

# Land tenure issues in tropical forests: whom to pay for biodiversity conservation?



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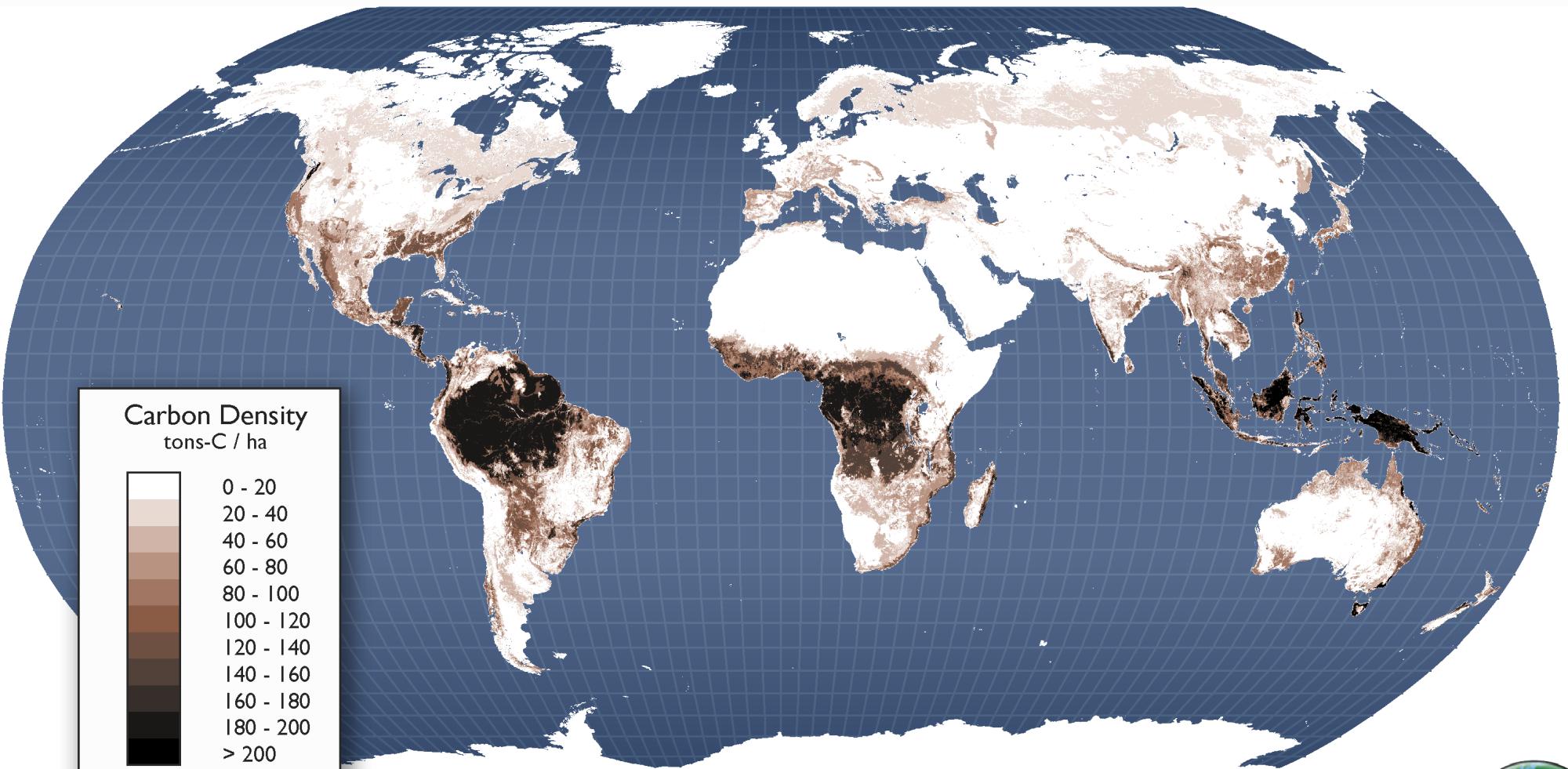
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BIODIVERSITY



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## Above and Below-ground Living Biomass Carbon Stocks, 2000



Ruesch, A. and Gibbs, H., ORNL-CDIAC, 2008



Inadequate attention to property rights  
& tenure in PES, esp. ‘pro-Poor’ PES

Too often: Land Tenure ≠ Land Title

Land tenure: *the terms on which something is held.*  
*i.e. the rights and obligations of the holder. [...]*  
*Resource tenure describes rights to land, water,*  
*trees and other resources.* J. Bruce, 1999

**Local tenure varies according to local  
ecologies & social structures.**



Land Tenure Center

## Why Tenure Matter for PES:

Case study from Uganda illustrates key issues:

1. Uncertain tenure puts biodiversity & poor at risk.
2. Uncertainty allows elite to capture communal land & resources
3. Uncertain property rights is politically advantageous – cheap flow of wood energy source to urban populations



Focus: Kibale National Park in Albertine Rift.

Biodiversity hotspot.



