The Perennialization of Agriculture:
Vision for an agroecological future

Dennis Garrity
Drylands Ambassador, UNCCD
Chair, EverGreen Agriculture Partnership

EverGreening
GLOBAL ALLIANCE

World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

A Desertifying Landscape

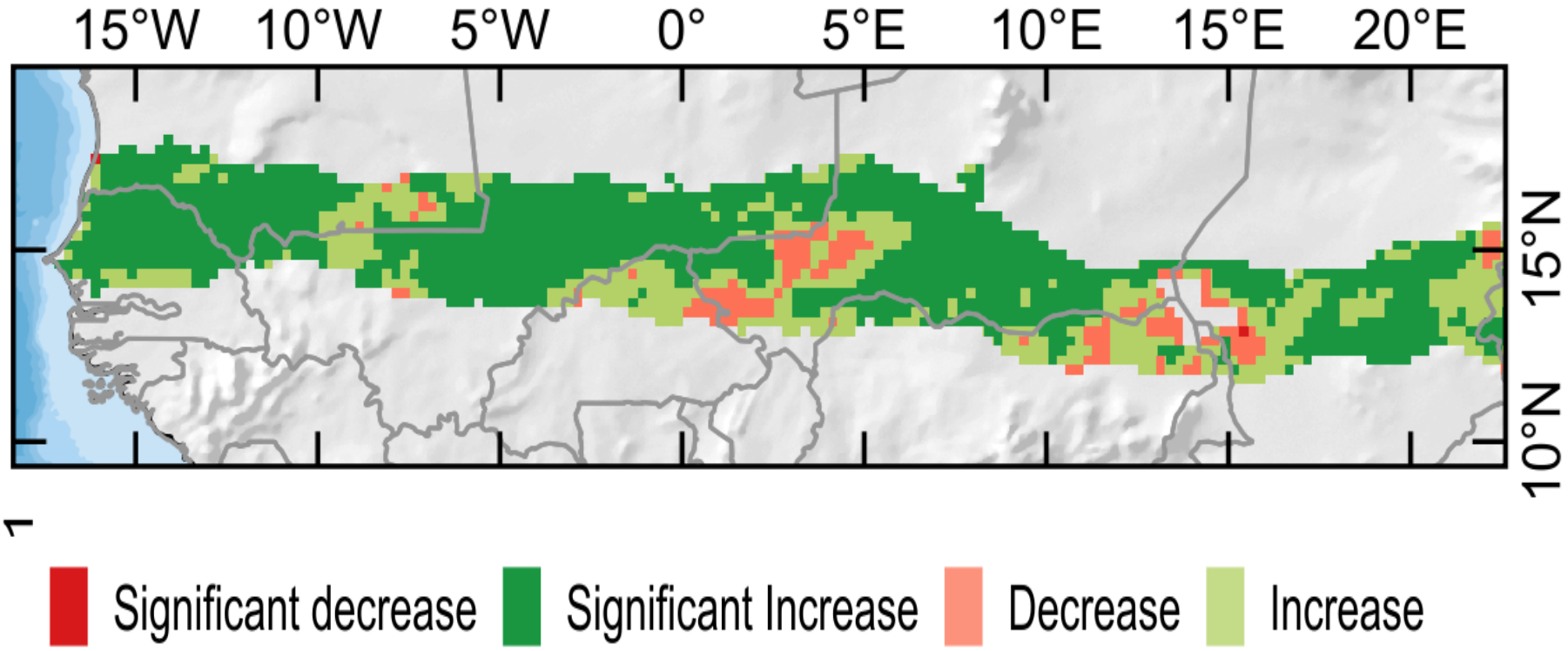
Southern Niger in the 1980s

The Parkland Renaissance on Niger Farmlands

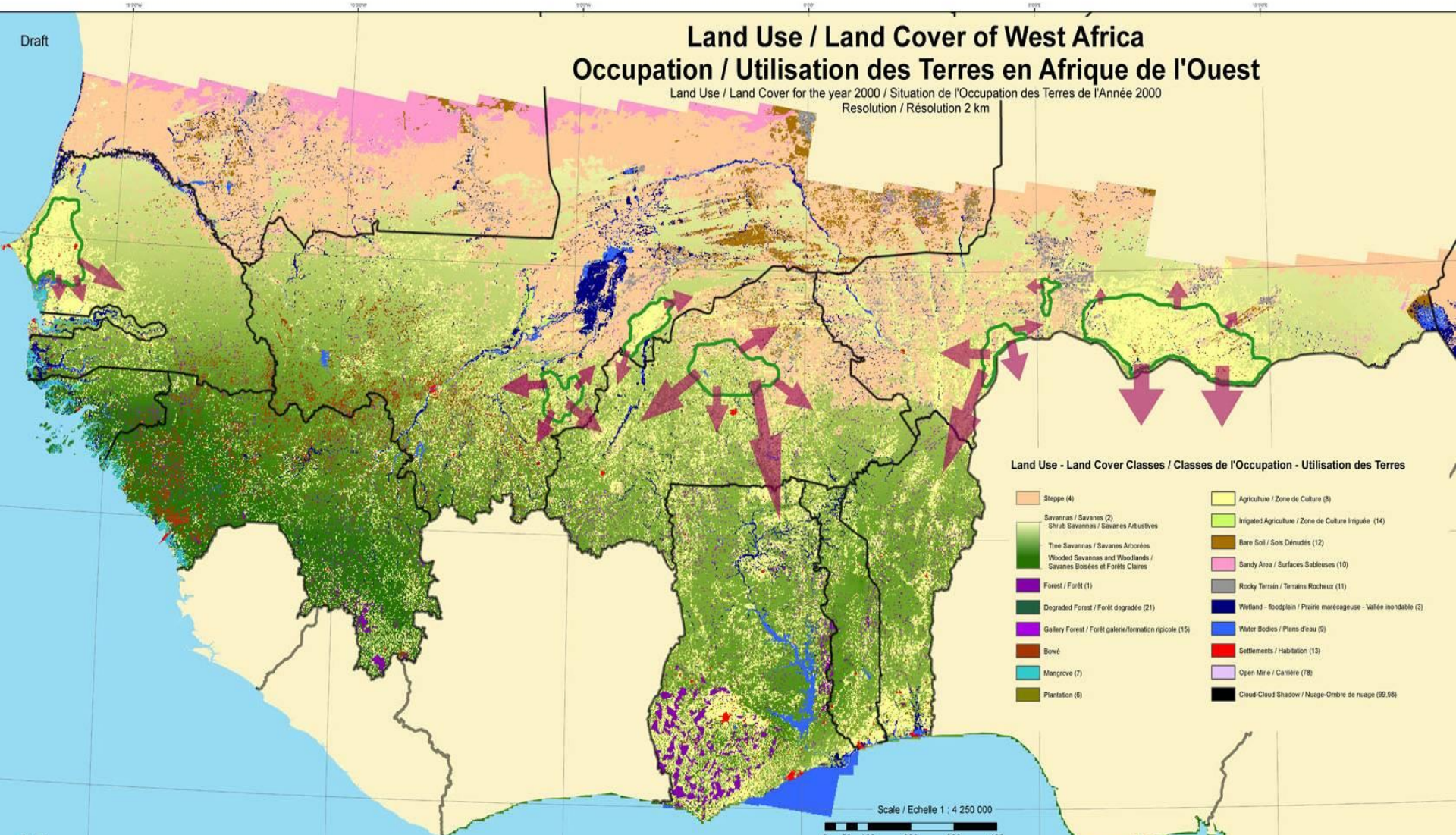
Farmer-Managed Regeneration of trees is being massively upscaled on the croplands in Niger & Mali & Senegal

