



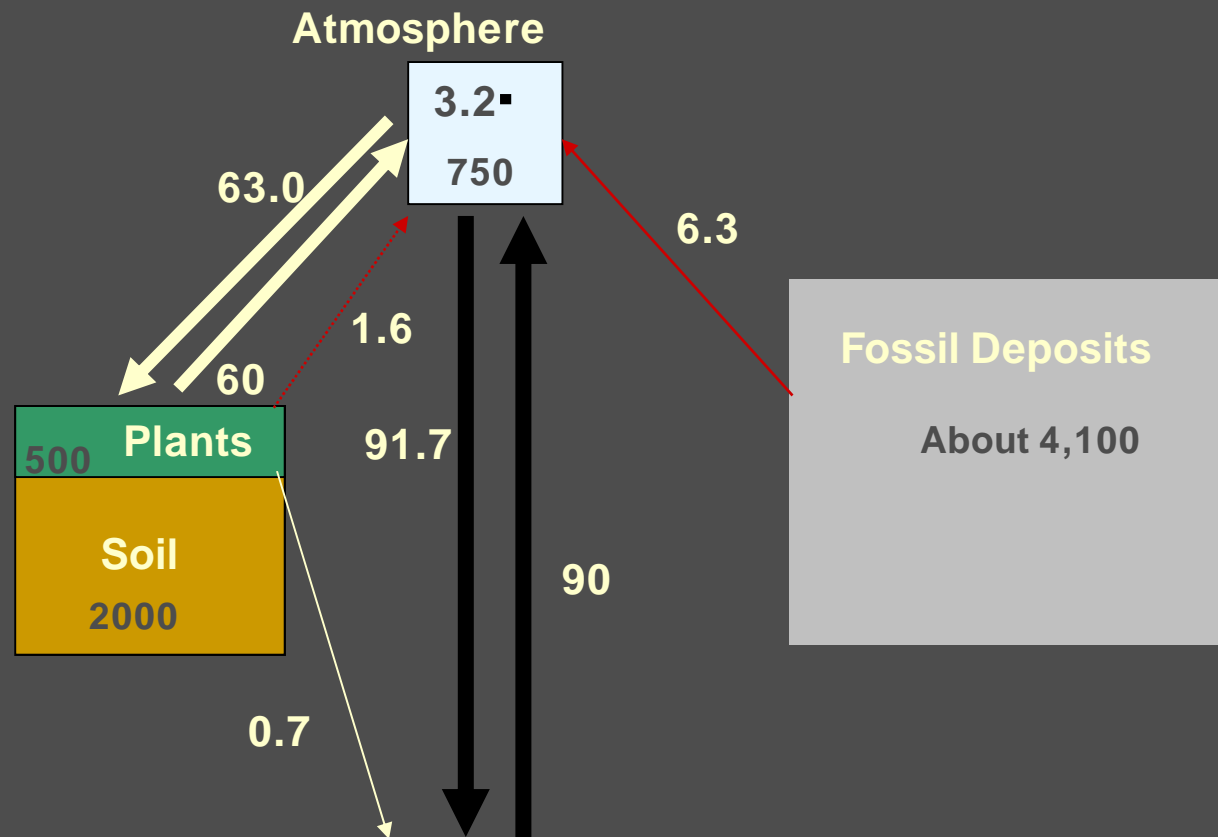
## *BioCarbon Fund*

Harnessing the carbon market to sustain ecosystems and alleviate poverty

# Why Sinks Matter

## Global Carbon Cycle (1990s)

Units  $Gt\ C$  or  $Gt\ C\ y^{-1}$



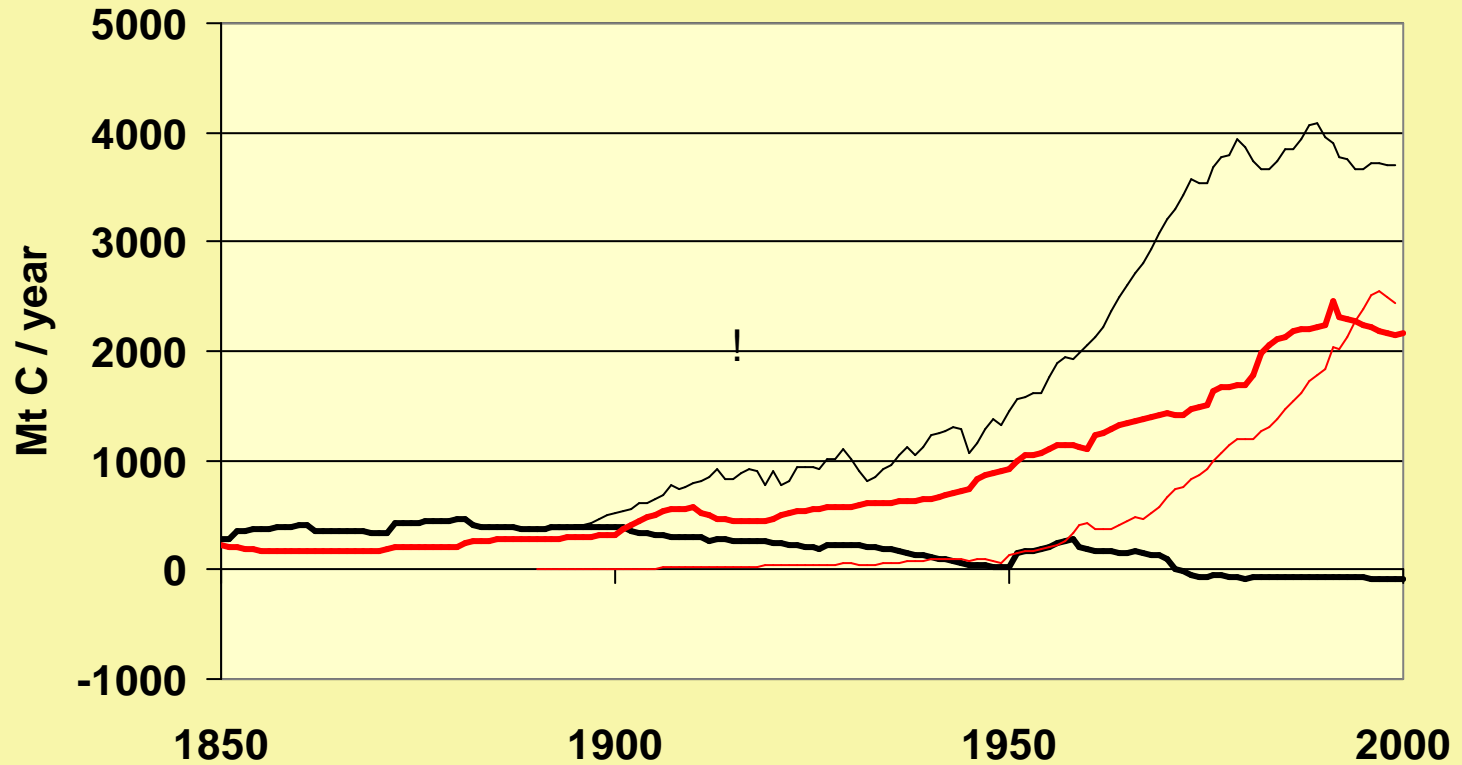
3 Gt/y net uptake

20% of current emissions &  
40% of historic emissions

# History of emissions



— LULUCF Annex 1      — LULUCF Non Annex 1  
— Fossil C Annex 1      — Fossil C Non Annex 1





# Multiple Goals of the BioCarbonFund

# Atmospheric



## ■ Atmospheric benefit

- The project must contribute to reducing GHG in atmosphere
- **Additionality** - The project would not have gone ahead without the stimulus of the CDM (i.e. it cannot be BAU) and net emissions must be “reduced below those that would have occurred in the absence of the registered CDM project activity”



# Environmental Goal

*Bio* **C**  
**F**



- A project must make a **positive contribution** to improving the quality of the environment, e.g.
  - Conserve biodiversity
  - Reduce soil losses
  - Rehabilitate degraded lands
- Such benefits are an **integral** component of well chosen projects – not an add on

# Social Goal



- A project must make a **positive contribution** to improving the livelihoods of local people and especially the poorest and indigenous peoples, e.g.
  - Additional income
  - Income stability
  - Education, capacity building, technology transfer
  - Health benefits
- Projects with high social value are much more likely to be maintained – ie **permanence**

# BioCarbon Fund and Adaptation



- Adaptation challenge: to increase the biological and social resilience of communities reliant on agricultural and forest ecosystems
- Fund can act as a **catalyst** for changing land-use practices