Nature  
tourism,  
3<sup>rd</sup> largest  
source of  
**GNP,**  
**Uganda**

T. Harris 2005



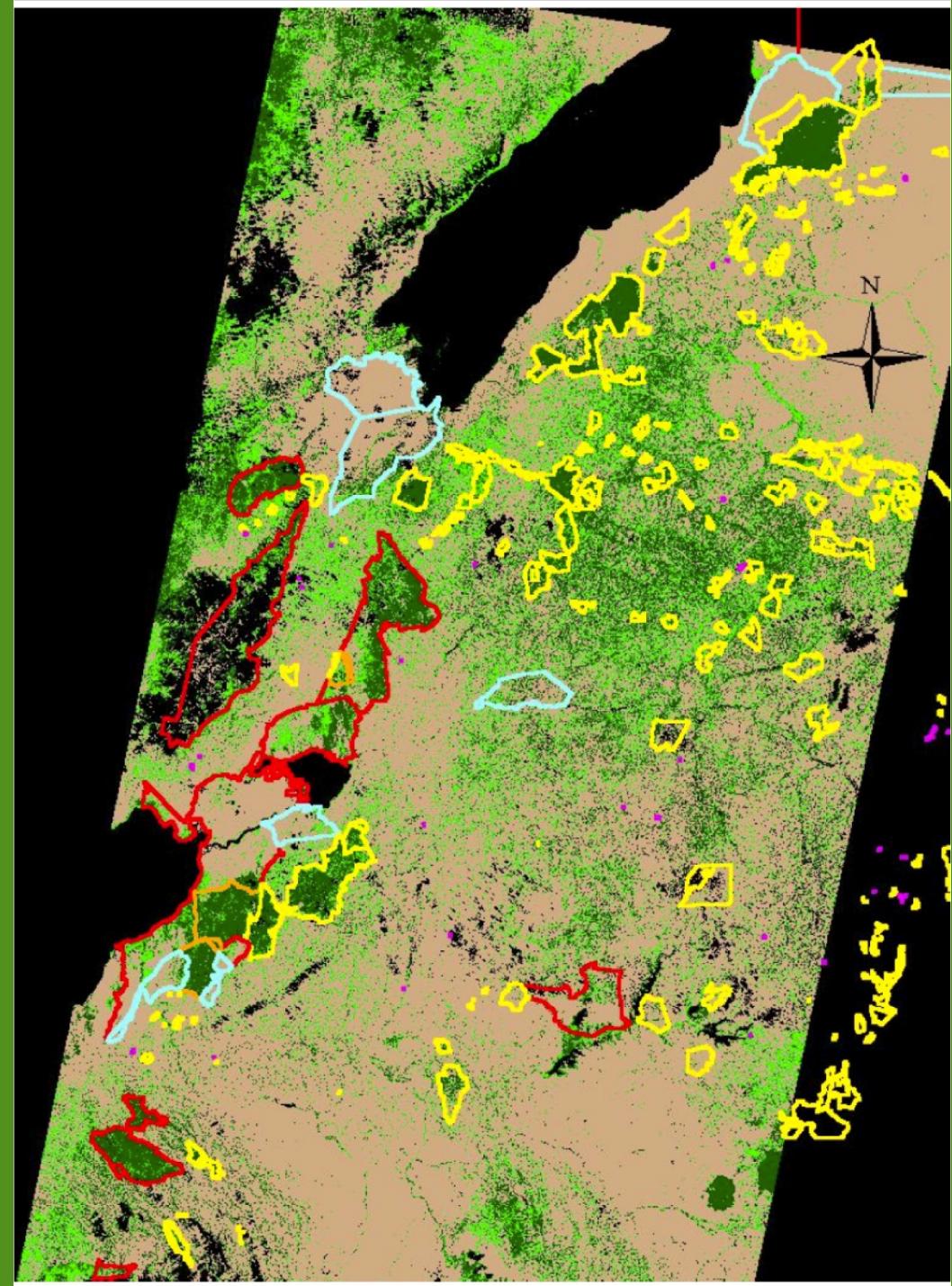
## Example: Aberdares Forest, Kenya

Drinking water and  
hydroelectric power for  
Nairobi (~3 million  
people)

~\$55 million/year

*Local benefits:*  
Fuelwood  
Water  
Medicinals





## Ugandan Albertine Rift

1900-1985: 80%  
closed canopy  
forest lost

1985-2005: 860 sq  
km forest lost,  
~0.7%/yr

*WCS, 2006*

# Proximate causes of deforestation in Ugandan Albertine Rift:

agricultural expansion

charcoal manufacture



## Underlying forces of deforestation around Kibale:

- population growth ( $\uparrow$  300% since 1970)
- tea expansion ( $\uparrow$  350% since 1980)



*High energy demand*



Fuelwood and charcoal = 98% of rural energy  
90% of urban energy

Uncertain land & forest tenure – transition from customary to formal privatized system





Charcoal: a poor  
man's  
business:

Underpriced.  
landowner sells  
\$2/sack  
urban market  
\$13/sack  
Corrupt license system.