Tree Foliage Cover is increasing throughout the Sahel

Trend from 1992–2012



Major agroforestry regions in West Africa and potential directions of expansion



Tree Cover on Agricultural Land

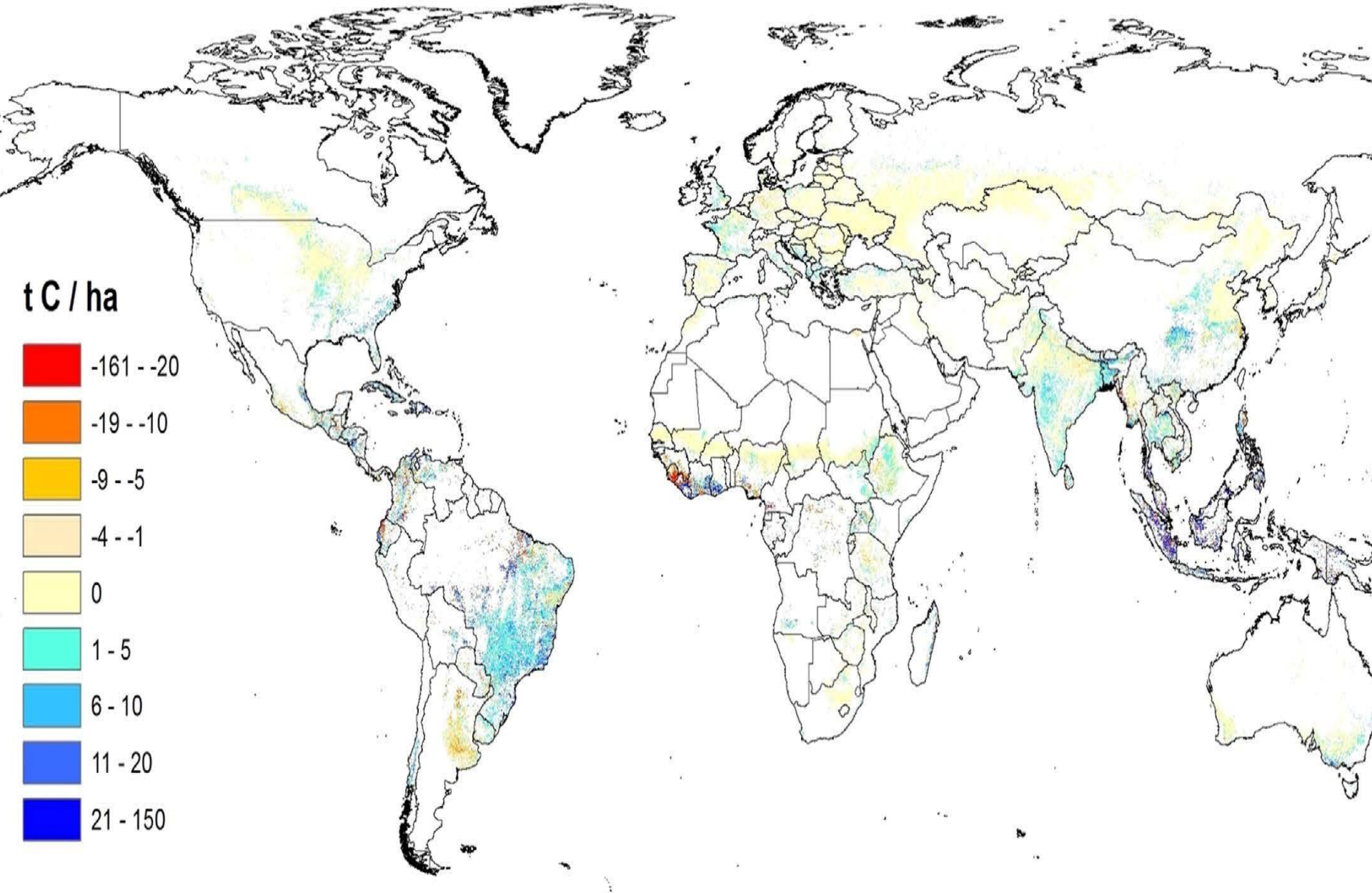
Over 43% of the world's agricultural land now now has ≥10% tree cover.

Between 2000 and 2010 there was an increase of tree cover by **2%.**

Highest tree cover on agricultural land (>45%) was found in the humid regions such as **Southeast Asia, Central America, eastern South America and central and coastal West Africa.**

Tree cover is 10–30% in **South Asia, sub-humid Africa, Central and Western Europe, Amazonian South America, and Midwestern North America.**

