



Community-Forestry

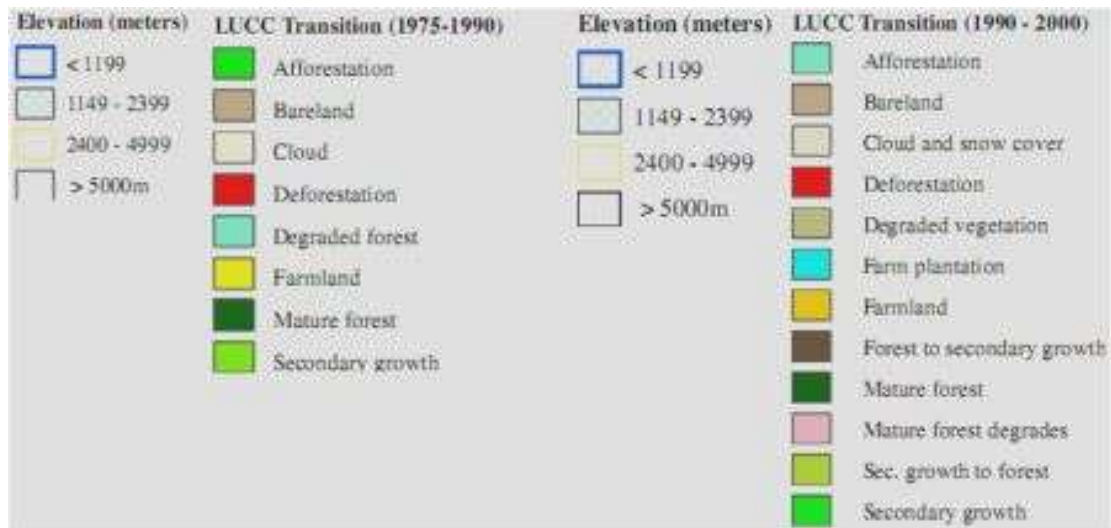
Selected activities to maintain or enhance carbon stocks

Bernhard Mohns

Nepal

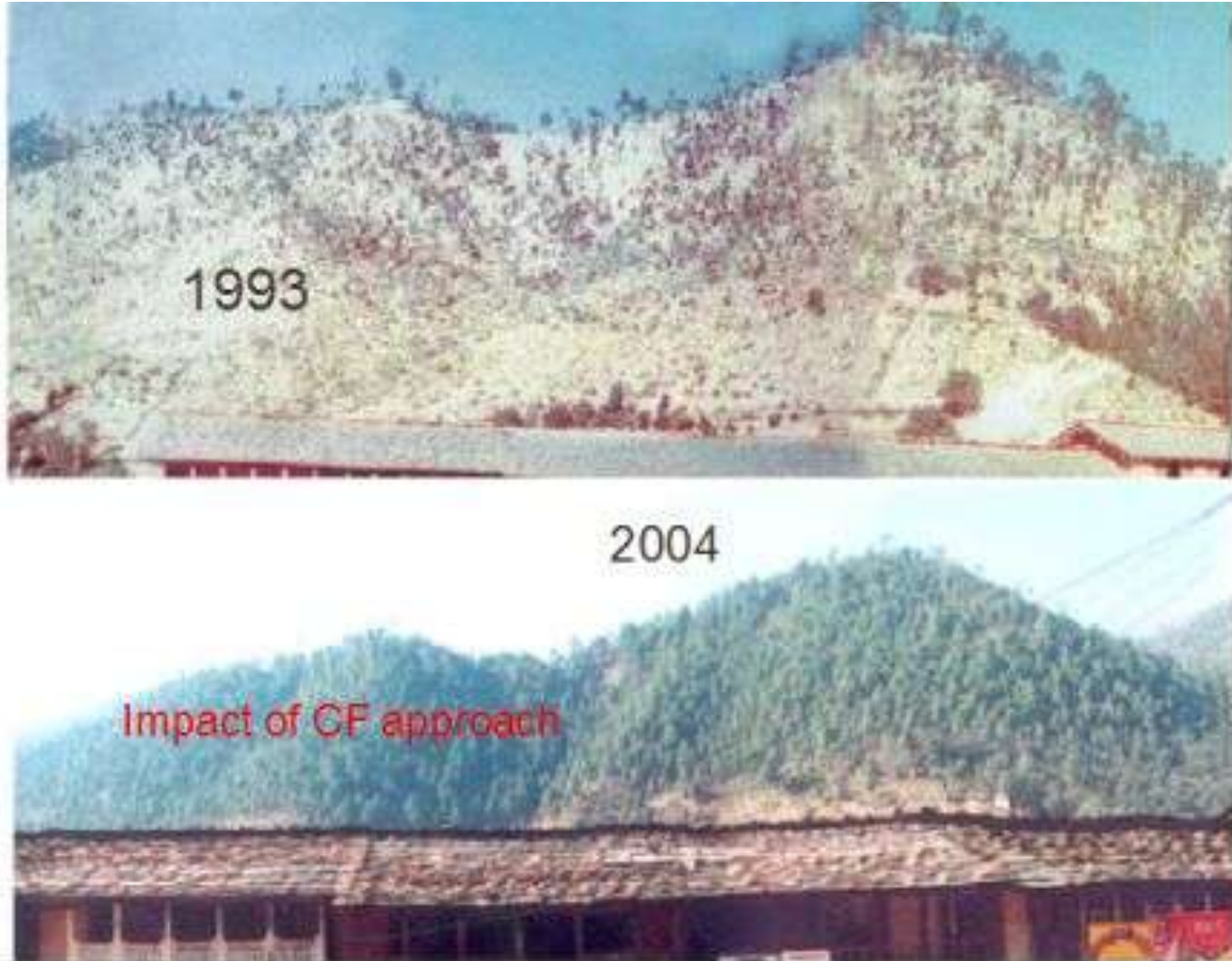
**A community forestry
success story
with remaining problems**

Nepal : Central Development Region Land Use Transition



Bhattarai (2006)

Improved forest conditions due to community forestry



Source: Amataya S.M. And Kandel P.N. 2009 Forest cover change assessment in Nepal

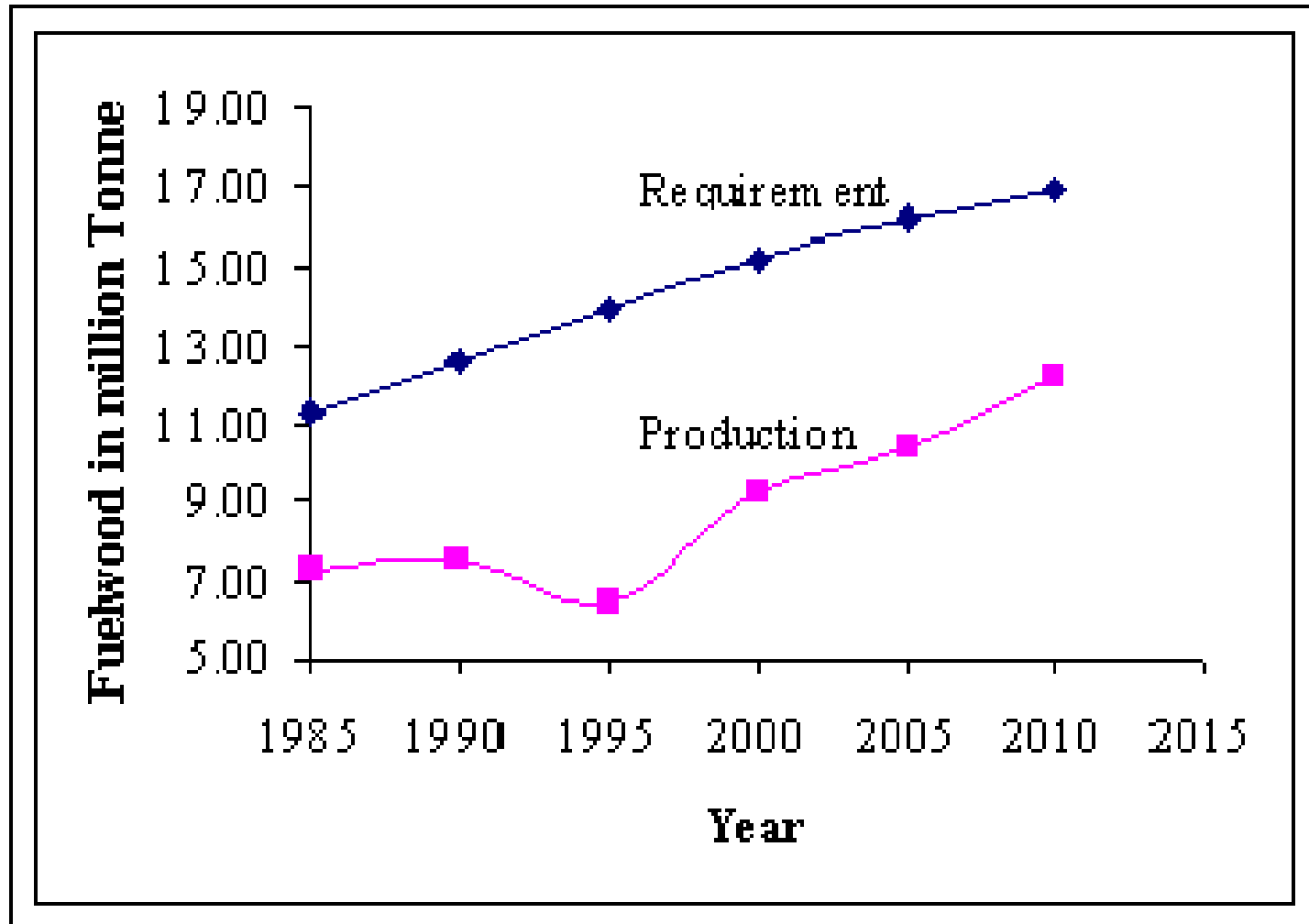
Biomass stock in forest and other wooded land