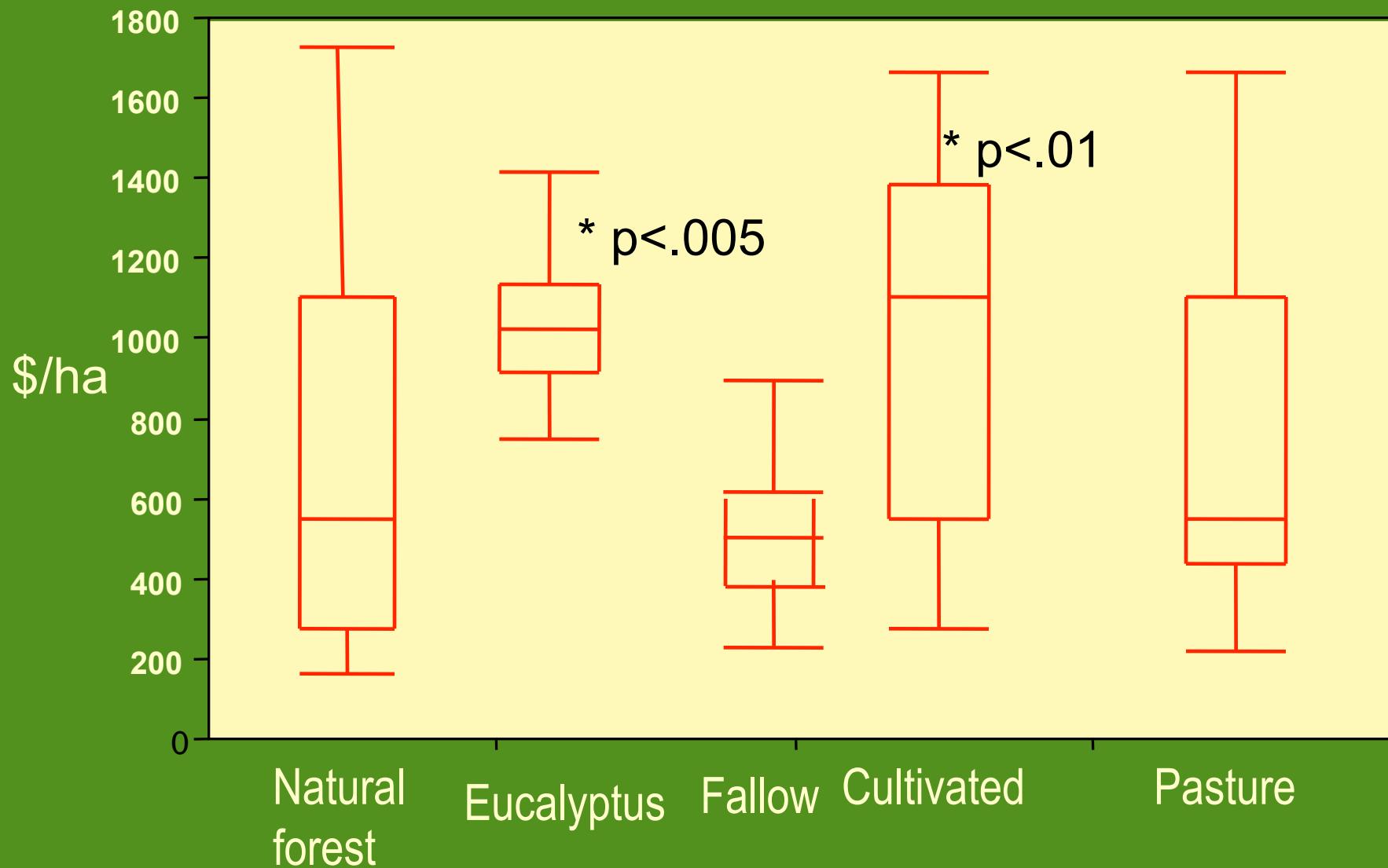


**Natural forest = common pool resource**

**with some species privatized**

**Planted eucalyptus forest = private property**

## Reported land prices around Kibale (n=102)



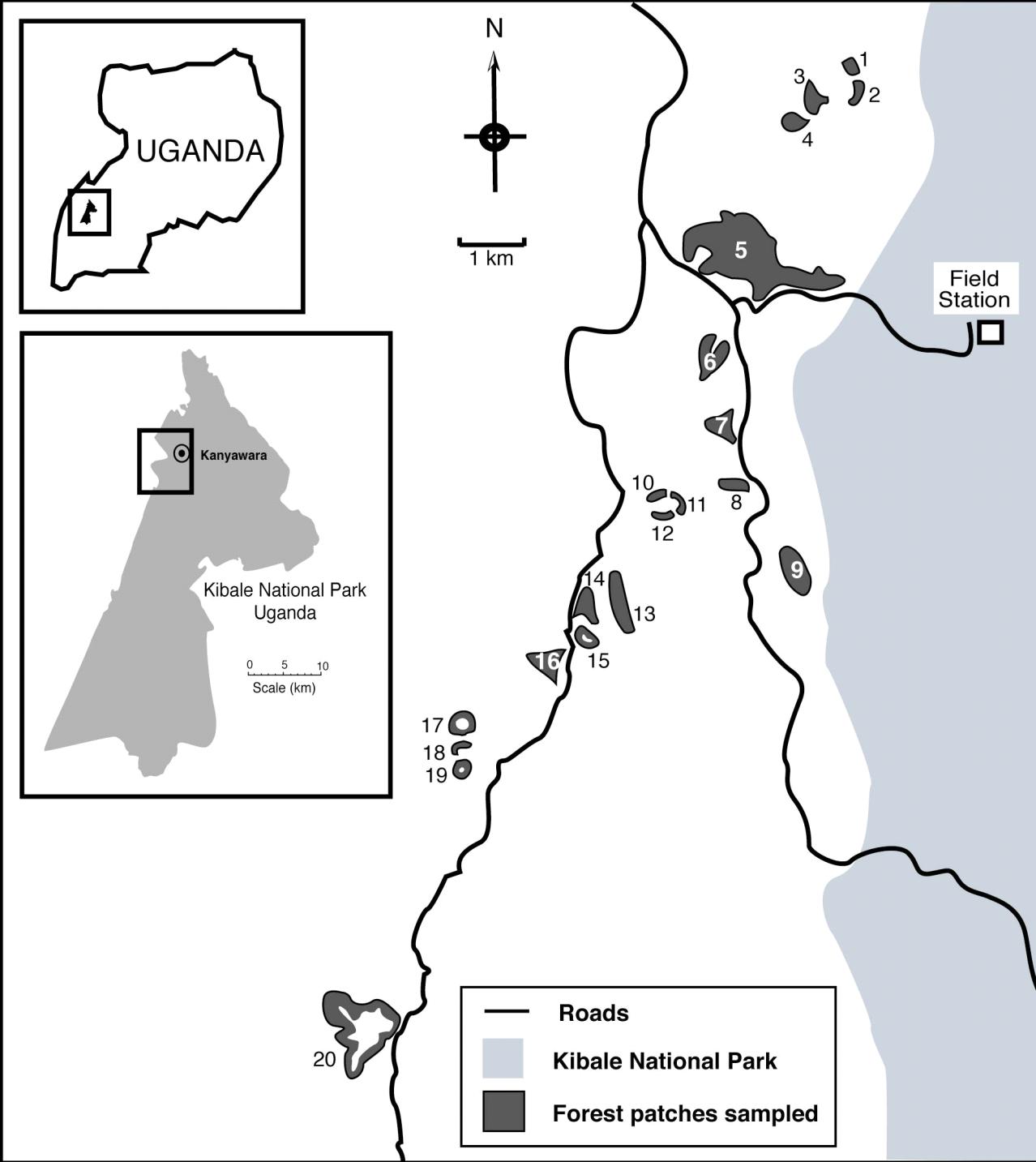
# Kibale National Park



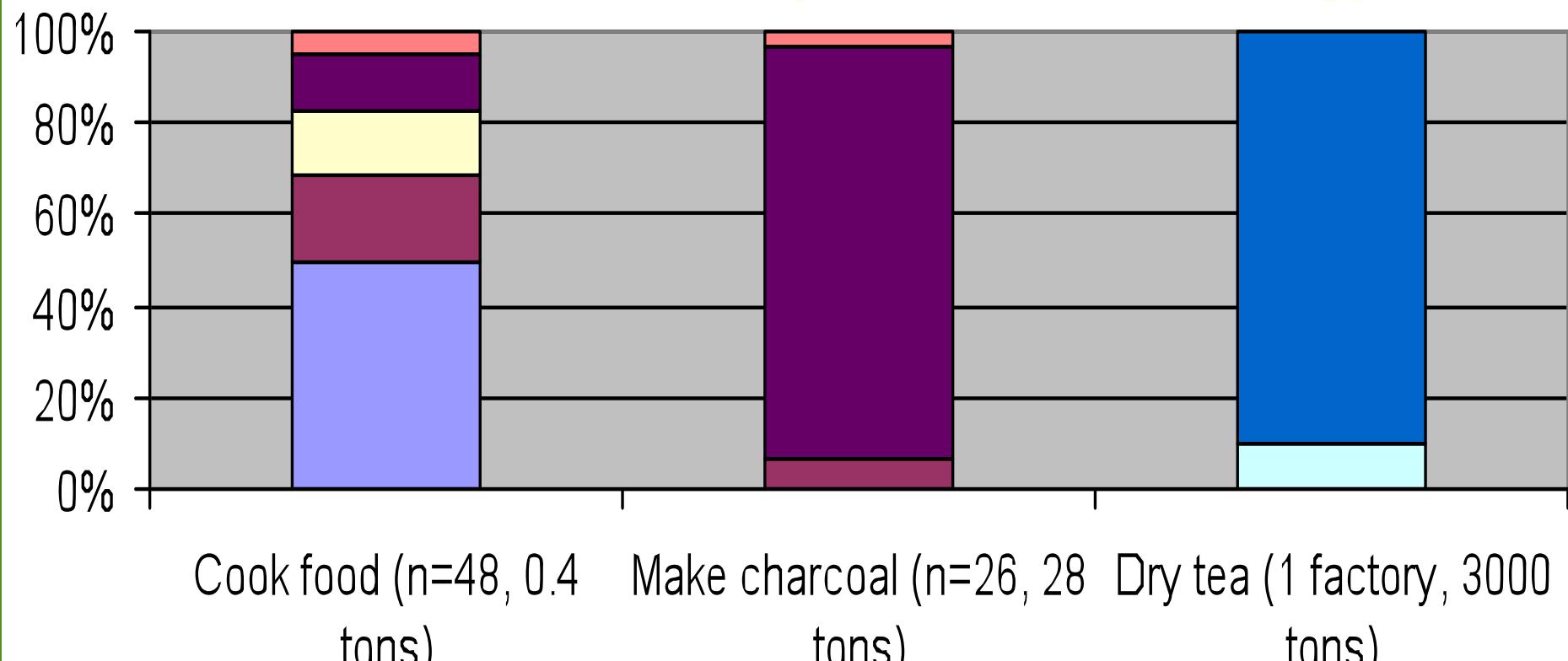
2001 Landsat ETM+  