  - Source of funding
  - Demonstration of new practices/crops
  - Conservation of buffers, genetic resources etc





# Seeking synergies between the major environmental conventions

**Bio** **C**  
**F**



- Climate, environmental and livelihood goals
- Compatibility with national sustainable development goals
- Local participation: communities, NGOs, private and public sectors
- Actions that assist adaptation to climate change
- Emphasis on managing the whole landscape



# Types of Projects

# Landscape approach

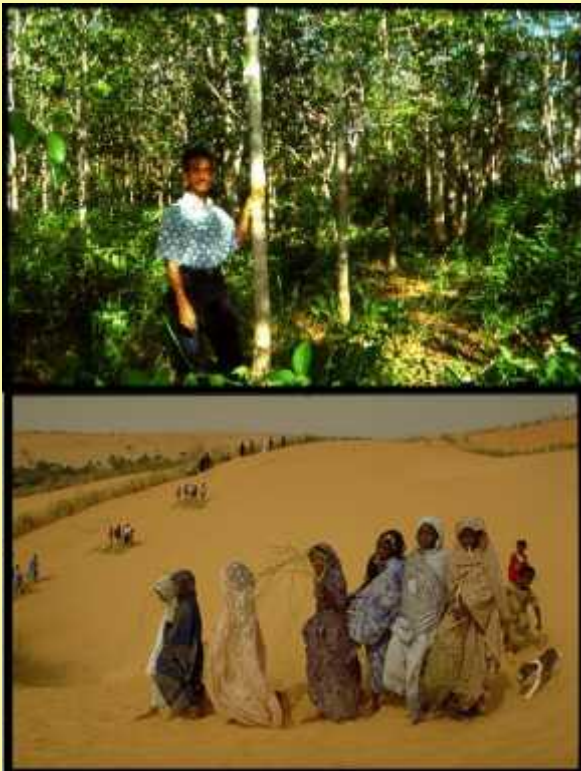


- Multiple asset types distributed across the landscape
- Risk spreading within project
- Gives local communities multiple reasons for maintaining sequestration
- Social benefits through resilience and adaptability

# Restoration Plantings – First Window



- Examples: Stabilization of dunes through tree planting
  - Reconstructing corridors to connect forest fragments



- Primary role of the plantings is long term environmental protection
- May have other local uses such as wood, fruits etc

# Community Forestry – First Window



## ■ Community Forestry – First Window

- Plantings usually carried out by grower cooperatives or community groups
- Plantings have high community value including biodiversity
- Individual plots often only a few hectares
- Trees are used for fruit, wood products, fuel wood, shelter etc



# Agroforestry – First window



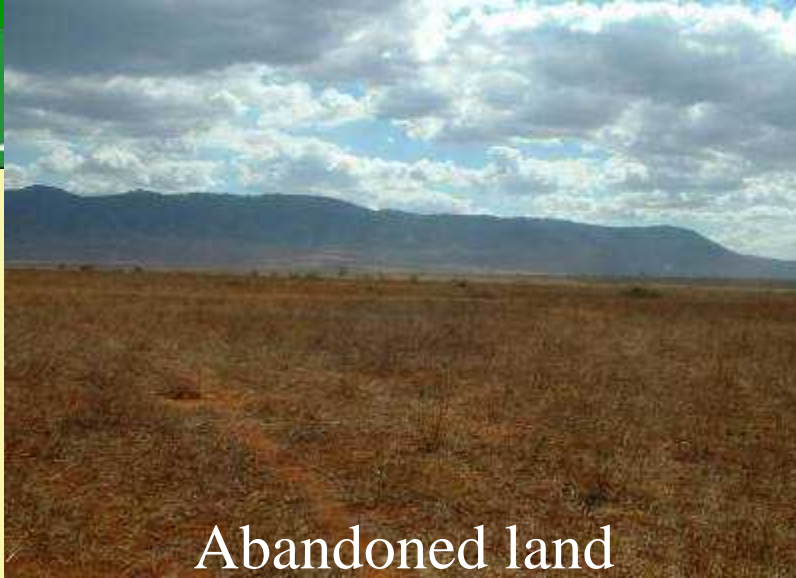
- Establish trees over cropping and/or gardening activities as additional crop or wood suppliers
- Establish trees within grazed pastures or rangelands either for drought fodder, shelter or additional products
- Often linked with improved agricultural practice
- Usually community based