FRA 2005 categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	557	770	718	42	58	63
Below-ground biomass	195	269	251	15	20	22
Total living biomass	752	1,039	969	57	78	85
Dead wood	113	156	145	9	12	13
Total	865	1,195	1,114	66	90	98

Source : FAO (2005) Forest resources assessment Nepal

The REDD/ Energy Link

Nepal: Fuelwood requirement and production



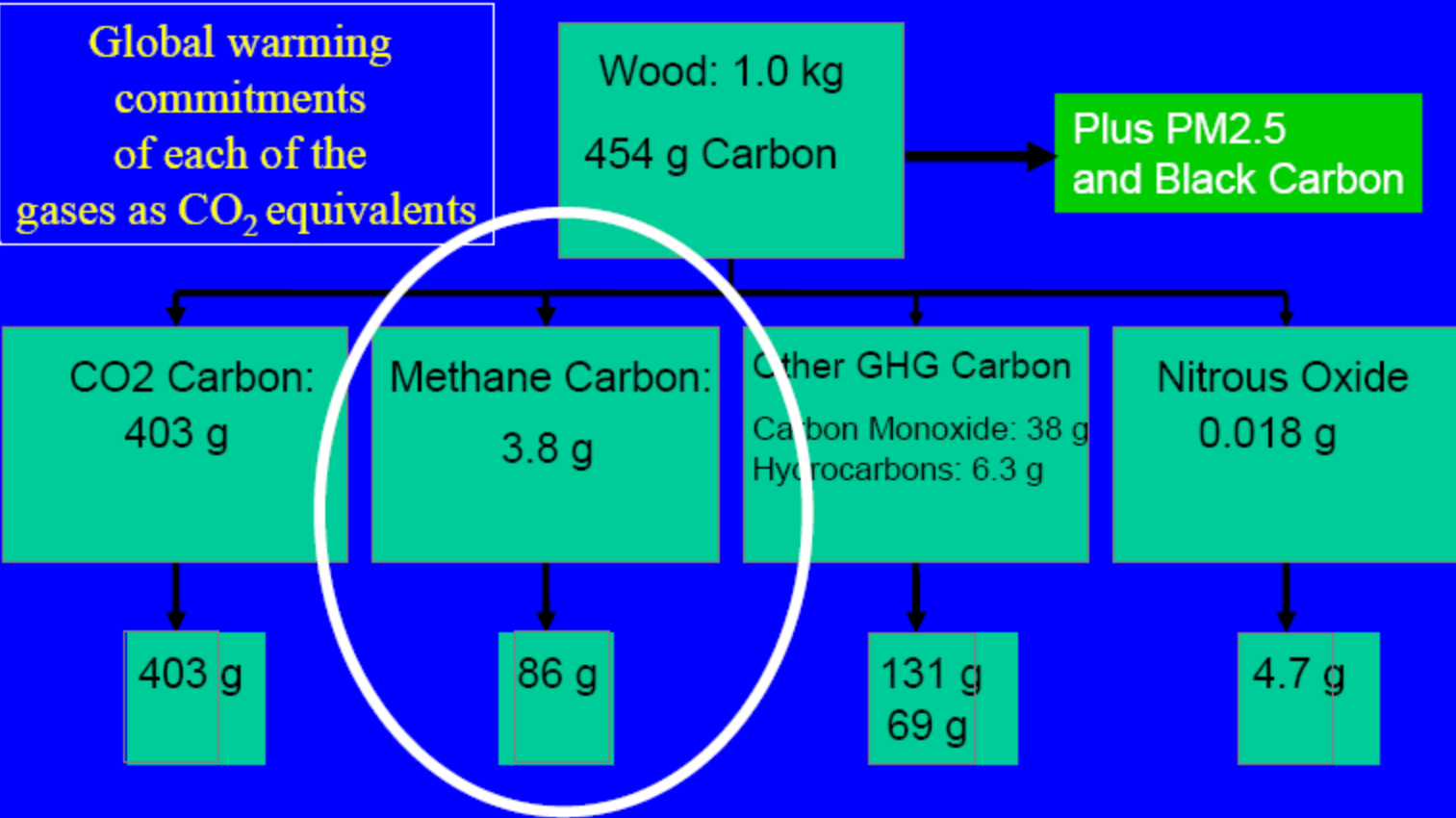
Source: FAO (2000) FRA Nepal

Changing the demand side : Improved cooking stoves



CDM or REDD payments as a subsidy: CER below 10 \$ / stove

Greenhouse warming commitment per meal for typical wood-fired cookstove in India

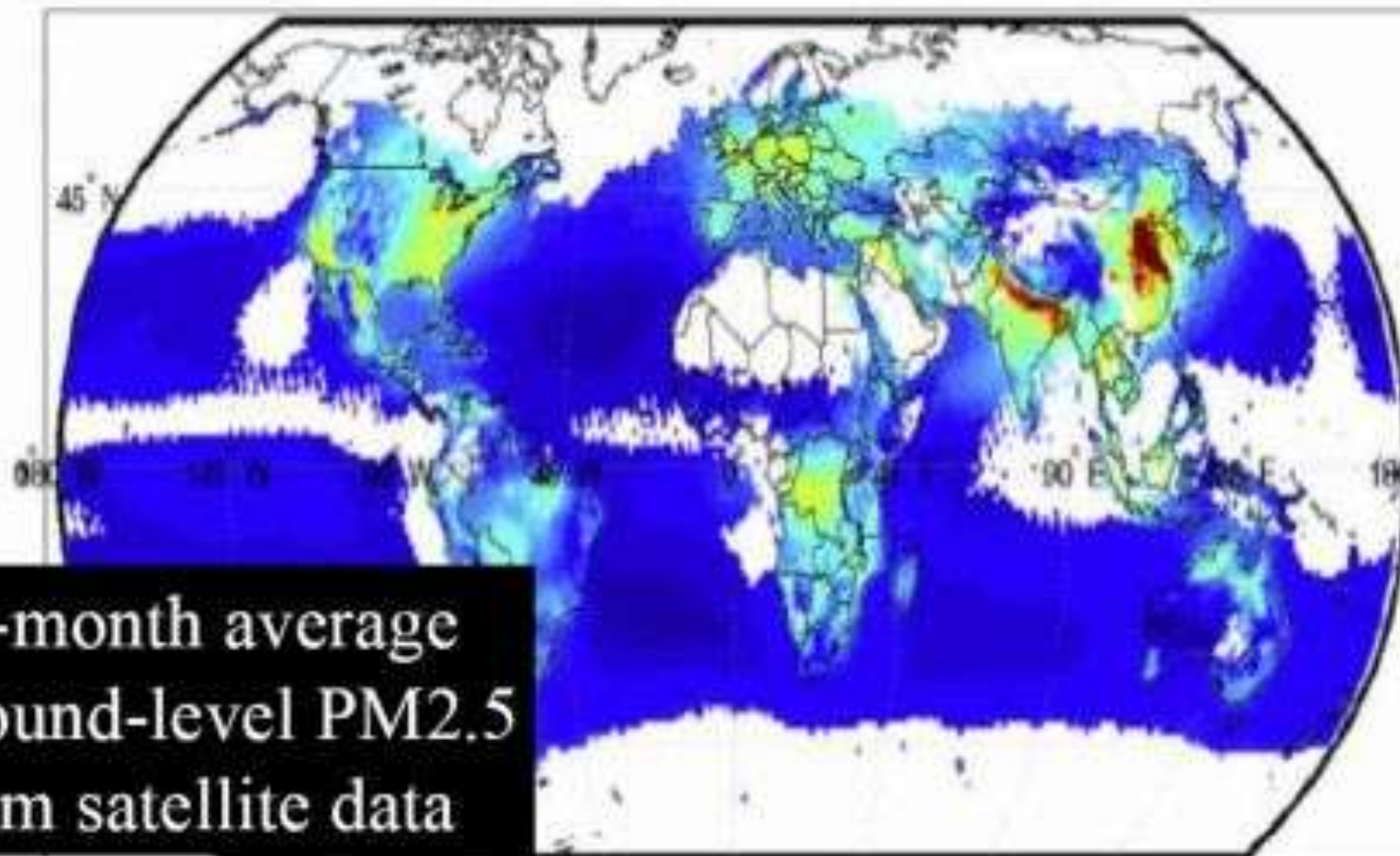


PM: fine dust fraction

