

Soil carbon crediting for smallholder agriculture: lessons from the field



Leslie Lipper
Senior Environmental Economist
Food and Agriculture Organization of the UN

Importance of soil carbon to farmers



- Poor soil fertility is a key constraint to agricultural productivity growth and thus food security/poverty reduction
- Increasing soil fertility is an important component of many developing country ag. development strategies (particularly Africa)
- Years of attempts to promote adoption of SLM have shown there are considerable barriers that have generally not yet been overcome

Importance of soil carbon to mitigation



IPCC 2007: 90% of technical mitigation potential from soil carbon sequestration

Four broad categories

- Cropland Management
 - Cropland Management
 - Grassland Management
 - Management of Organic Soils
 - Restoration of Degraded Lands
- Cropland Management includes:
 - Avoiding bare fallow, use of cover crops
 - Soil and water conservation structures
 - Tillage management (e.g. conservation agriculture)
- Grassland Management includes:
 - Reduced fires
 - Seeding fodder grasses
 - Grazing management

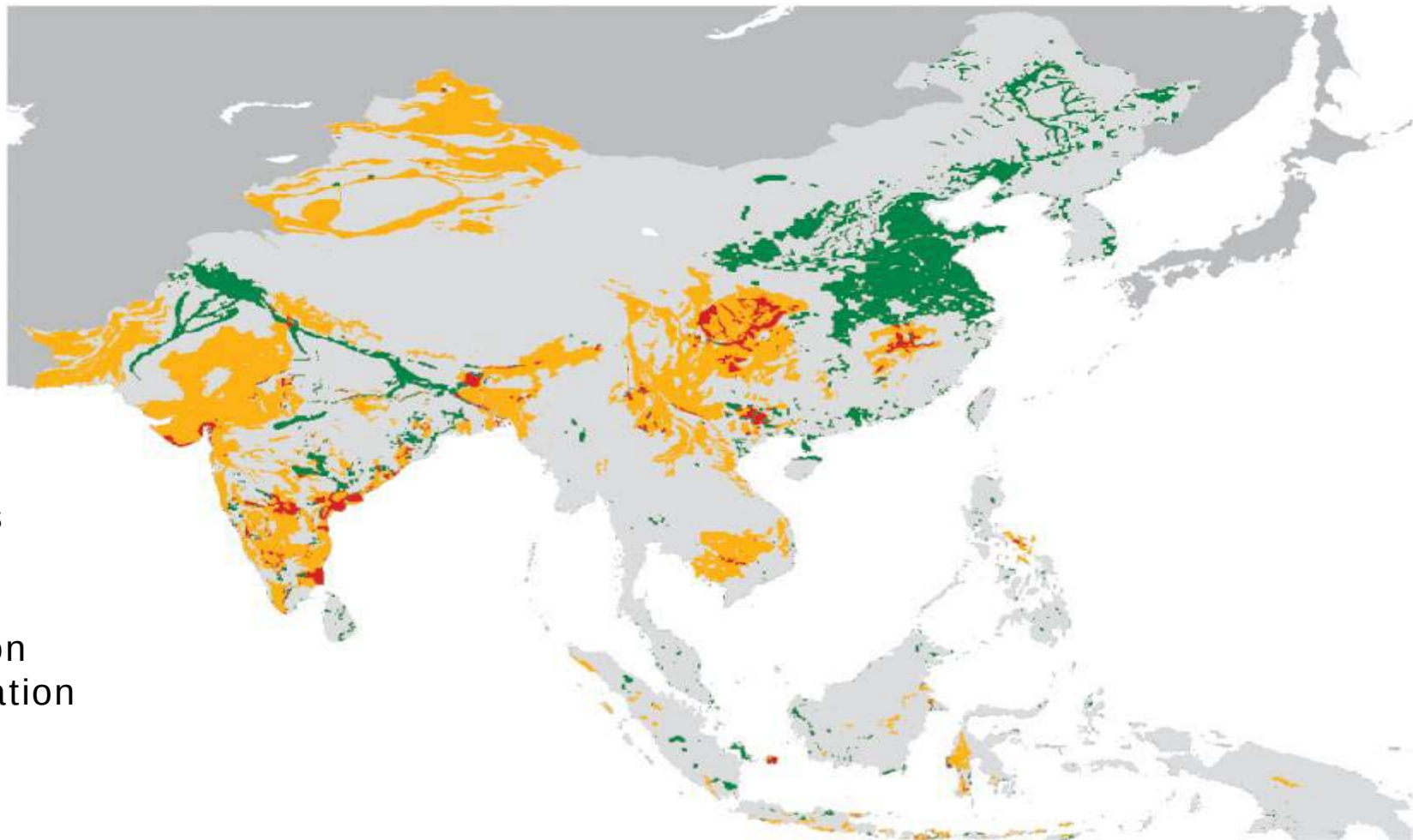


MAP 8

**Highly degraded croplands with soil carbon sequestration potential
and high poverty rates**

High
synergies
between

soil carbon
sequestration
&
poverty
reduction

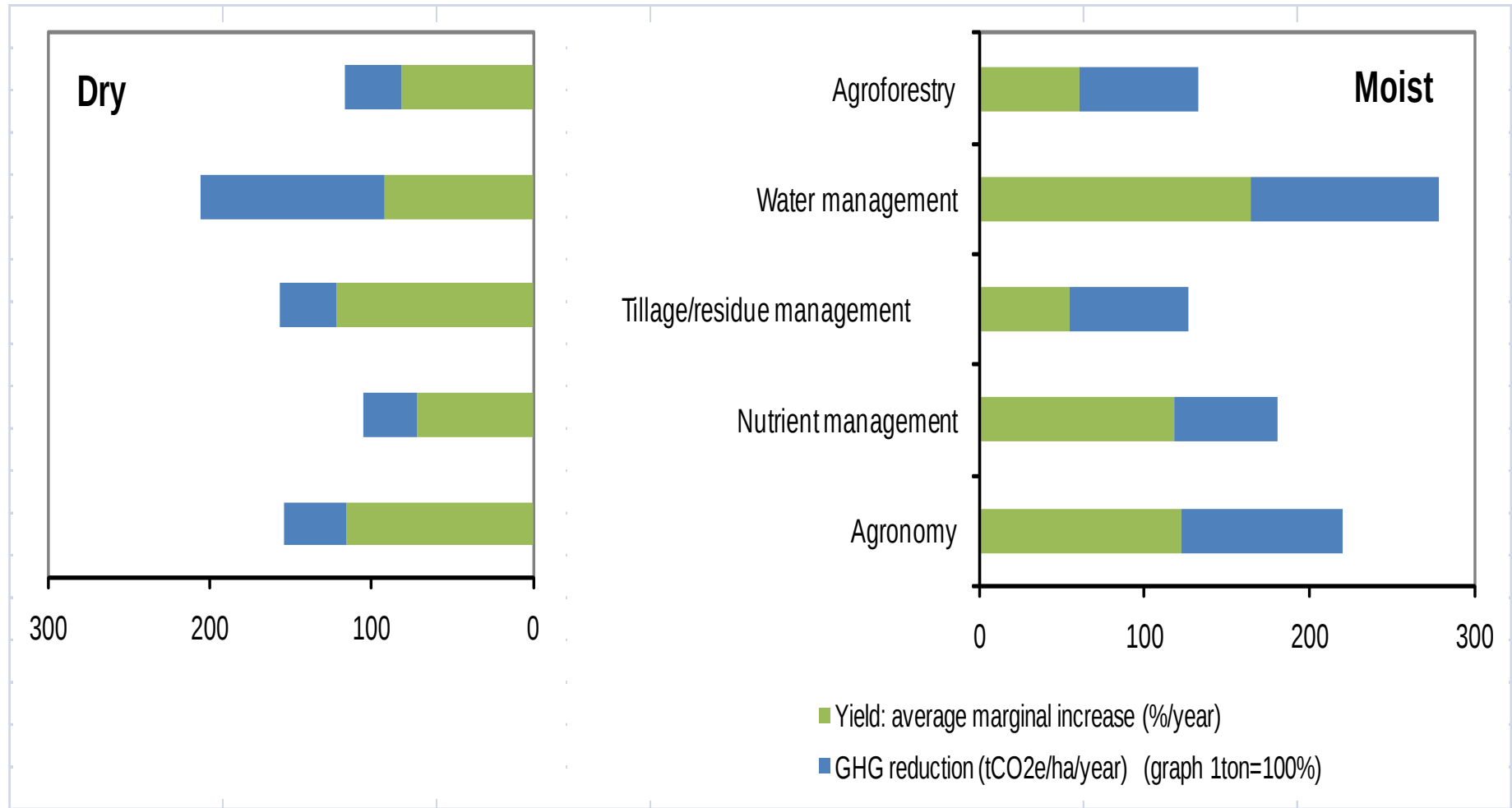


Red Croplands with soil carbon gap, soil degradation and high poverty rates
Green Other croplands with soil carbon gap