# TIST Tanzania

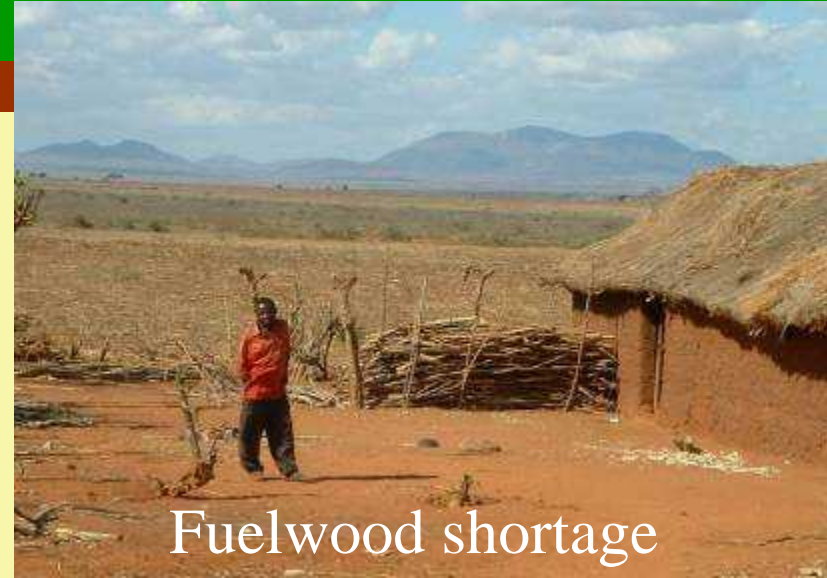


- BioCarbon Fund project proposal
- Planting started in 1999
- >2,000 small groups in 4 regions, growing fast (self-selection into program)
- > 9 million trees planted (80 species); 4 million seedlings in nurseries
- 2,000 mature trees = 1,000 t CO<sub>2</sub>e
- 2 US¢ paid per live tree per year
- Mostly compatible with CDM rules (full-scale or small-scale afforestation/reforestation)

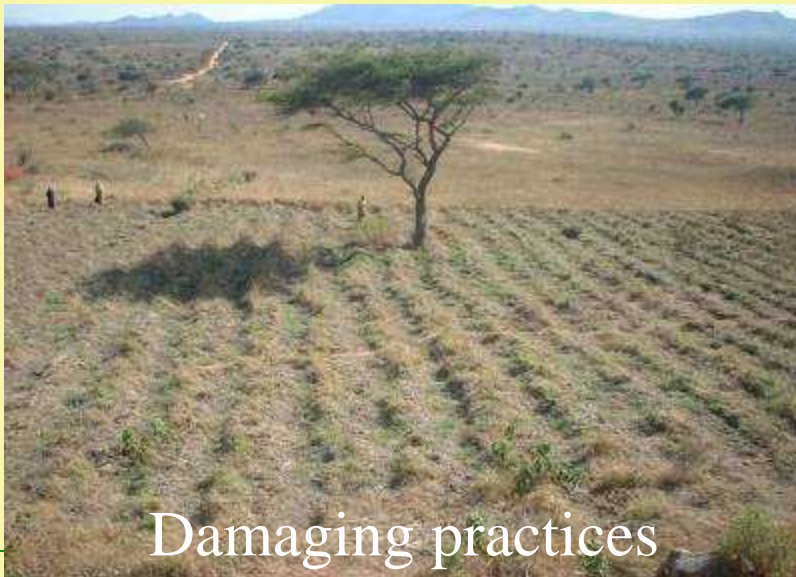
# TIST Tanzania: without project



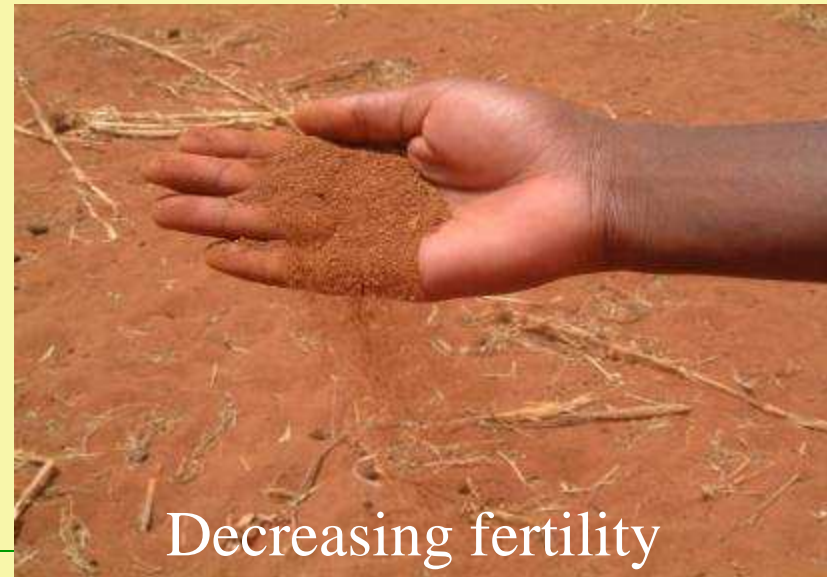
Abandoned land



Fuelwood shortage



Damaging practices



Decreasing fertility



# TIST Tanzania: with project



Village nurseries



Groups with a purpose



Trees line up houses, paths



Grass growth under trees

# Commercial Plantations



- We see only a small role for commercial plantations in the CDM



- Most will not pass an appropriately applied **additionality test**
- Some would fail **sustainability tests**

# A Second Window



- Activities in the CDM in the first Commitment Period are limited to afforestation and reforestation
- This leaves many activities that are allowed in Annex 1 countries and which would be very useful in meeting all three goals of the BioCF, excluded to developing countries
- Within landscape projects there will usually be a mixture of activities, including carbon sequestering activities other than A&R
- Most projects will be measuring the changes in carbon stocks across the whole landscape (ie all activities) as part of baseline and leakage estimates