Bands 4, 3 and 2

90 sq km  
Study area

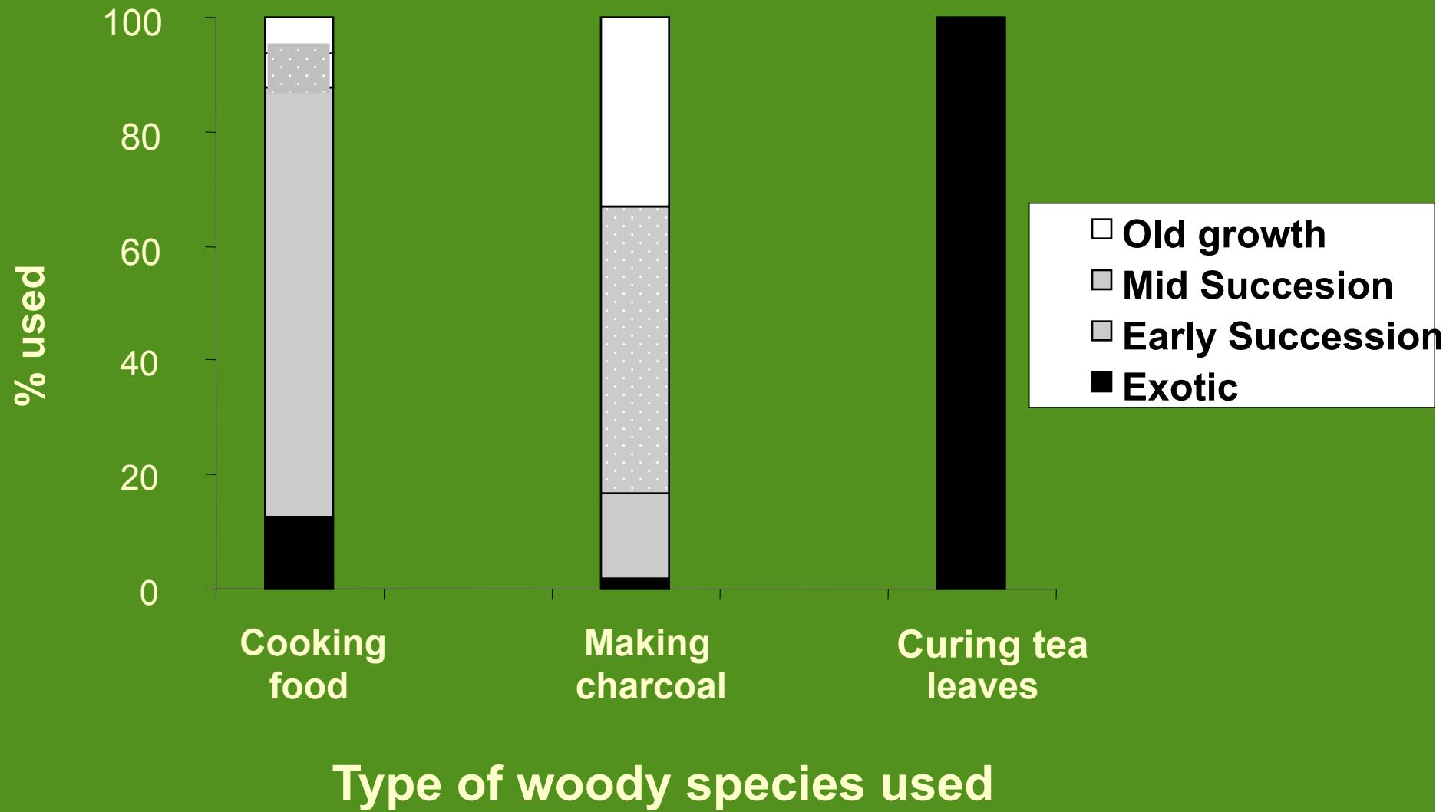
C. Chapman



## Land tenure vs. type of wood energy use



- █ Fallow-own
- █ Fallow-nbr
- █ Woodlot-own
- █ Woodlot-nbr
- █ Forest patch
- █ KNP
- █ Corporate plantation



(Naughton-Treves et al 2006)

# Longitudinal study, 1995-2006 biodiversity & local welfare

Forest patches,  
1995-2005 (n=34)

Landsat and Aster  
images

GPS ground truthing

Canopy species count

Primate spp. presence/  
absence

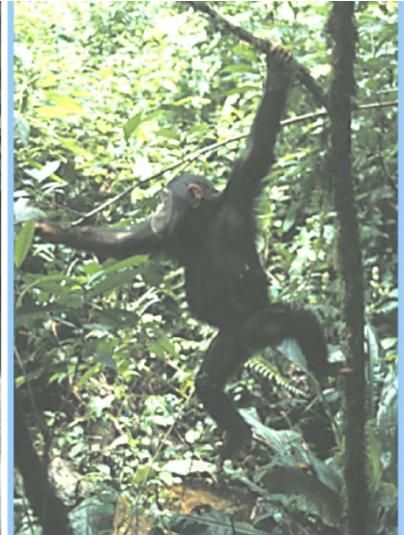
Households,  
1998-2006 (n=244)

Wealth indicators & assets  
(roof type, livestock,  
employees, eucalyptus,  
water source, wage  
labor, farm size)