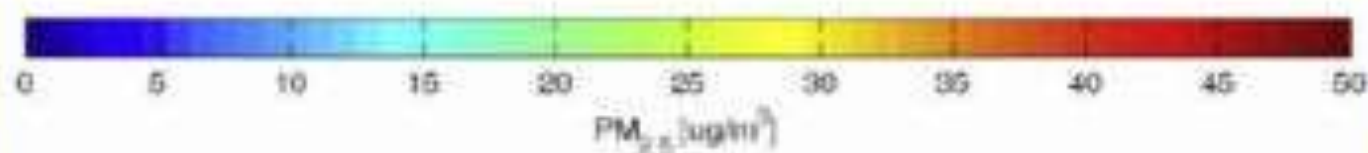
Kirk R. Smith, UC Berkeley

Smith, et al., 2000

MODIS



20-month average
ground-level PM_{2.5}
from satellite data



Burden of Disease

- Current estimates put SFU 10th among major risk factors for ill-health globally
- Third in India, after malnutrition and poor water/sanitation
- 1.6 million premature deaths in 2000, two-thirds in children
- 420,000 in India
- Only pneumonia and COPD counted

COPD: chronic obstructive lung diseases

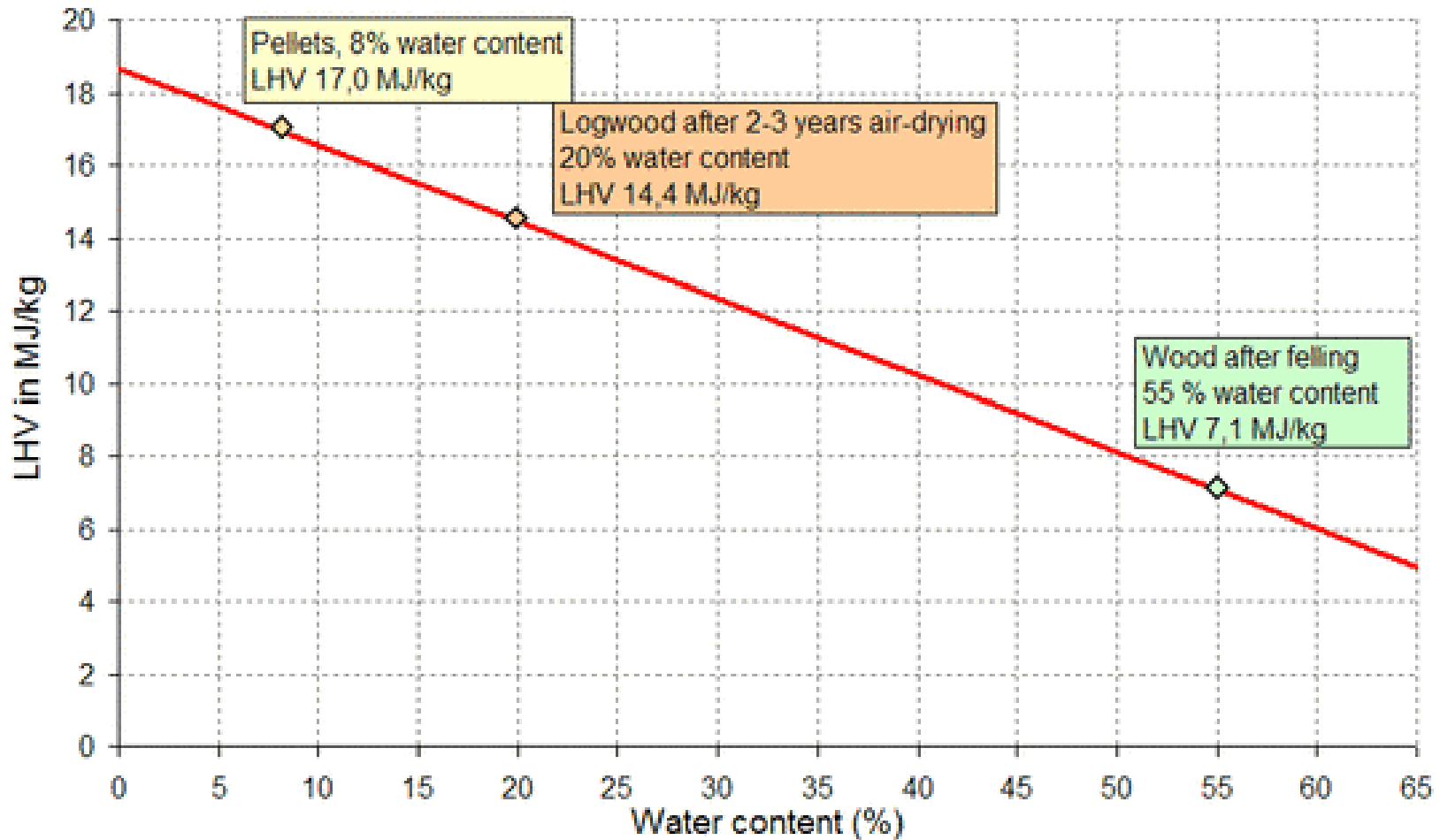
SFU : Solid fuel use

A Biomass Gasifier Stove

Tests show emissions nearly at levels of gas stoves:
Low health risk and essentially no greenhouse emissions