# Avoided Deforestation



- A major concern during negotiations
- Strong support from many NGOs and Host countries to explore this issue
- Not the wholesale “preservation” of major tracts of forest
- Protection of forest fragments within the wider landscape
- Often links with forest restoration, corridor creation etc



# Role of the BioCarbon Fund



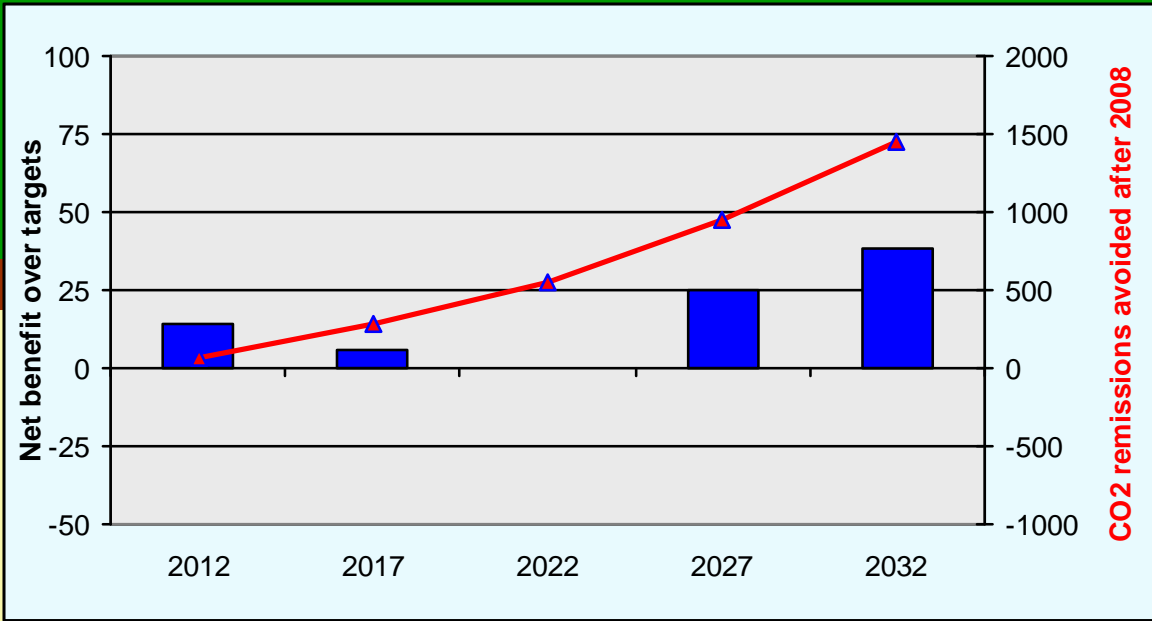
- Learning by doing
- Real life testing of the most stringent standards
  - Additionality, Measurement, Permanence
- Providing the poorest people with resources and a stake in climate change
- Development and adaptation opportunities for those with the greatest exposure to climate change and the fewest possibilities to take an active role
- Must start NOW

# Can 'Kyoto' credit be gained for forest conservation?

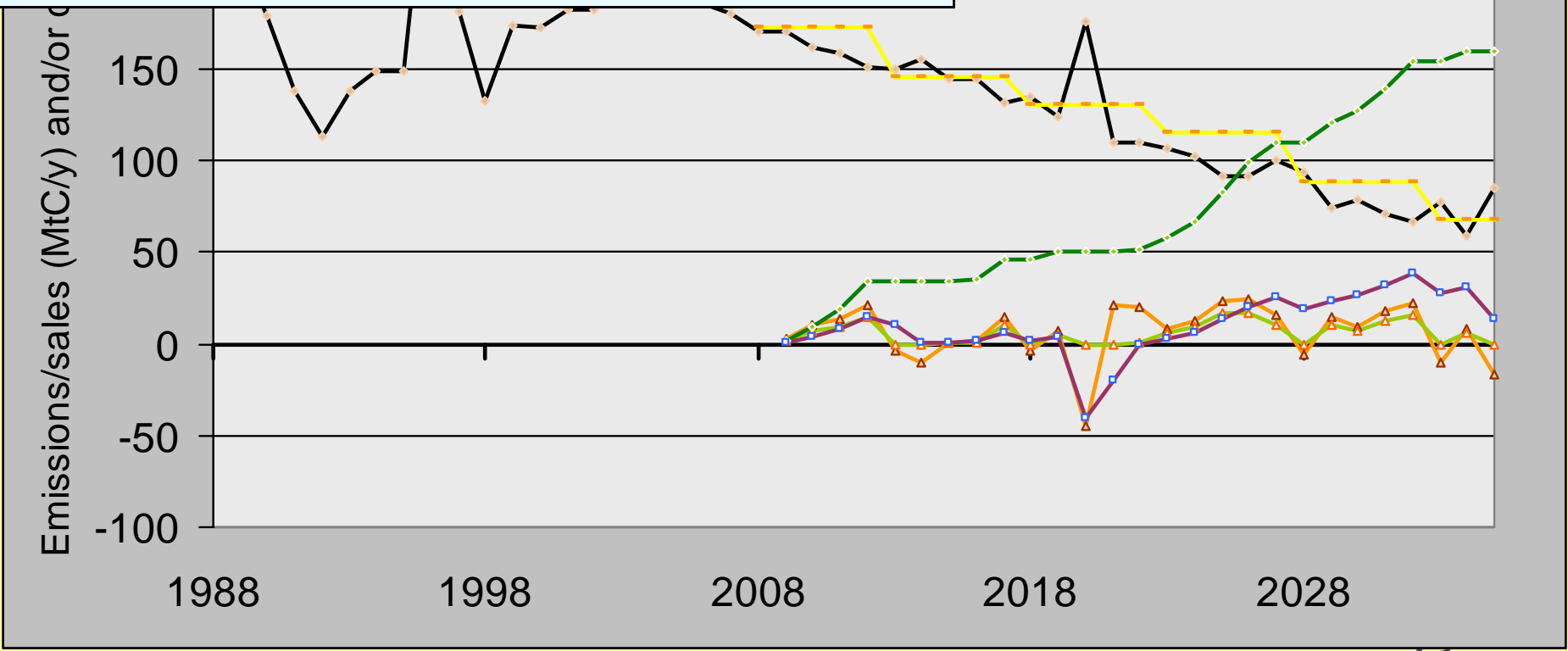


- Brazilian proposal (“soft caps”)
  - For a particular region (all of a nation’s rainforest?)
  - Set a target for a rate of decline in clearing
  - Credits gained for clearing rates even lower than this target
  - Some credit must be “banked” against possible later increases in clearing
  - Rest can be sold through a CDM type mechanism
  - Target re-set every commitment period based on previous period (as in fossil emission targets)