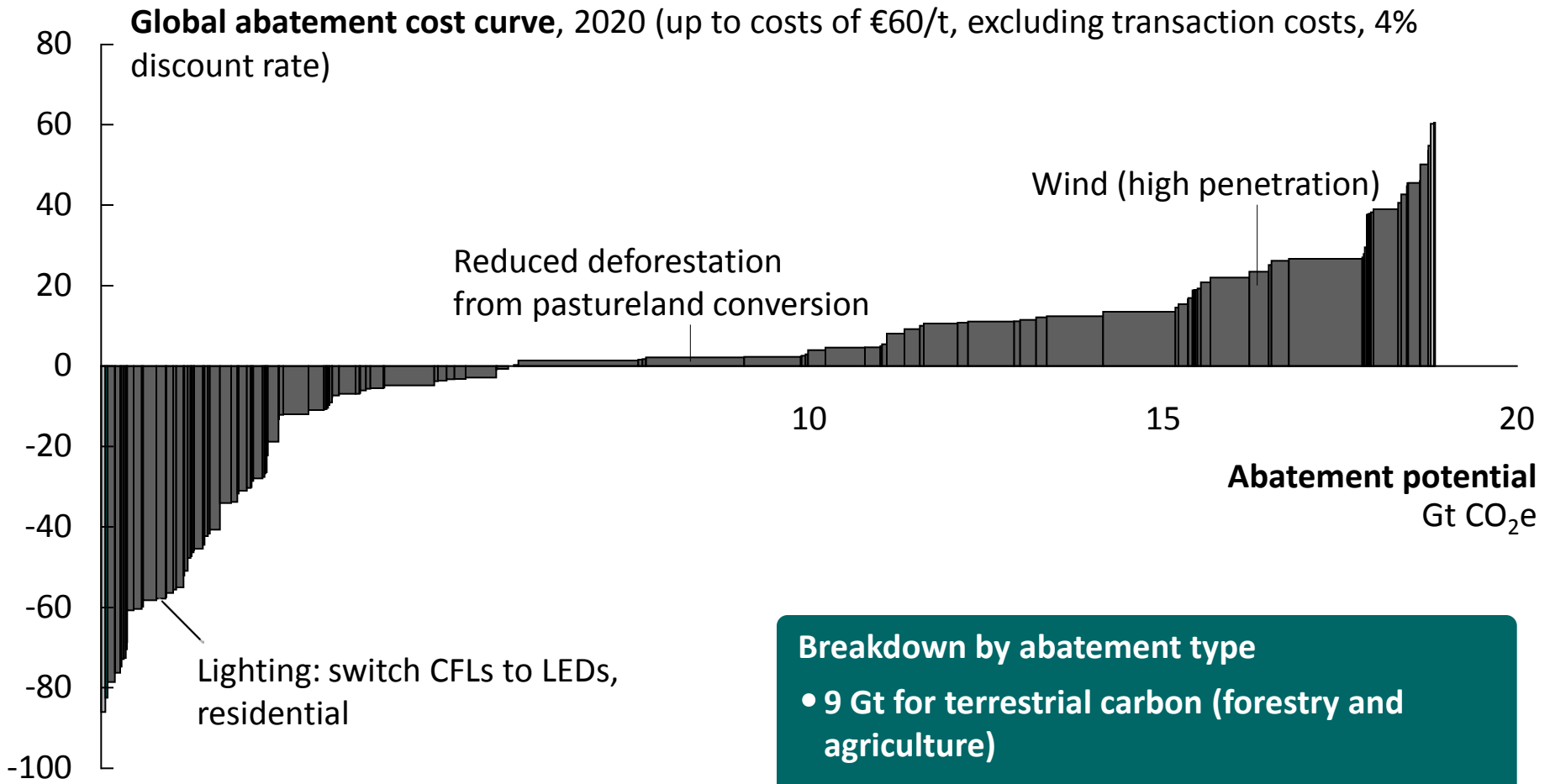
Orange Other areas with soil degradation and high poverty
Grey Non-study area



Comparing effects on average yields and carbon sequestration from adopting SLM



Soil carbon sequestration relatively cheap form of mitigation...