Largely overlooked: Effect of moisture content on heating value



Commercial firewood in urban areas Sold by („wet“) weight



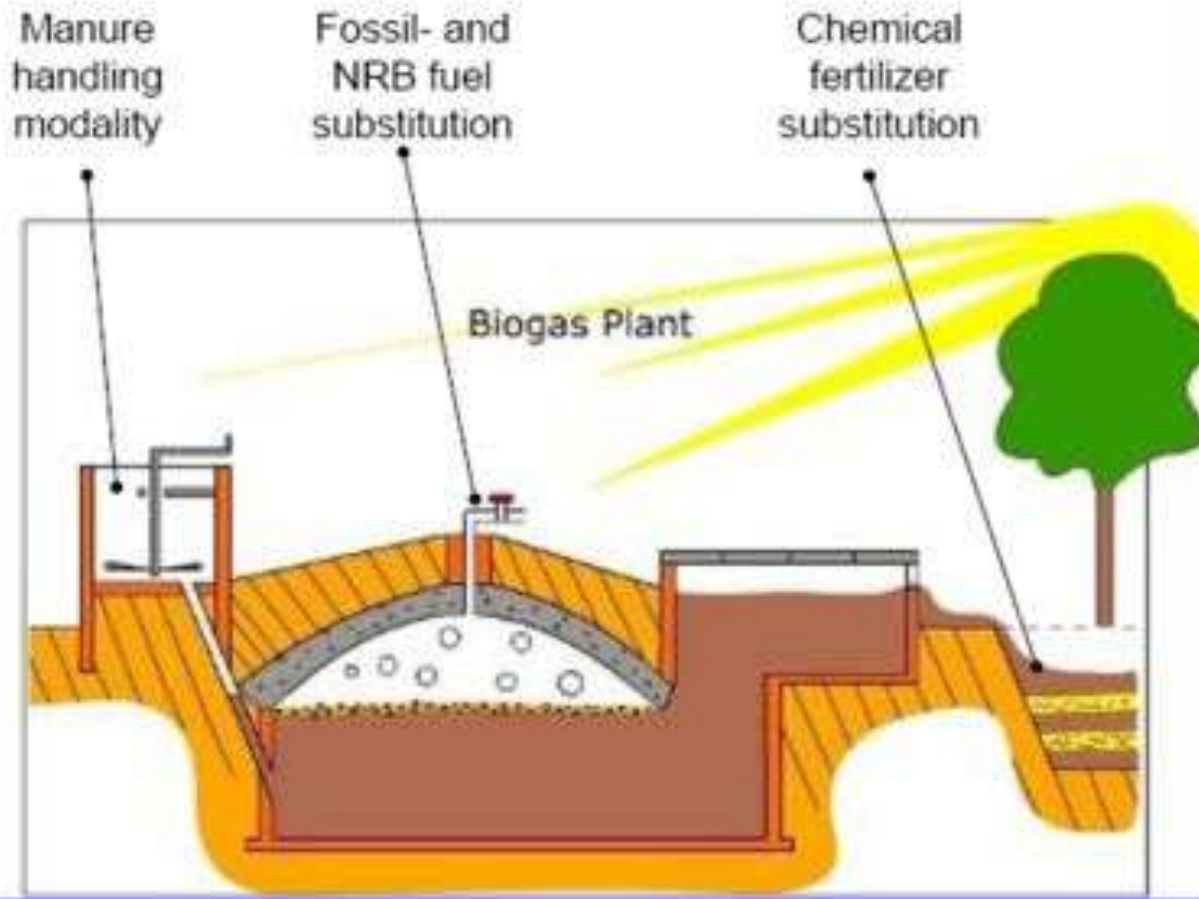
„Wet“ Storage of commercial firewood !!!



Why not this way at each stage of the supply chain



Biogas & GHG reduction



Subsidy : CER to be below 50 \$/scheme/year

But

Biogas production will need additional inputs

- **Cut (tree fodder)**
- **Bedding material**

due to stall feeding

Thus assumptions of ongoing CDM schemes questionable

Linking household energy and forest restoration



**Chromolaena
Odorata (Eupatorium)**

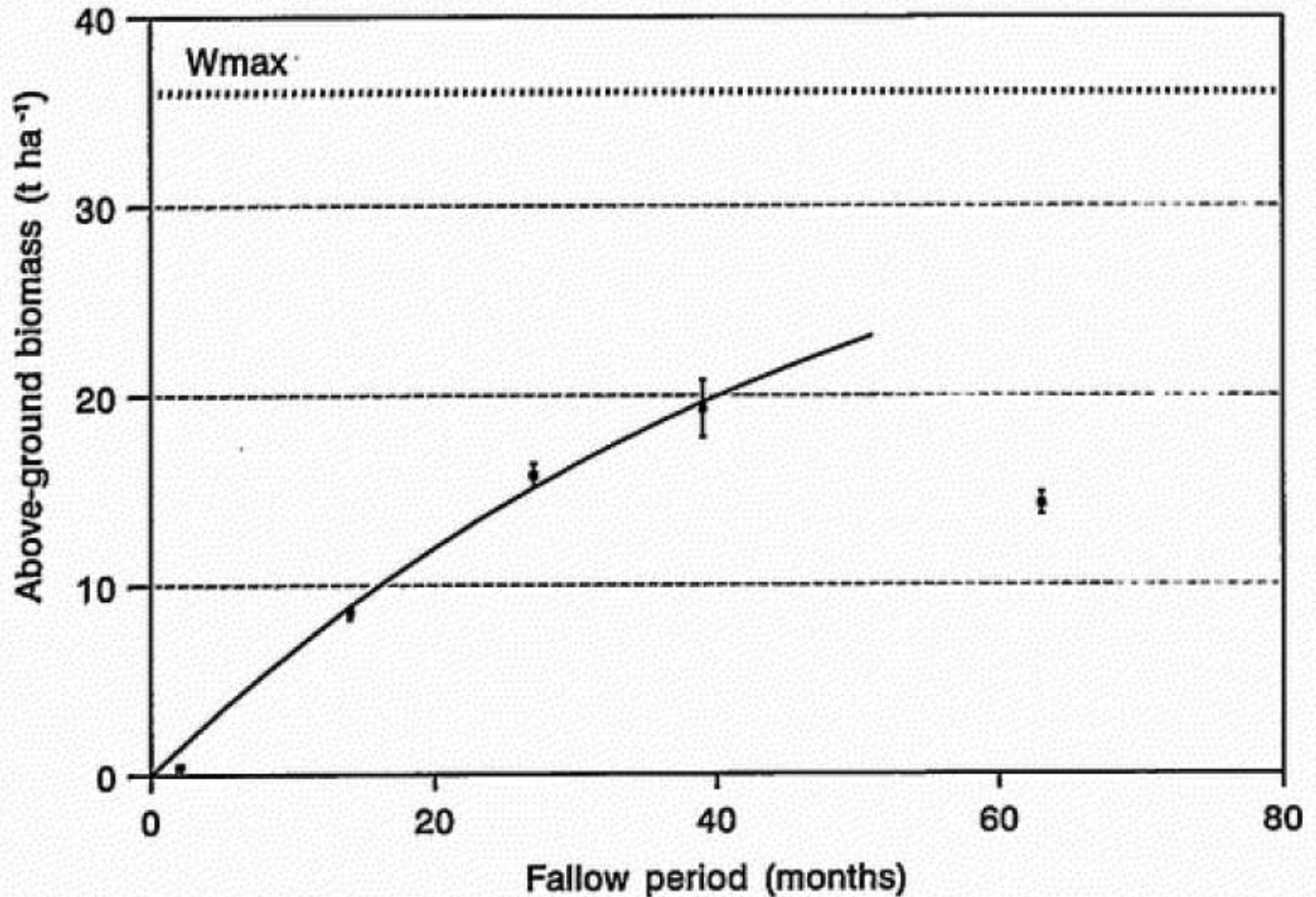
**Nepali:
Ban mara The forest
Killer**

A key invasive species

Chromolaena supresses forest regeneration



Dry matter production of *Chromolaena odorata*



From: SLAATS et.al (1996) Growth of *Chromolaena o.* fallow.....

Bee hive briquetting of invasive weeds

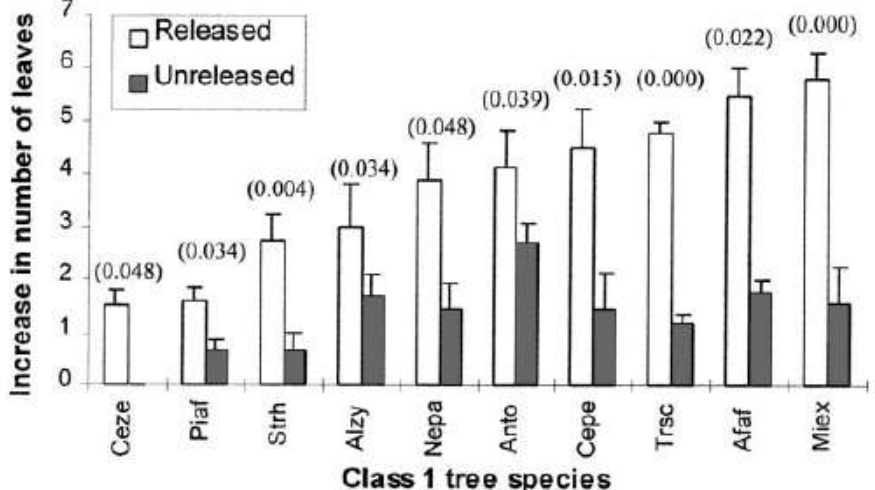
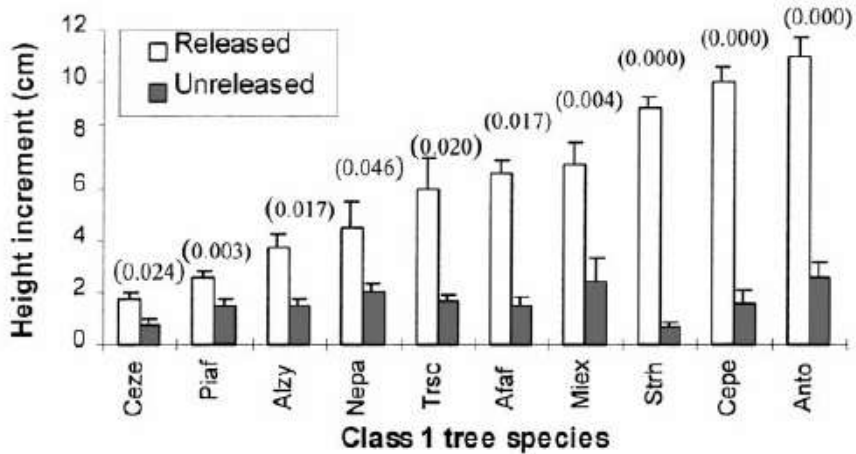


Briquette Stove from which the insulation has been removed (left) and Baked Clay Stove (Right)

Forest restoration so far not considered in CDM based subsidy scheme

Effect of control of *Chromolaena odorata* on seedling regeneration

From Honu et.al (2000) for Ecol. and Mgmt.