# ...tion - "soft cap"



...ales 1 — Total sales — Bank



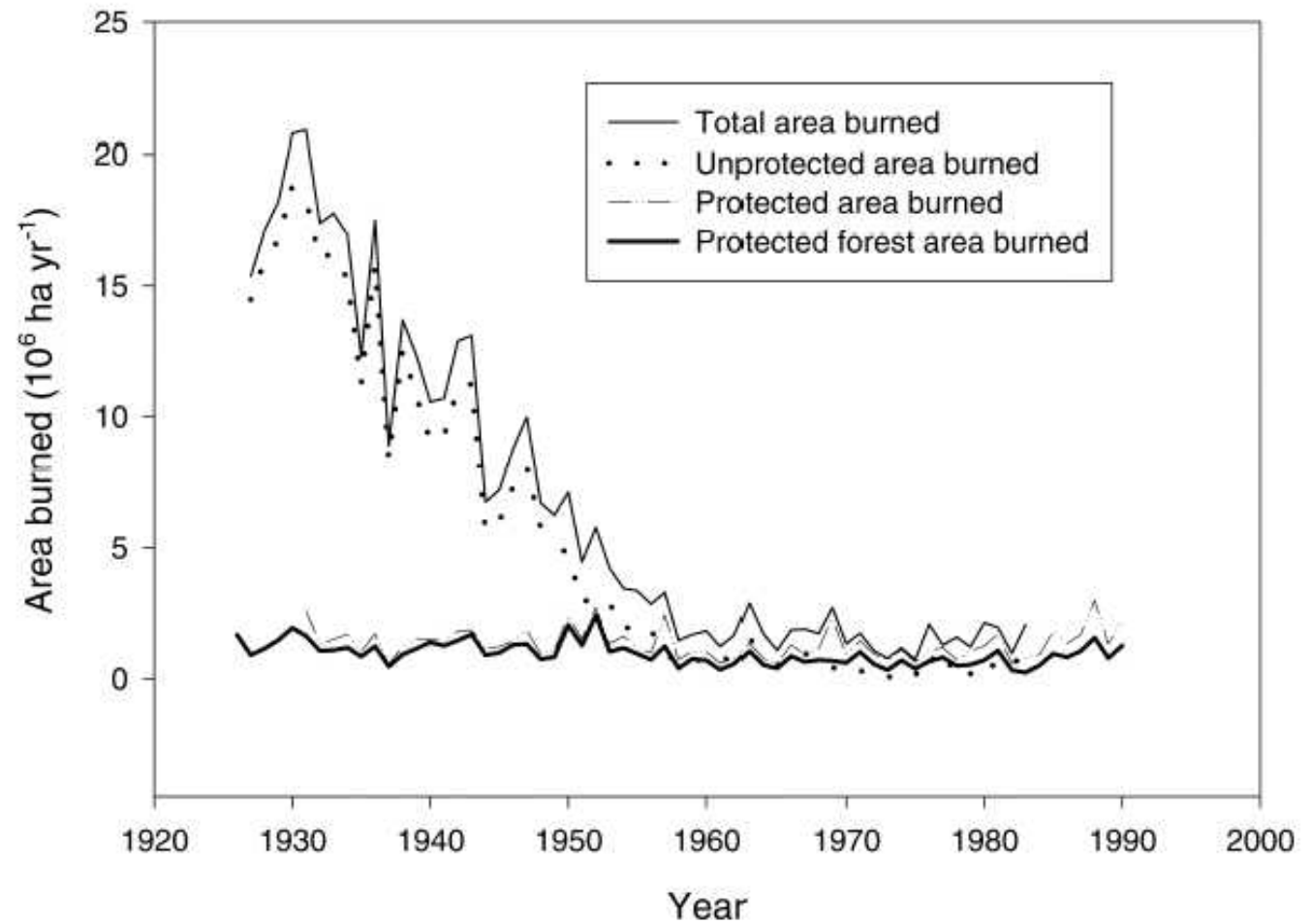
# What impact would such a system have?



- Encourage developing countries to engage in mitigation actions
- Source of income for avoided deforestation
- Financially viable?
  - PNG example
  - 30 m<sup>3</sup>/ha forest – prob c. 50 tC/ha
  - Timber value c. \$2400
  - Carbon value c. \$500 to \$1000
  - Other values ??
- Keeps options open