Land transactions

## Decline in forest patch size (n=34), 1995-2005

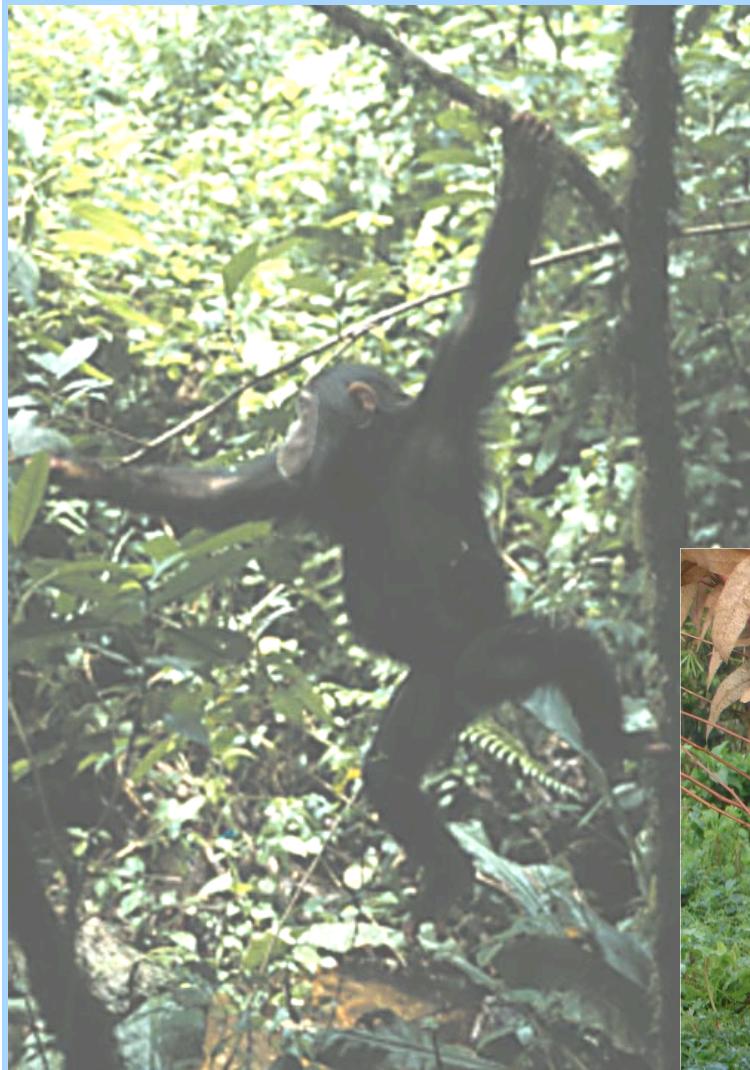
	Forest loss 0-5 km <u>outside</u> <u>park</u> , annual %	Forest loss 0-1 km <u>inside</u> park annual %
1995-2001	2.8 (.77)	0.2 (.1)
2001-2005	3.5 (1)	0.3 (.08)



P/A	9	13	10	10
A/A	1	3	12	19
P/P	16	13	6	3
A/P	8	0	6	2

34 forest patches

Chapman et al 2003



# Change in human welfare



<b>Wealth indicators</b>	<b><u>1996-2006</u></b> △% households (n=244)
Livestock	<b>33%</b> ↑
Employees	<b>25%</b> ↑
Safe water	<b>13%</b> ↑
Eucalyptus	<b>13%</b> ↑
<b># Eucalypts/per household</b>	<b>108%↑</b>
<b>Farm size change – large farms (&gt;6 ha, n=37)</b>	<b>4%↑</b>
<b>Farm size change – small farms (&lt;1 ha, n=55)</b>	<b>22%↓</b>



Land loss via 'Distress sales' or abandonment

A scenic landscape photograph showing a farm at the edge of a forest on a hillside. The foreground is dominated by lush green fields and small farm buildings. In the background, rolling hills covered in dense green forests stretch towards the horizon under a clear blue sky.

**Forests as land bank  
and safety net.**

"Farm at Forest Edge" © David Pluth



## Conclusions

- FOREST ↓ HUMAN WELFARE ↑ (*average*) but poorest of the poor suffer from deforestation.
- Deforestation accelerated by land tenure uncertainty
- Powerful political & economic reasons for unclear property rights
- National park maintains forest

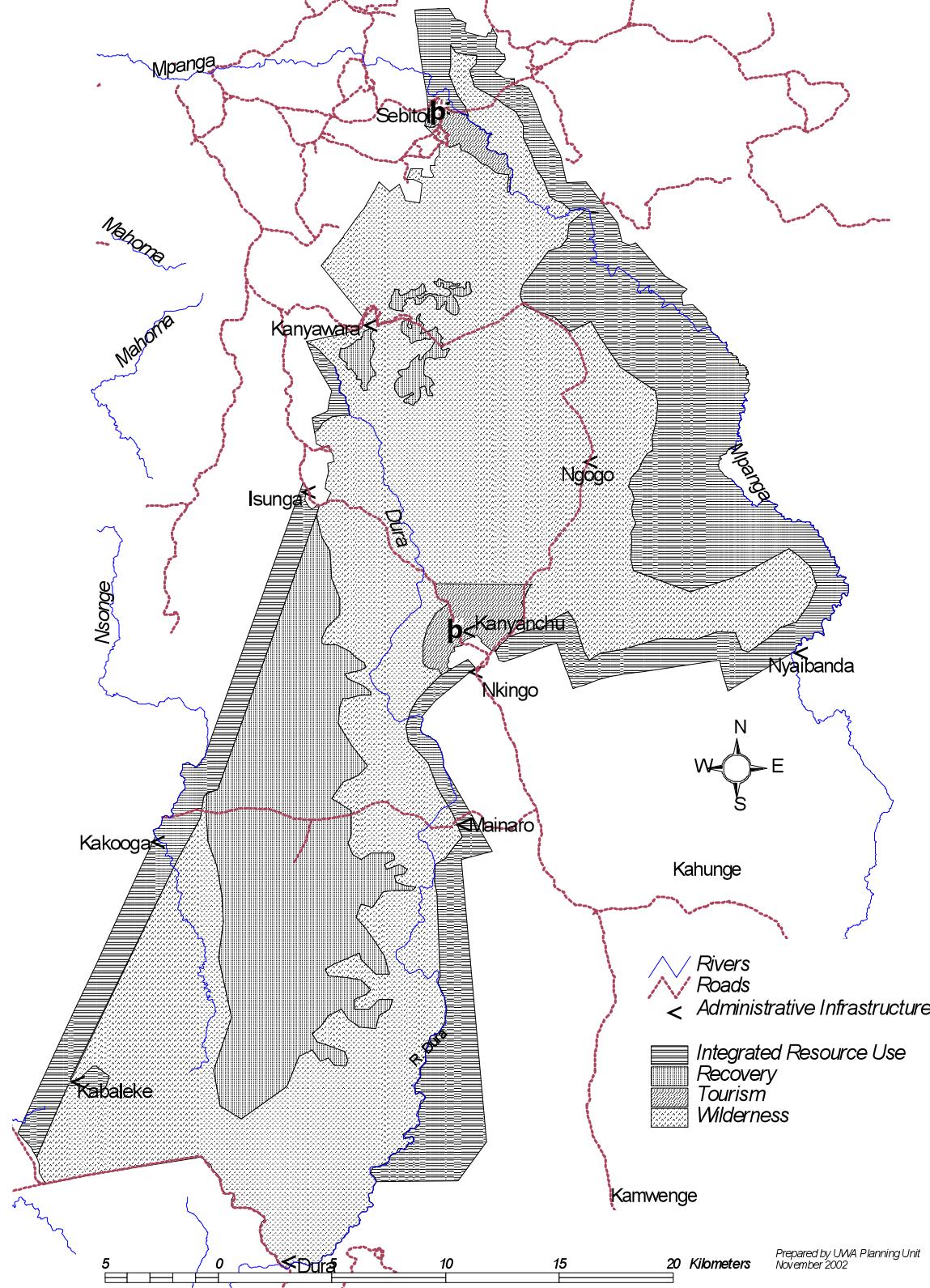
Pro-Poor PES must invest in Governance:

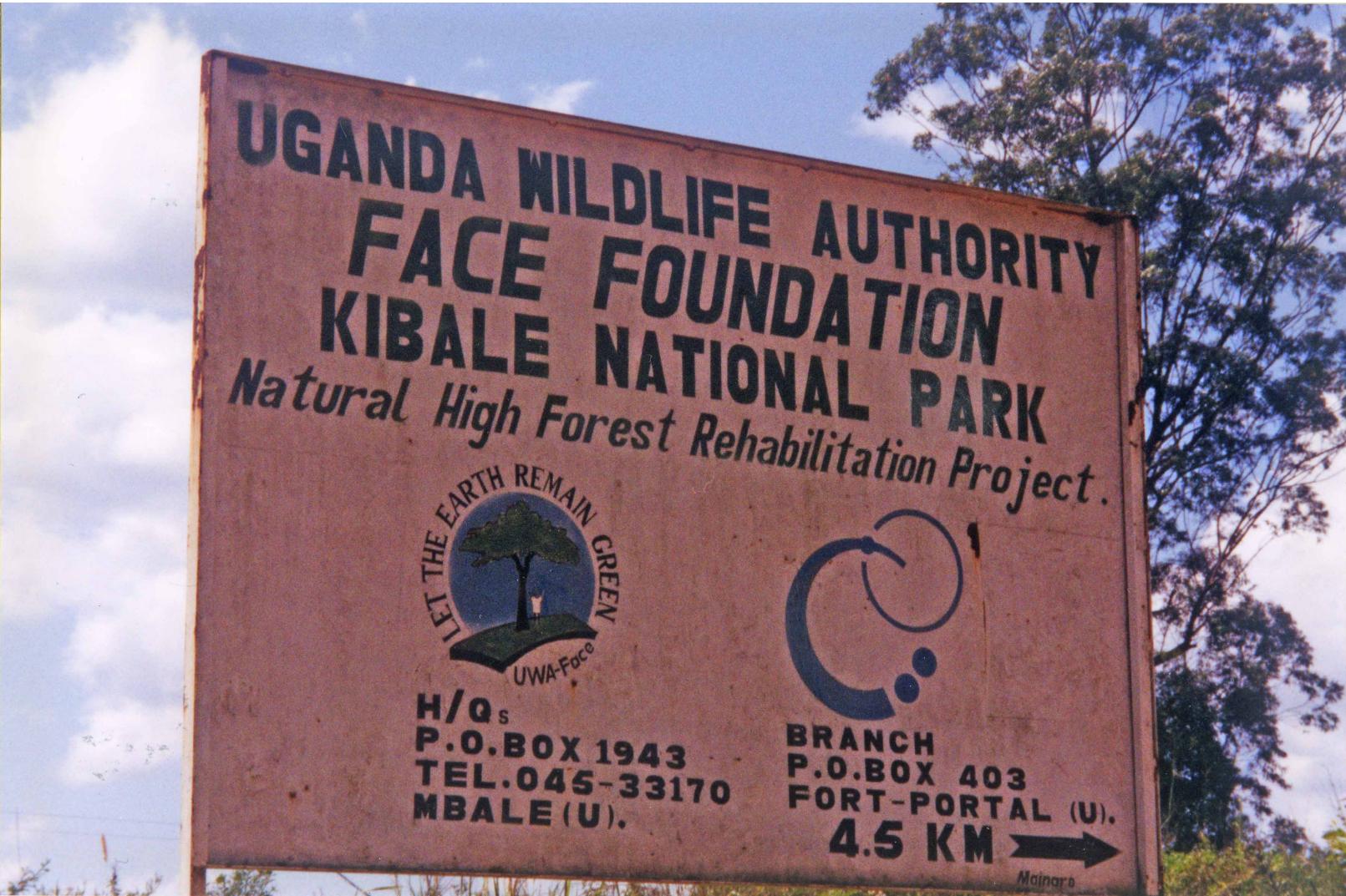
- Implementation of Land-(use) reforms
- Legislative & Institutional reforms
- Improve law enforcement

# Range of Conservation Interventions

# Contracts with communities for NTFP use in Kibale







Payments for Ecosystem Services  
employing citizens to reforest land and limit fires  
in park corridor



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HELP TO PRESERVE OUR NATURAL FOREST

DO NOT MAKE CHARCOAL

DO NOT POLLUTE OUR WATER

DO NOT HARM OUR WILD LIFE

PLEASE DRIVE CAREFULLY

THANK YOU

Reform in tea industry (more efficient wood use, better labor treatment).