Livestock forest linkage

Livestock population of Nepal

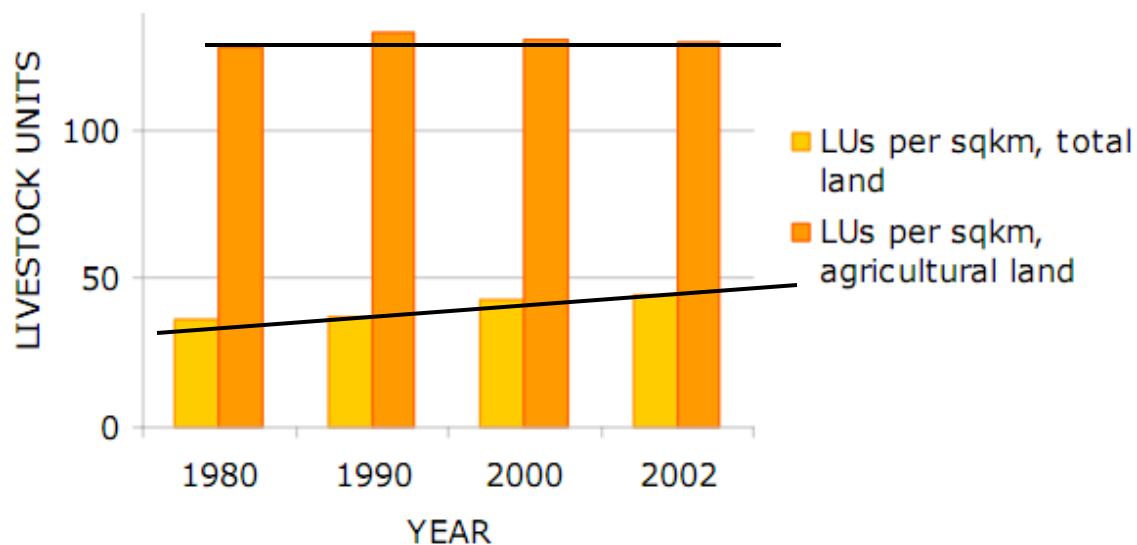
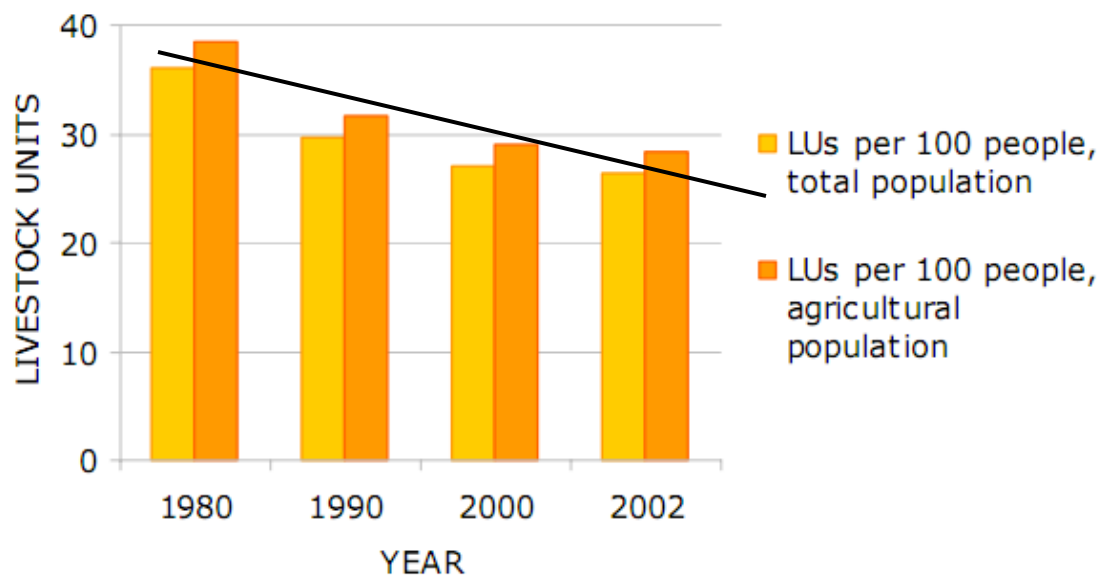
Values expressed in 1,000

Species	Year				Annual growth rate (%)	
	1980	1990	2000	2002	1980-1990	1990-2000
Cattle and buffaloes	9,400	9,293	10,549	10,680	-0.1	1.3
Sheep and goats	5,380	6,216	7,177	7,447	1.5	1.4
Pigs	375	574	878	934	4.4	4.3
Poultry	5,860	13,498	19,045	21,779	8.7	3.5
Total LUs	5,372	5,518	6,358	6,489	0.3	1.4

LU: Livestock unit; **conversion factors:** cattle (0.50), buffalo (0.50), sheep and goats (0.10), pigs (0.20) and poultry (0.01)

Source: FAO (2005a)