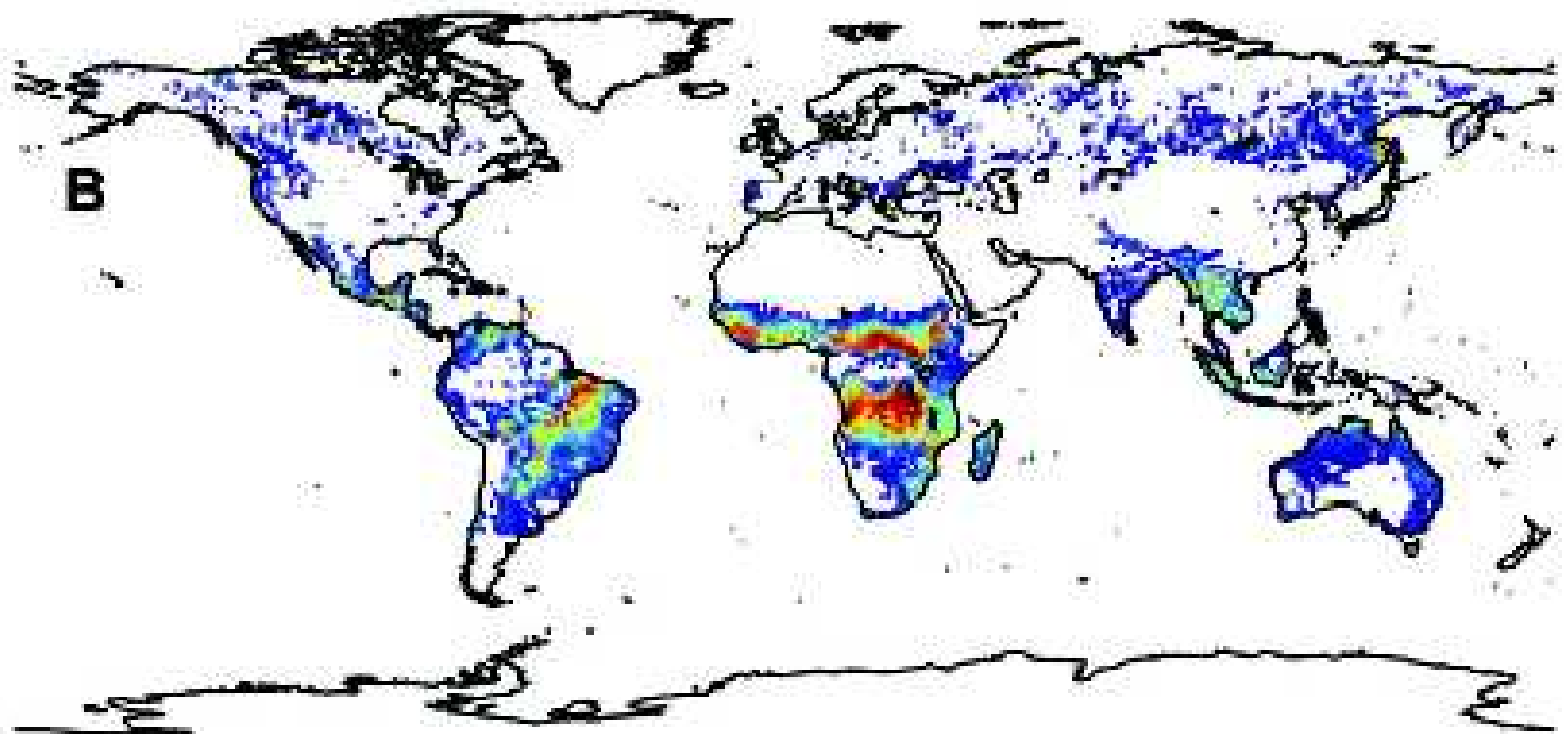


# Fire management



# Emissions from fire

BioC



1997 - 2001 mean annual fire emissions (g C / m<sup>2</sup> / yr)

# Total annual emissions



Van der Werf et al Science 2004

## Summary

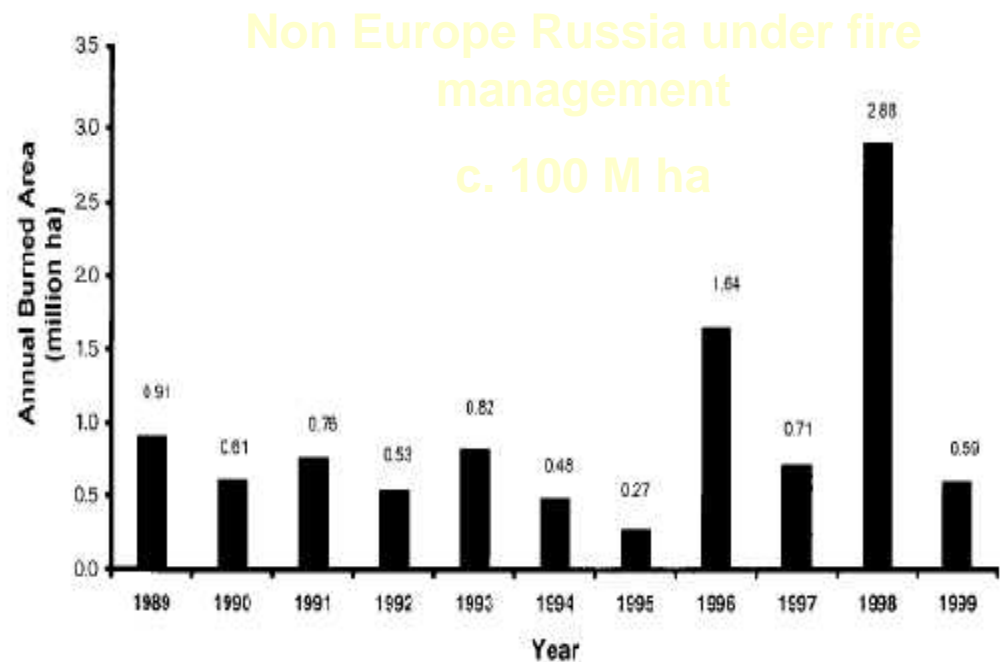
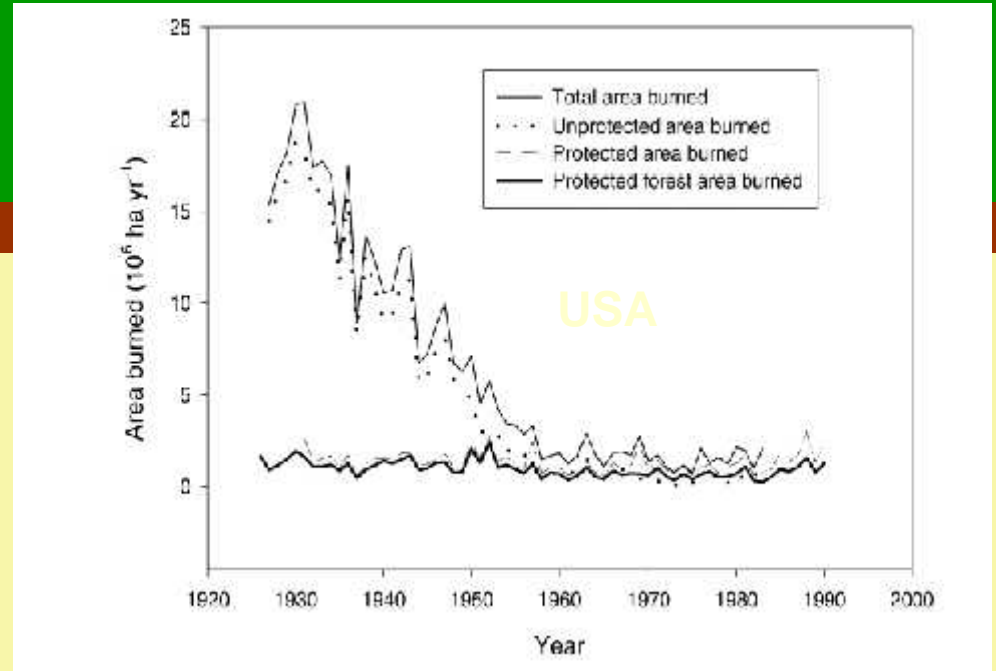
Temperate forests 0.4 Gt C / y  
Tropical forests 0.7 Gt C / y  
Savanna & grassland  
2.8 Gt C / y