Breakdown by abatement type

- 9 Gt for terrestrial carbon (forestry and agriculture)
- 6 Gt for energy efficiency
- 4 Gt for low carbon energy supply



But is it?

Number of years to reaching positive income flows
Three Rivers Grasslands Carbon Credit Project,
Qinghai China

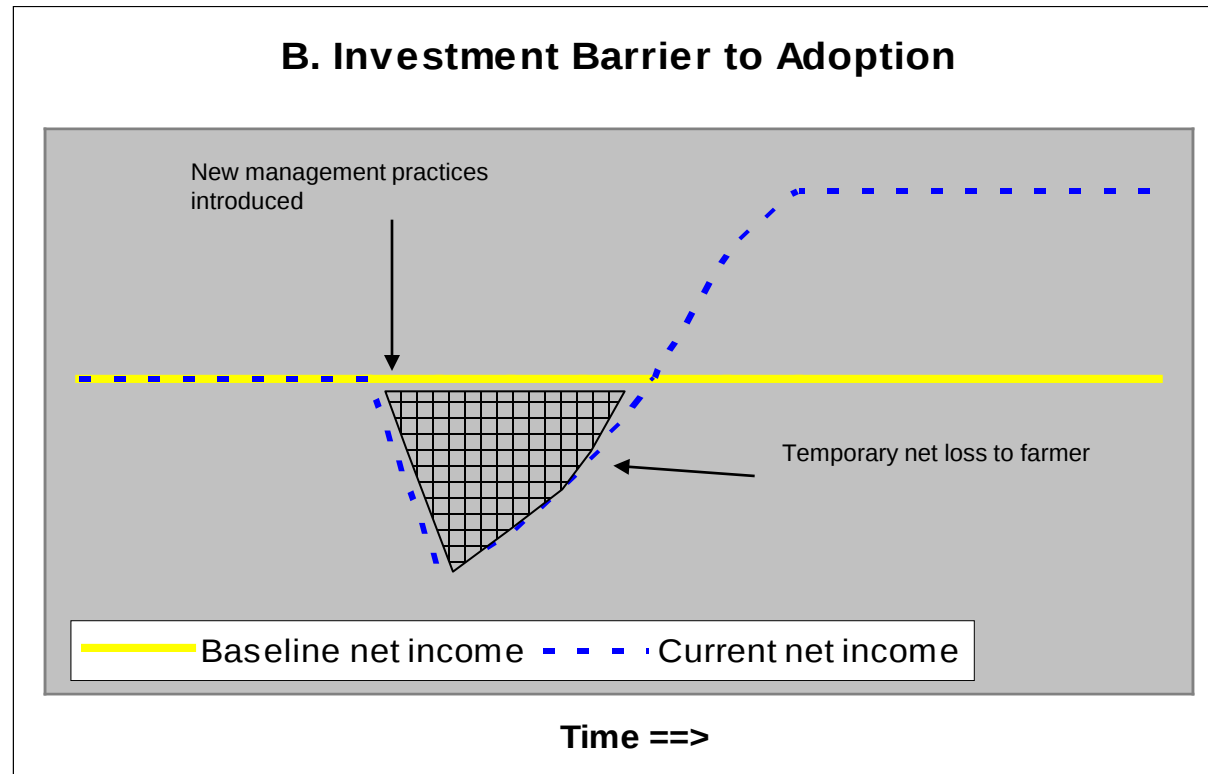
Size of herd	Baseline net income	NPV/HA over 20 years	No years to positive cash flow	No of years to positive incremental net income compared to baseline net income
	(\$/ha/yr)	(\$/ha)	(number of years)	(number of years)
Small	14.42	118	5	10
Medium	25.21	191	1	4
Large	25.45	215	1	1
Source: Wilkes 2011				

SLM Adoption Costs and Barriers



- Up-front financing costs can be high, but on-farm benefits not realized until medium-long term
 - Local credit markets very thin
 - Local insurance options very limited
- Tenure Security & Management of Common-Pool Resources
- Limited Access to Information, e.g. Research & Extension
- Risk management and need for flexibility