Selected indicators of livestock production in Nepal

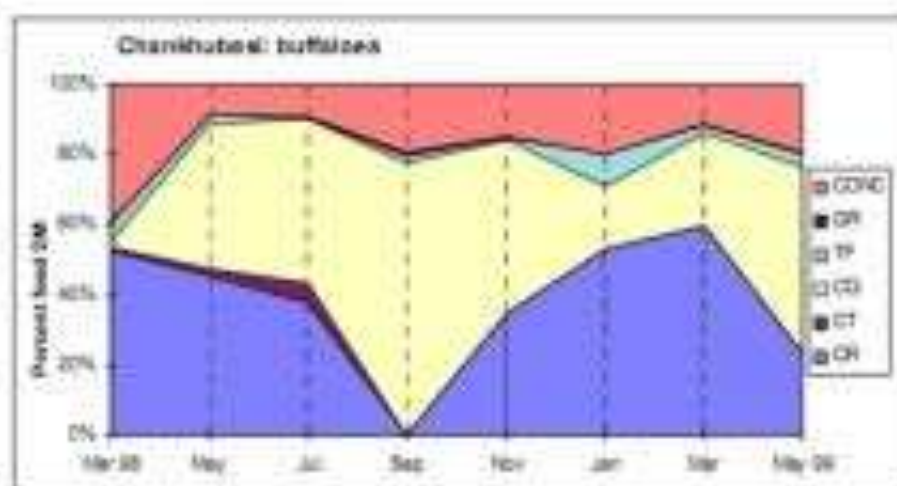
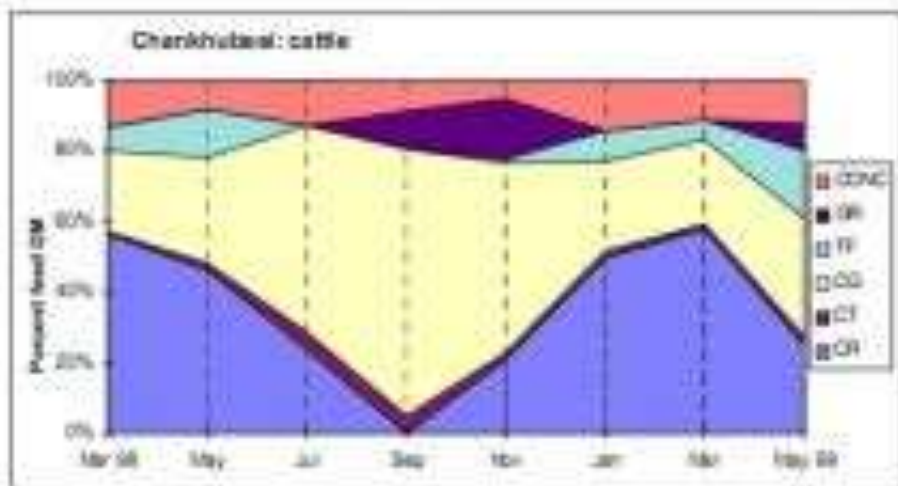
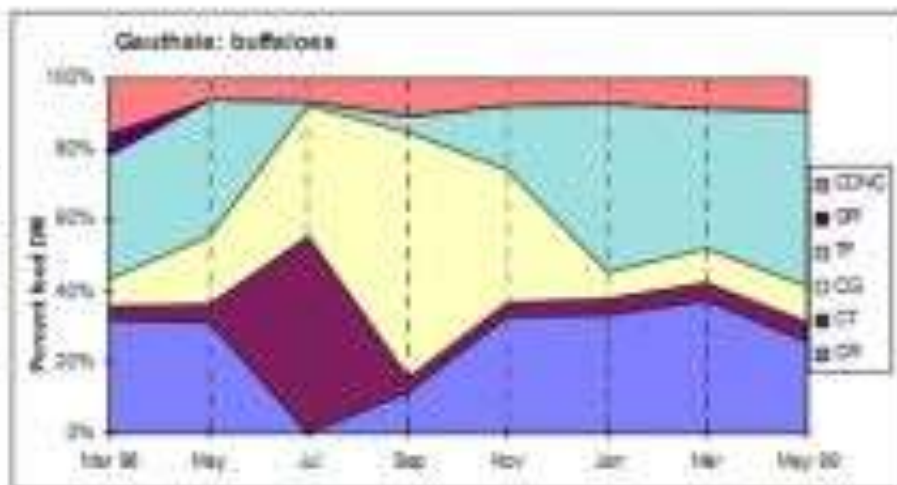
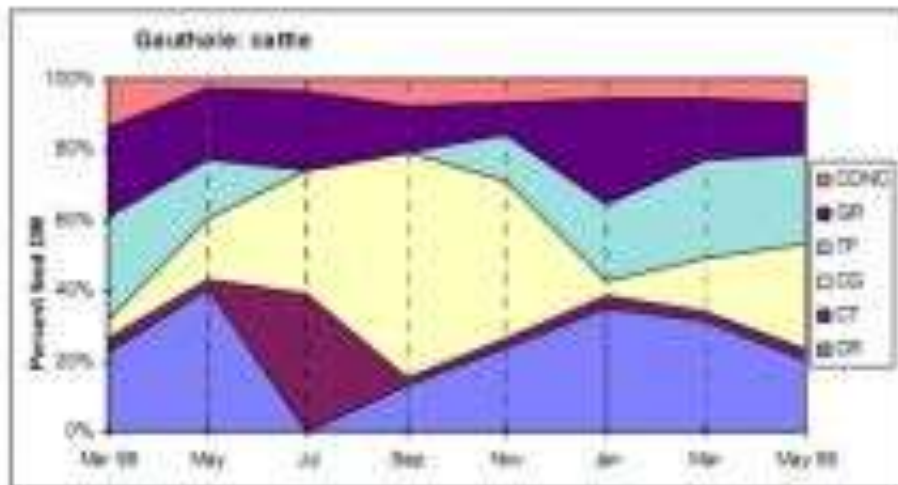




What is the real issue fuelwood or livestock inputs fodder/bedding ?

Seasonal diet composition for cattle and buffaloes

Tree fodder
 Cut grass





An issue overlooked : leaf litter collection ?

Frequency of fuelwood, fodder and litter collection

Product	Frequency (trips / week)	Time per trip (hours)	Time spend (hours per week)
Fuelwood	1	3	3.8
Fodder	7	2	14.0
Litter	3	2	7.0
Total	13.5	-	28.0

Data from : Schreier.et. al. (2006) Water and Development in a Himalayan Watershed

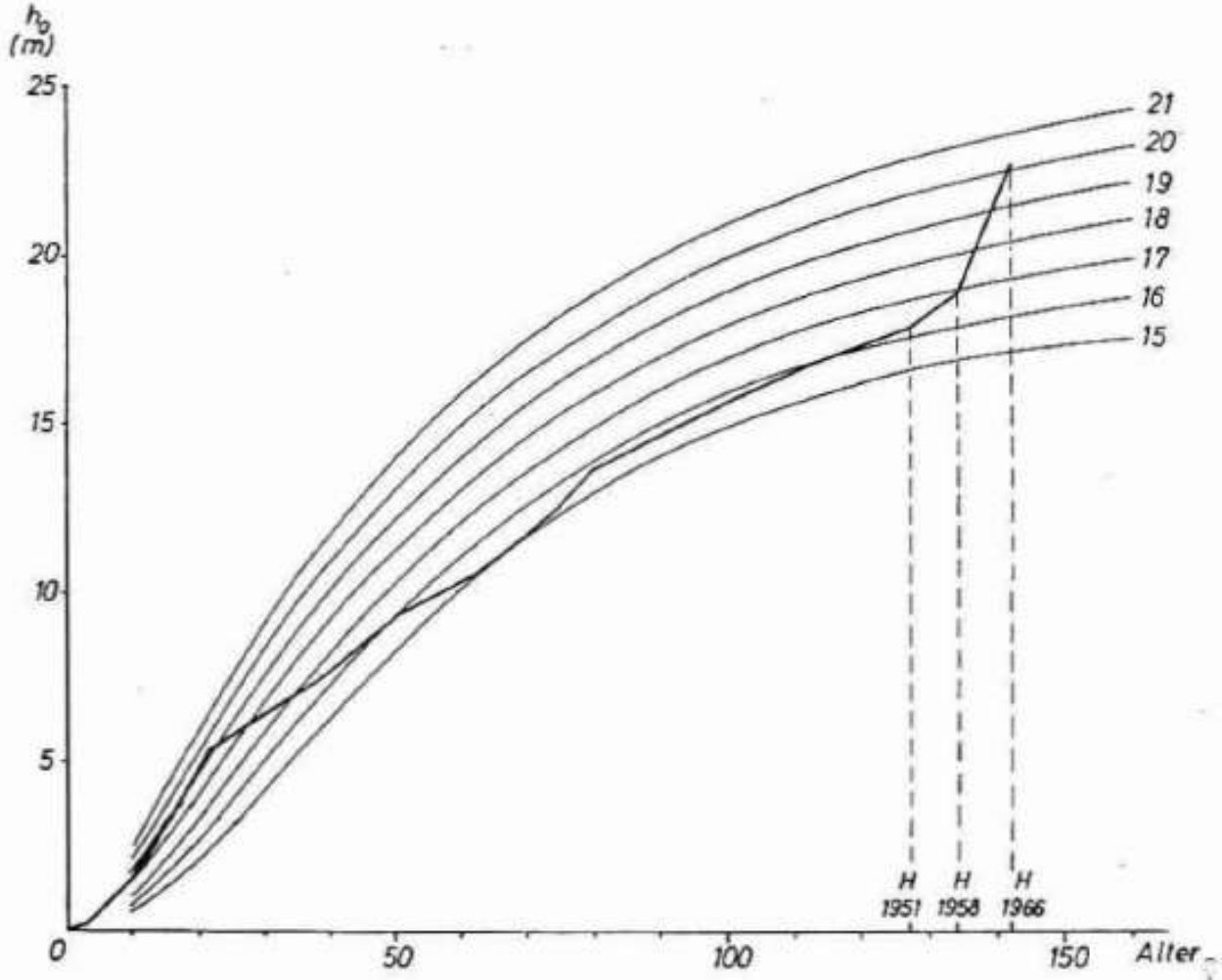


Effect: Depleted forest understorey

**Leaf litter collection for stalled
livestock
in Central Europe around 1940**



Effect of stopping leaf litter collection in Pine forests



Stem analyses in Bavaria Germany 1970ies

Many answers are provided by trees and other resources outside forests



A win win for REDD ?