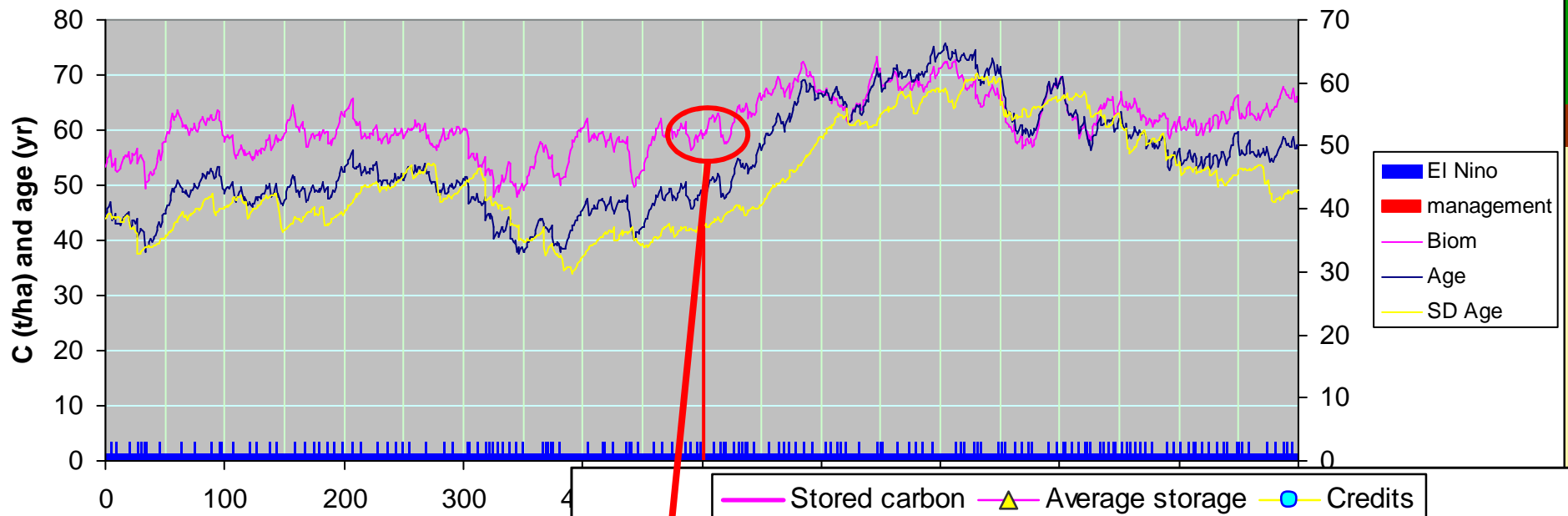
	1997–2001 average (Pg C yr <sup>-1</sup> )	El Niño anomaly (Pg C) †
Central and northern South America	0.27	0.24
Southern South America	0.80	0.34
Northern Africa	0.80	-0.12
Southern Africa	1.02	0.25
Southeast Asia¶	0.37	0.34
Boreal (regions north of 38°N)	0.14	0.14
Other#	0.13	-0.03
Global	3.53	1.17



The goal is to reduce fire frequency, thus leading to greater sequestered carbon

Year to year variability

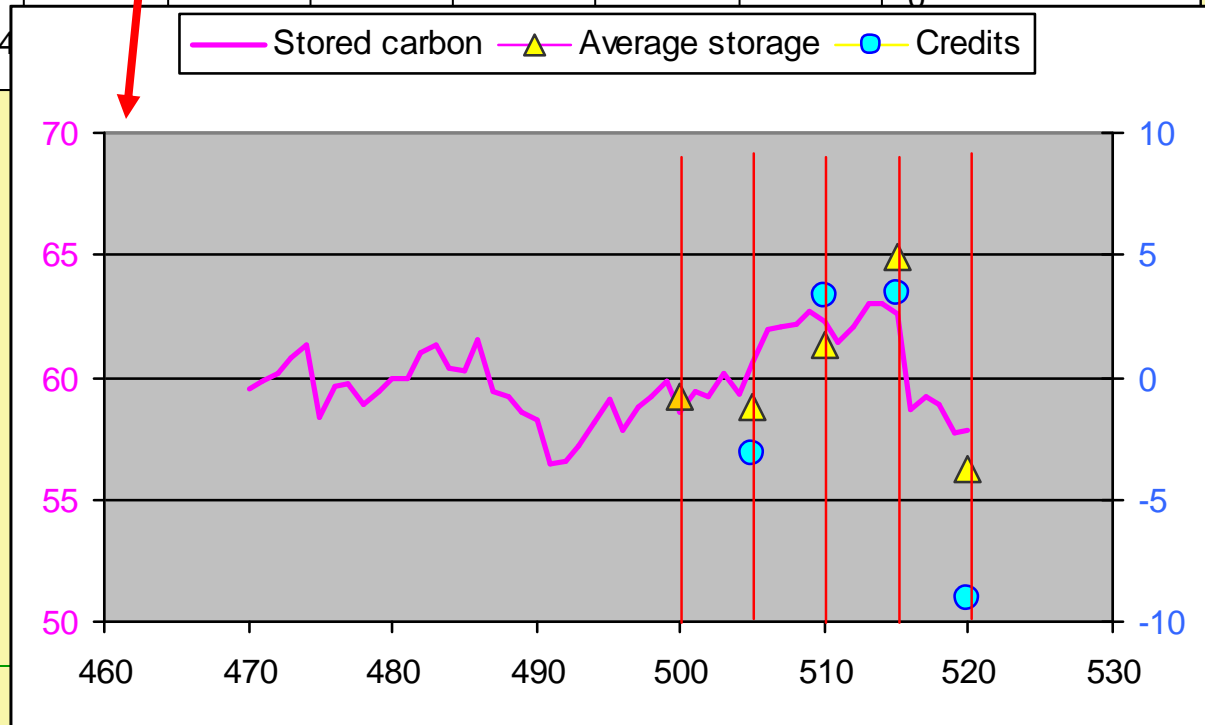




Fire probabilities reduced from 0.020 to 0.012 at year 500.