Adoption Barriers: Up-Front Financing Costs



Source: FAO 2007

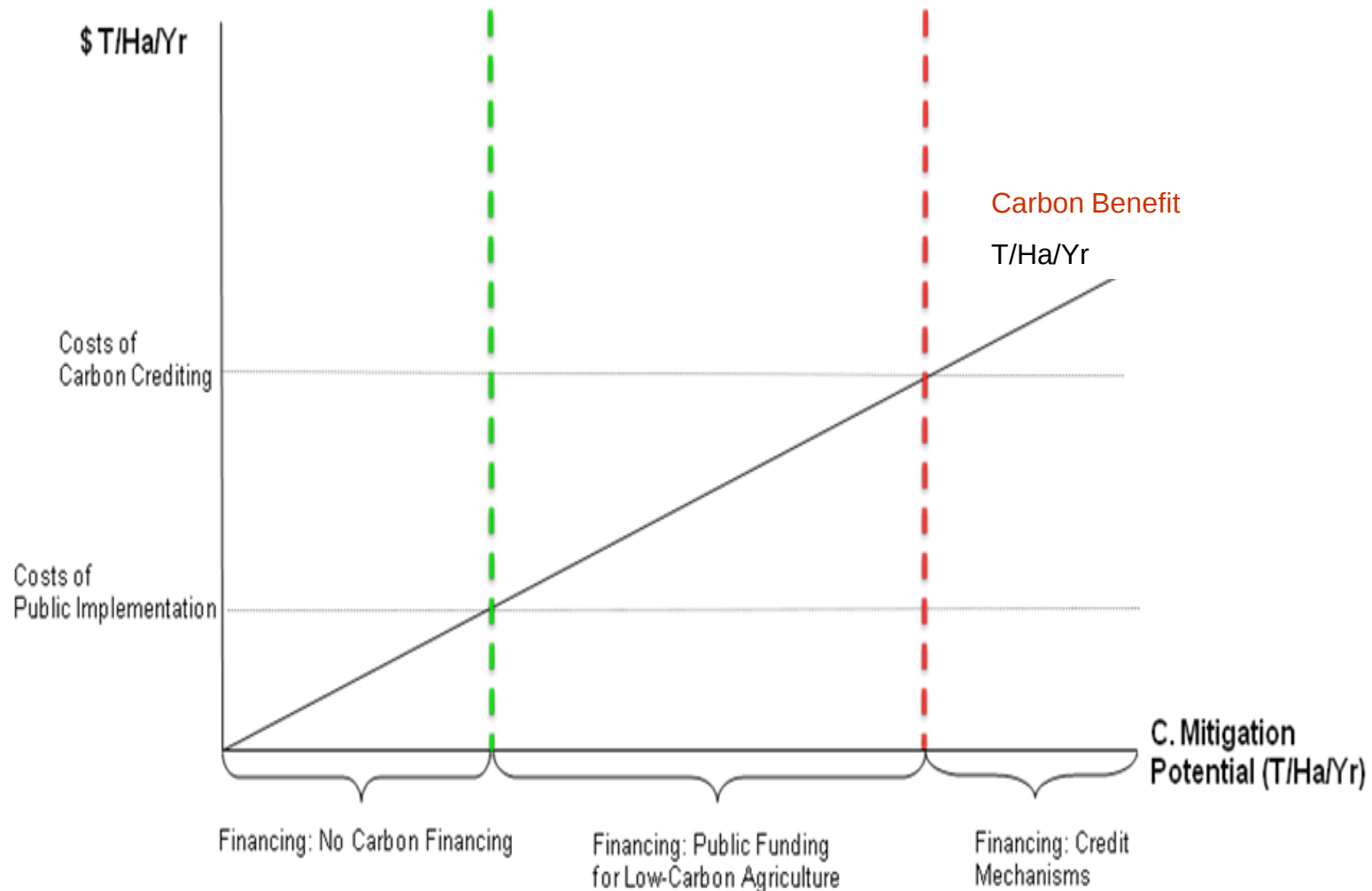


Soil carbon sequestration as an product

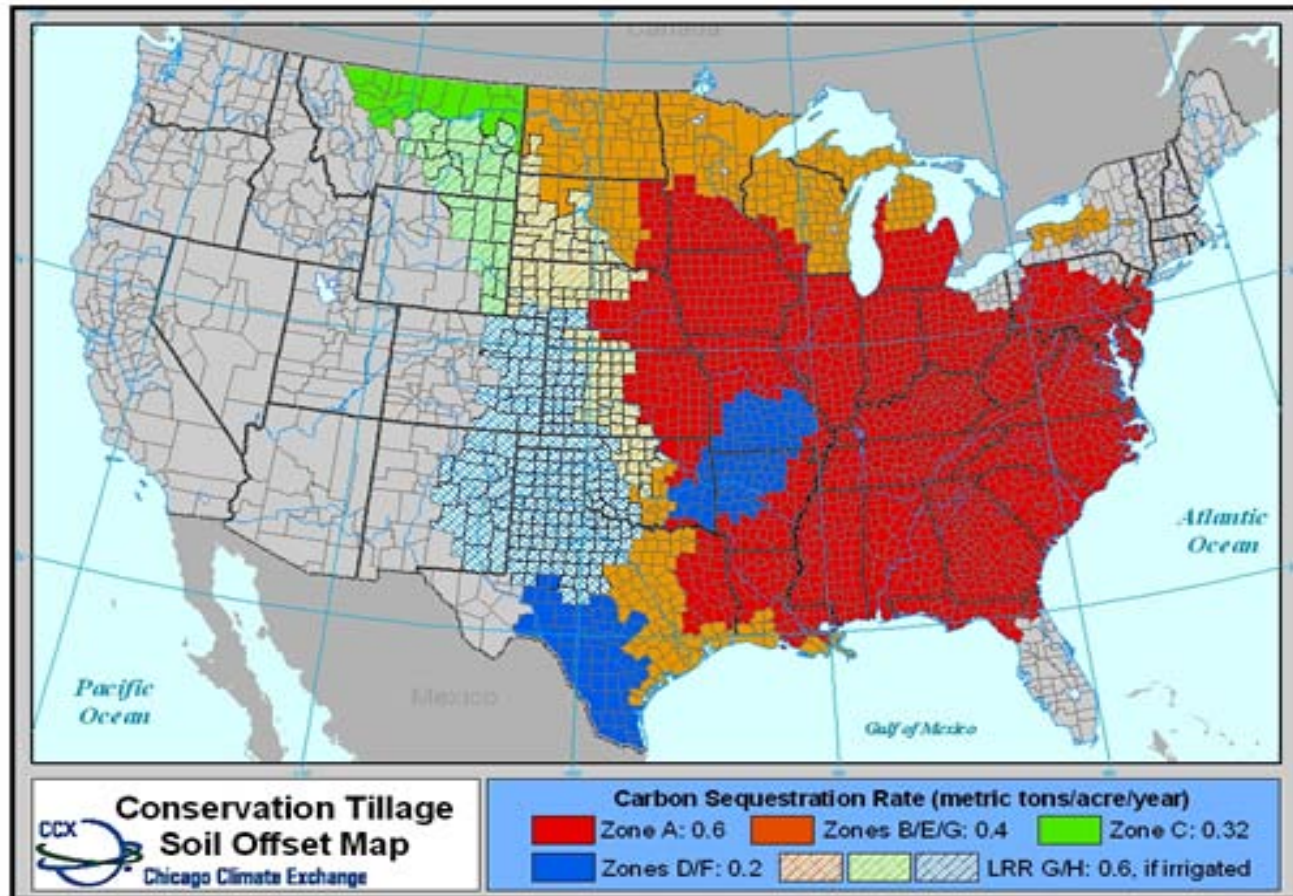
- Developing country agriculture has high soil carbon sequestration potential at low estimated costs (e.g. IPCC 2007; McKinsey 2009) However barriers to adoption not reflected in MACC and full cost accounting likely to be much higher
- Soil carbon sequestration generally low per hectare per year; accrues slowly over time (.1-2 tCO₂ eq/yr)
- Low market value (AFOLU VERS at .10 USD/TCO₂eq) of credits to lack of credibility; problems with permanence
- MRV is expensive: missing data to support activity based models; aggregation over large numbers/heterogenous conditions important
- Development of NAMA concept – funding for developing country mitigation linked to national development goals and not necessarily linked to offsets increases importance of agriculture – lower transactions costs associated with lower certainty

Options for capturing synergies

Linking mitigation finance to FS



Chicago Climate Exchange soil carbon crediting map





The bottom line

- In developing countries, soil carbon sequestration only makes sense where it has significant agricultural benefits;
- The scale attainable and early action characteristic of soil carbon are a great advantage – as are the important link to agricultural productivity and resilience;
- There are very significant barriers to adopting agricultural practices that result in higher costs than generally assumed – these costs can be shared with agricultural development financing/efforts
- Low Cton/ha, low prices, high uncertainty, leads to high transactions costs for crediting at high levels of confidence
- Public sector funding for soil carbon sequestration to build information and institutions needed for crediting and that link to agricultural financing channels is important to



Thank you!!