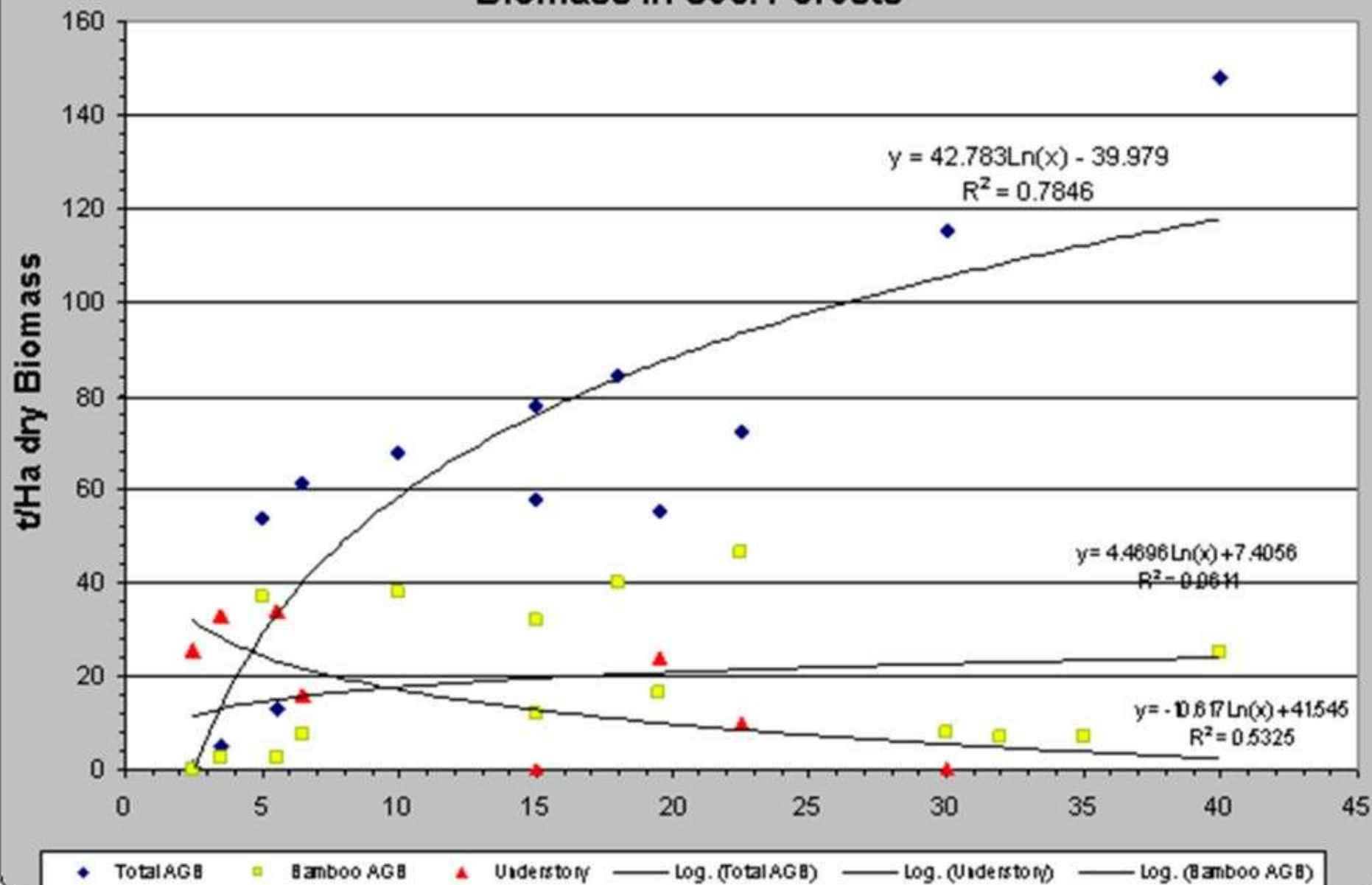
**Commercial scale bamboo
harvesting for pulp/ power
generation and fuel load reduction
(Forest Fire Control) in Northern
Lao PDR**

