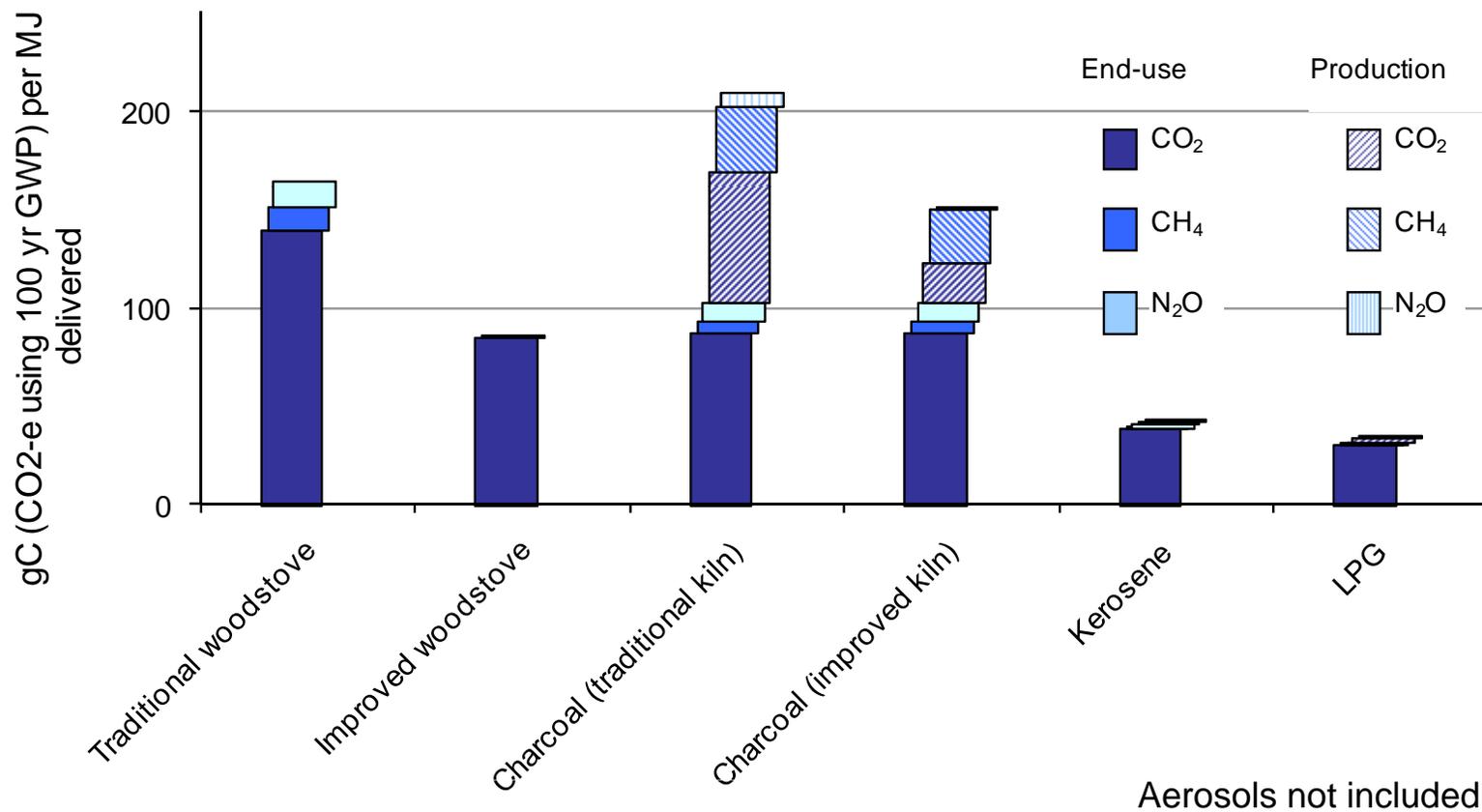
- Forest loss between 2003 - 2005
- Forest loss between 2000 - 2003
- Forest loss between 1995 - 2000
- Forest loss between 1986 - 1995
- Forest loss between 1973 - 1986
- Buffer of 10 kilometres
- Forest boundaries



7/2/2011

Charcoal, land use, and global change

Emissions from common cooking technologies - unsustainable harvest



Charcoal, land use, and global change

Emissions from common cooking technologies - sustainable harvest