Measurement error  $\pm 5\%$  of stored carbon

In 12% of commitment periods proponents would report a carbon loss



# Fire management projects



- An increasing source of emissions as climate changes
- A feasible deal for **very brave investors** with very large budgets

Or

- As a component of **national reporting** that includes all forms of land-use

# Land based emissions/uptakes and compliance regimes

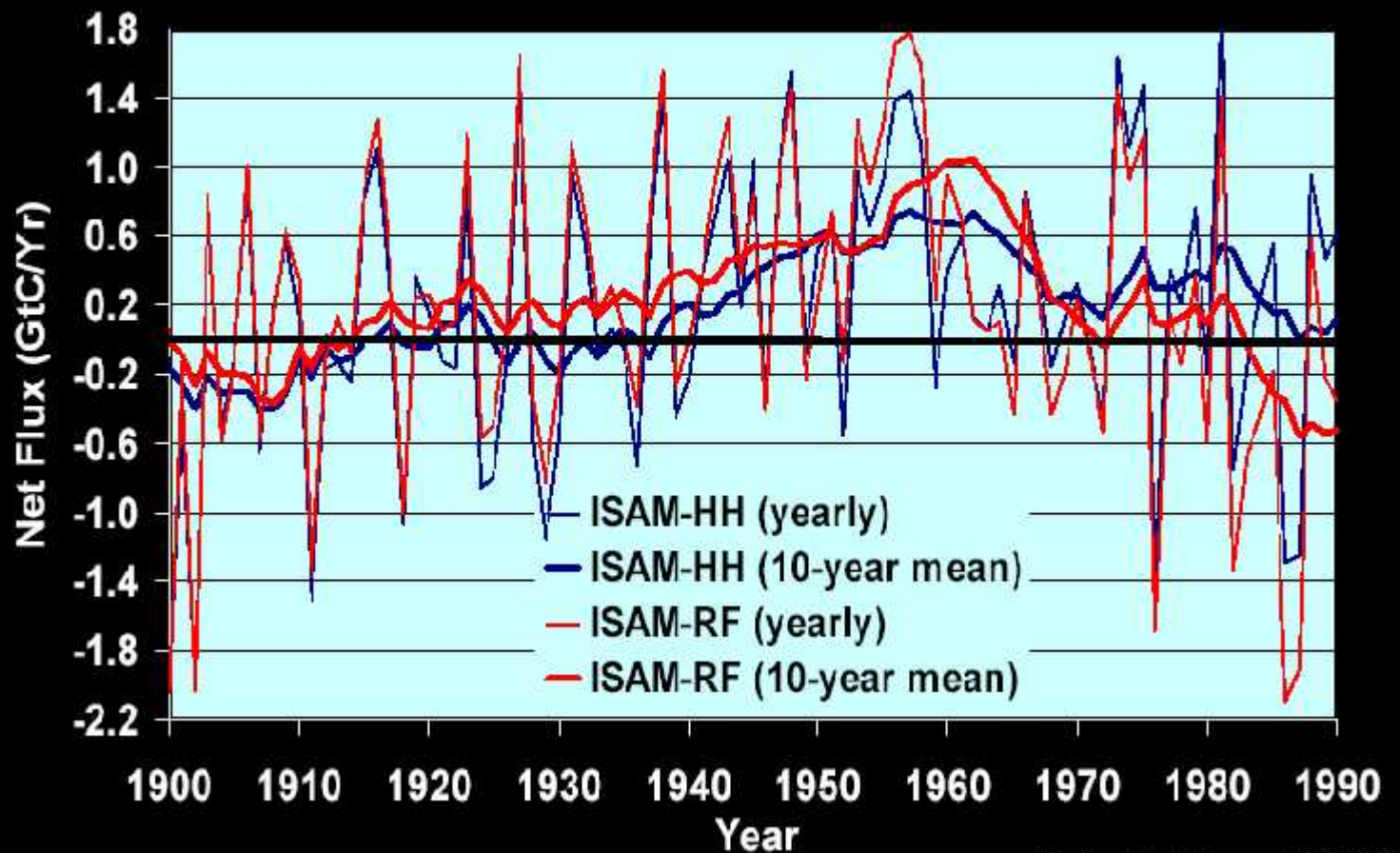


- Should a revised compliance systems more fully incorporate land based emissions/uptakes?
- Pros
  - Ensures monitoring of fluxes/sequestered carbon
  - Targets to reduce emissions can be set as for fossil emissions
  - May offer incentives for reduced clearing and better land-management practices
  - The system need not reward bad practice
- But ...

A fully included land-use sector would show annual fluctuations in sequestered carbon of  $\pm 1.5$  Gt C

**Bio** C  
F

### Net Biospheric Emissions



Jain & Yang (2004)



# What does this mean for (eg) the USA?



- USA emissions reduction target were 115 Mt C/y below 1990 or about 300 to 500 Mt C/y below BAU projections
- USA terrestrial ecosystems are a net sink of 300 to 700 Mt C / y
- The USA would have to incorporate an average figure in its baseline
  - Any mistake would be expensive or profitable (c. \$4B / y per 100 MtC)

# What does this mean for (eg) the USA?



- But sequestration will vary by several hundreds of Mt C year by year
- i.e. by about the same amount as its Kyoto target would have been
- Most sink capacity appears to come from changes in age structures, fire reduction etc
  
- Also 80 Mt C / y (+200 to –100) from CO<sub>2</sub> fertilisation
  - Is this a free ride?
  - And, should the effects of reforestation in mid to high latitudes be discounted?

# Modelling and the BioCF



- Simplicity and transparency
- Simple spreadsheet modelling of
  - Financing
  - Carbon pools
  - Landscape dynamics
- Avoid “crackpot rigour” – i.e. the detailed analysis of an idea that should never have been contemplated in the first place, or is so ill defined as to be misleading
- Models should be as simple as possible – but no simpler