Bamboo dominated shifting cultivation landscape

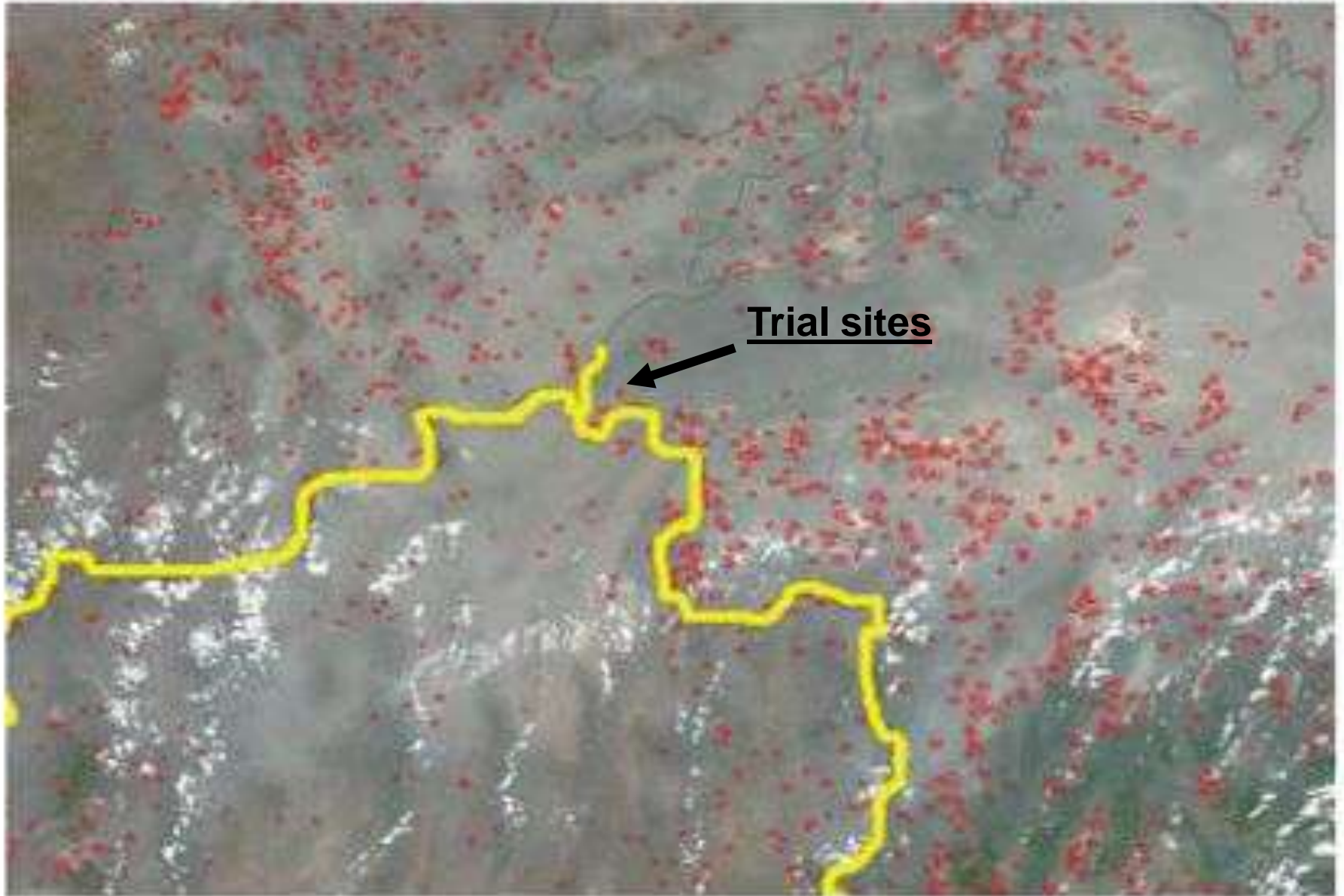
Bamboo supresses tree regeneration



Biomass in Sec. Forests



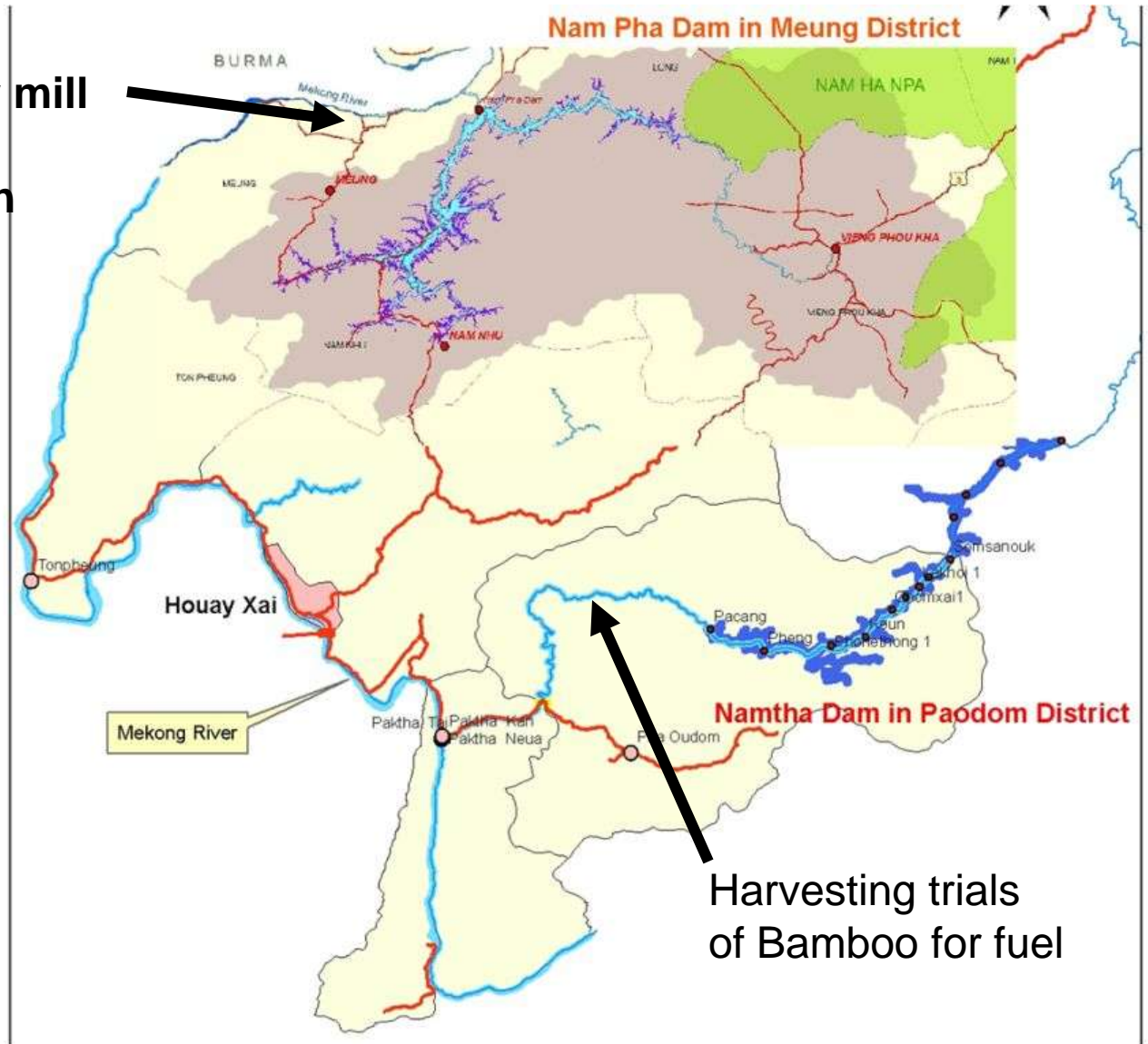
Forest Fires in Northern Laos



Trial sites

NASA Modis Rapid 27.3.2004

Location of the first bamboo paper mill in Lao PDR under construction



Prices for rice husk and other biomass fuels for power generation in Thailand

- 1000 -1100 Baht / t (dry) in 2010 **30 \$ US/t dry**
- 500 - 700 Baht / t (dry) in 2006
- Forecast????

Bamboo chips as additional fuel ??? :

Cost of labour and harvesting operations of bamboo in Laos/ transport to Thailand ??



Labour intensive felling and manual forwarding operations in dense and highly entangled bamboo culms

Felling costs between 15 and 30% of total costs when delivered to Thailand

0.5 to 0.7 t (DM)/ man day

Note: for SEA basically no studies on fuel load reduction available!!!!!!

Harvesting with horses

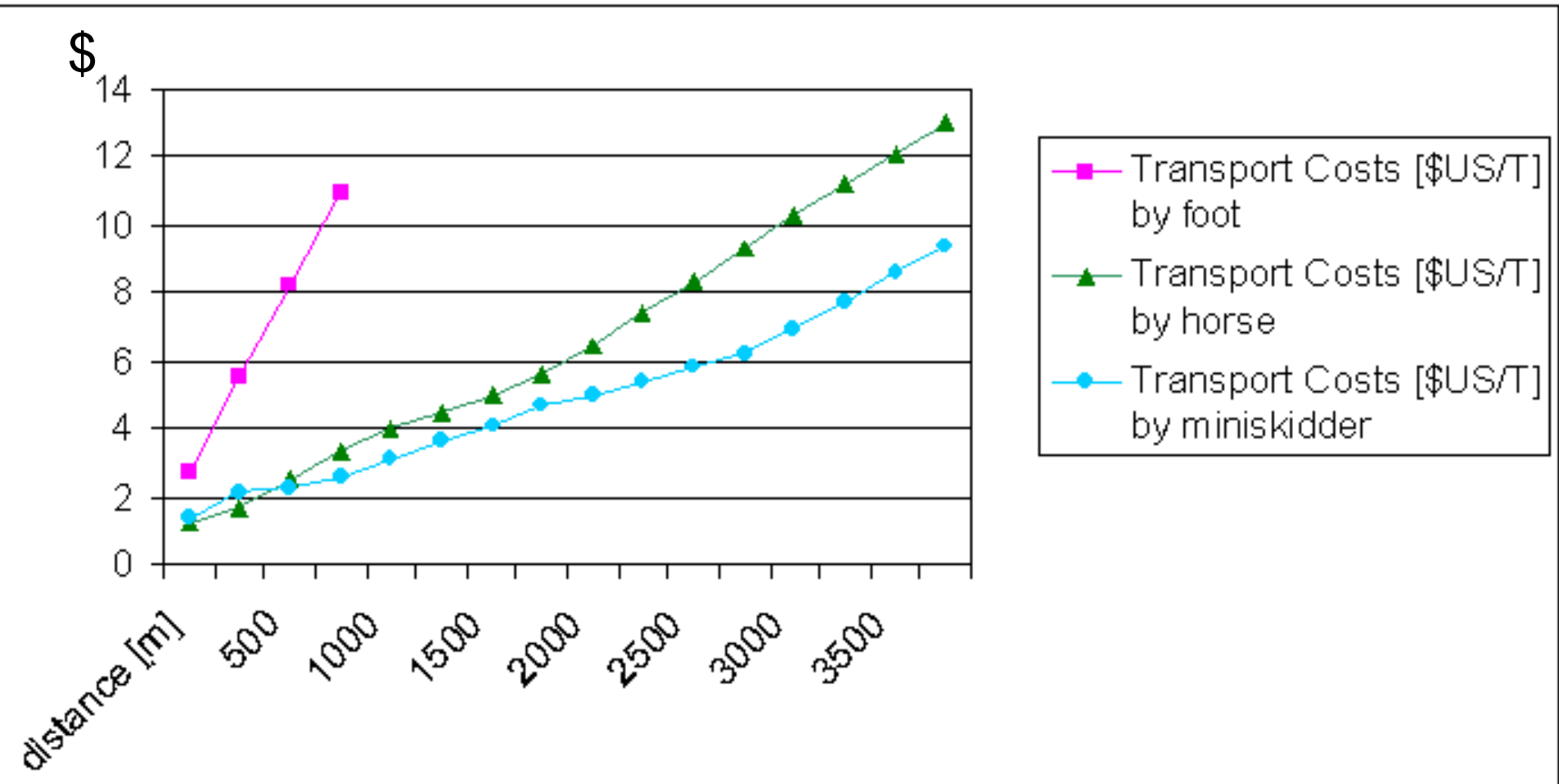


Extraction of bamboo and logs with locally bred horses. (own photo)

Note : maximum loads of this system will be around 250 kg for level or down hill situations .
The locally manufactured skidding shoe reduces friction when dragging the log on the ground.

Bokeo (Laos) 2006

Bamboo Forwarding Costs (Forest to Roadside) in Relation to Extraction System & Distance



Bokeo (Laos) 2006

Rafting trials with Bamboo

- Construction time for a 3 to 4 ton bamboo raft is estimated at 2 man-days.
- Transport distances of about 50 km will result in costs of about 6 to 7 \$ US per ton for small rafts

Note: no carbon footprint !!!!

Bokeo (Laos) 2006