## National Issues.

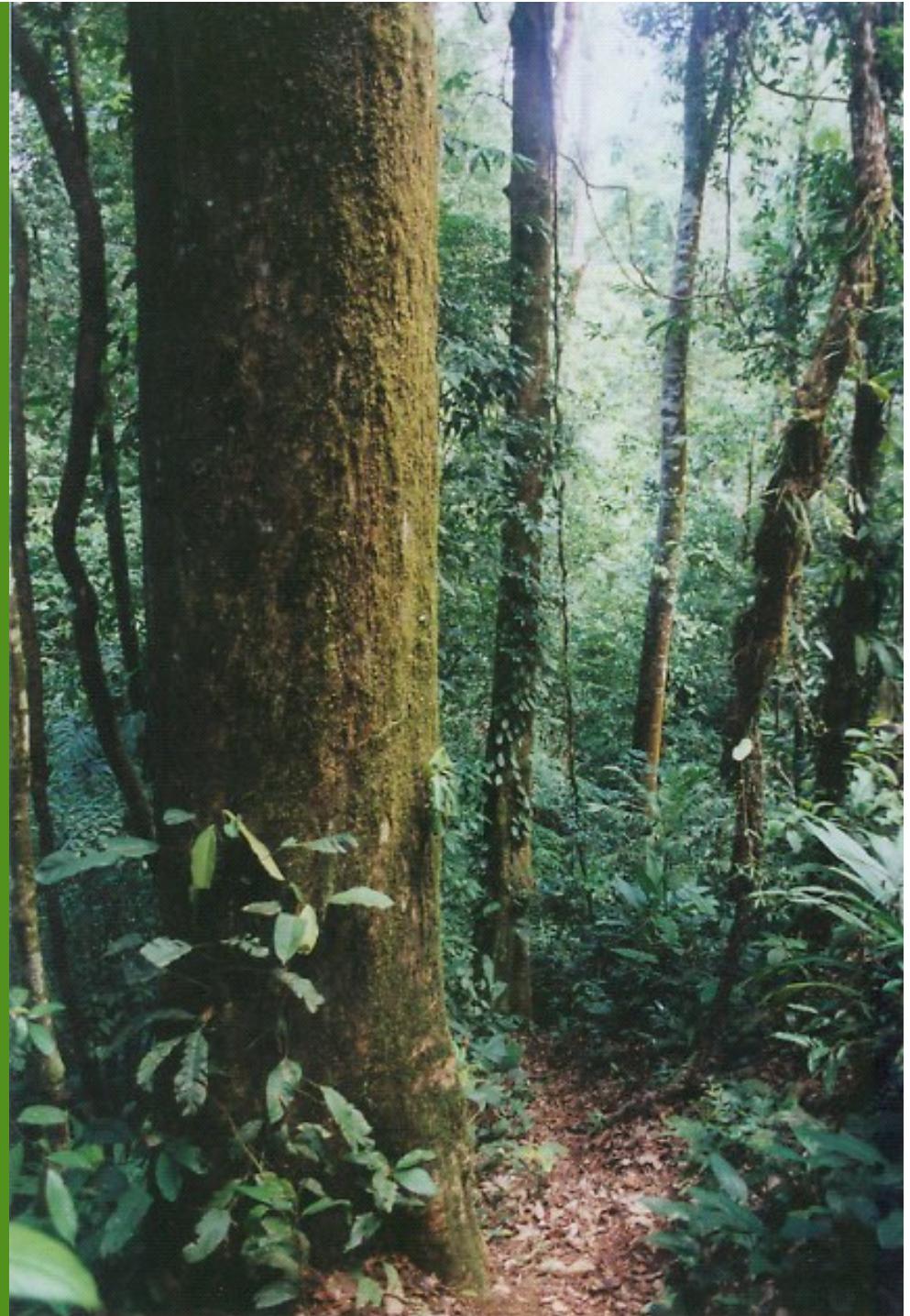
### Reform Charcoal Industry

More efficient production (better kilns, cooperatives).  
Licensing and pricing that reflects environmental costs.

Long term: shift to alternative fuel sources (e.g hydroelectric, elephant grass (*Pennisetum* spp.) or eucalyptus for biomass energy)

Tropical forests offer  
the "single largest  
opportunity for  
cost-effective and  
immediate  
reductions of  
carbon emissions"  
UK Stern Report,  
2006

Side benefits:  
biodiversity,  
poverty alleviation



Adapted from S. Pagiola  
WORLD BANK, 2009

## Broader conclusion: “REDD-Readiness” must include investment in governance

1. Design pricing system
2. Conduct forest inventory
3. Technical capacity building
4. Carbon stock assessment: different levels
5. Measure deforestation rates to create baselines
6. Finance additional inventories, permanent plots

Where to draw  
the line  
between  
readiness and  
investments?

Governance:  
Implementation of Land-(use) reforms  
Legislative reforms  
Institutional reforms  
Improve law enforcement  
Financial sector reforms