Change in Biomass Carbon on Agricultural Land - 2000 - 2010

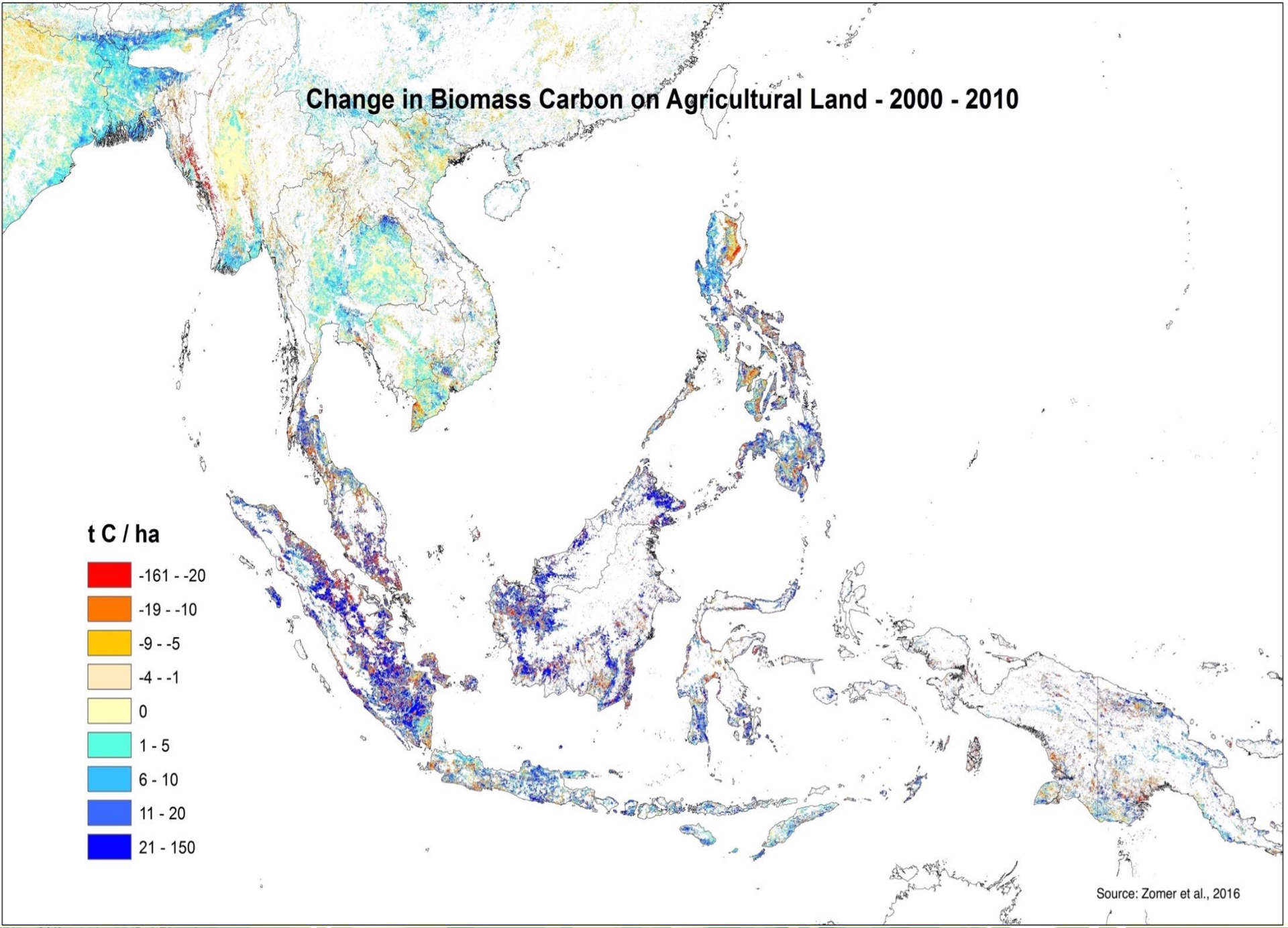


Increased Carbon Storage on Agricultural Lands

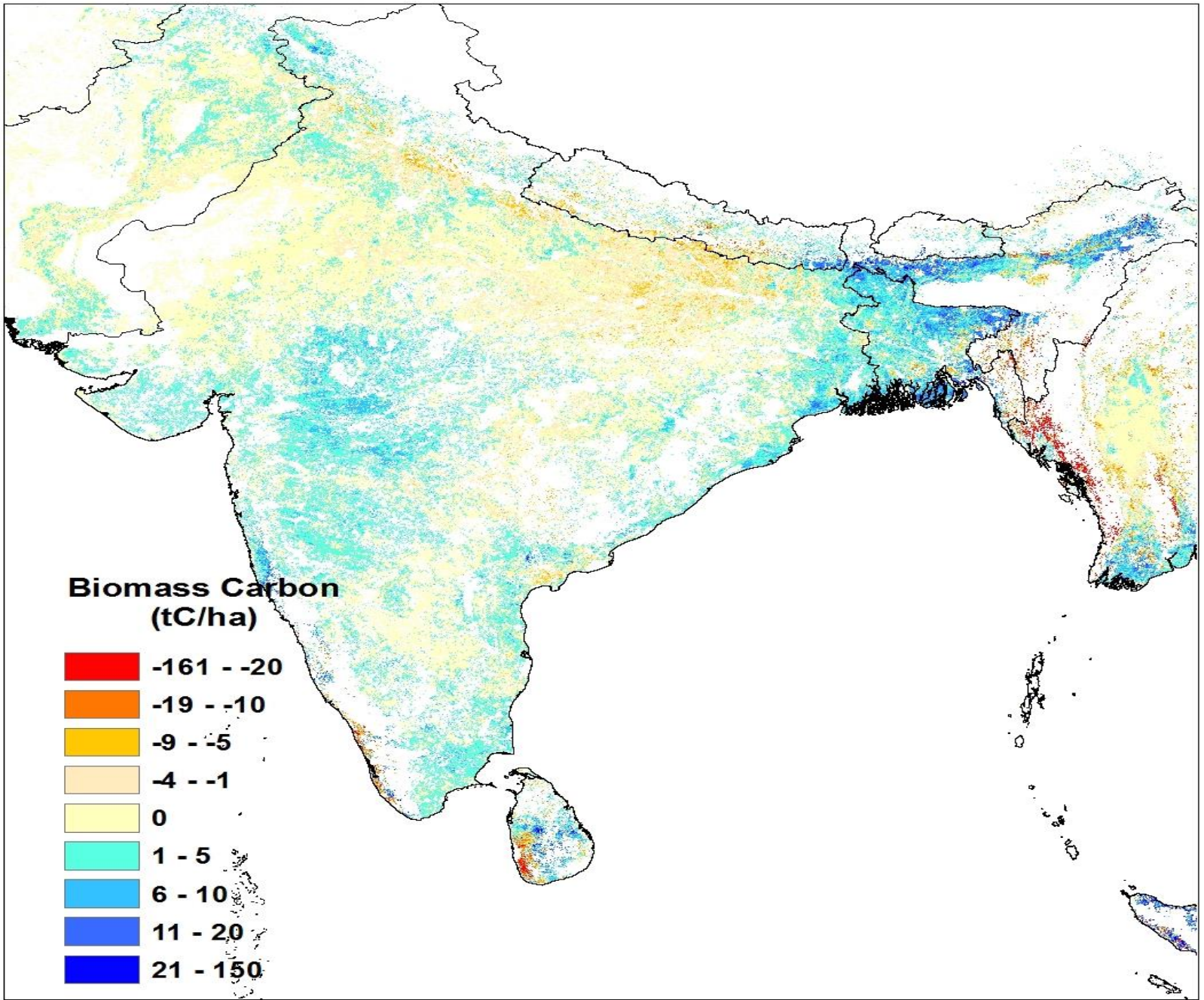
During the decade there was an **increase biomass carbon** on agricultural land **4.6%**.

The annual rate of increase in biomass carbon on farmlands due to tree cover is **740 mt CO2**.

This is really good news – agricultural land is overall gaining in carbon– due to trees!


Change in Biomass Carbon on Agricultural Land - 2000 - 2010
t C / ha
-161 - -20
-19 - -10
-9 - -5
-4 - -1
0
1 - 5
6 - 10
11 - 20
21 - 150
Source: Zomer et al., 2016

IPCC Tier-1 Estimate of Change of Biomass Carbon on Agricultural Land 2000 - 2010




Wheat production with Paulownia trees
> 6 m hectares in China

Wheat production with walnut trees
France

Prospective stretch goals
for increasing biomass carbon in agriculture

Current global annual increase in tree biomass carbon is 740 mt CO2 eq.

Tree biomass carbon increases:

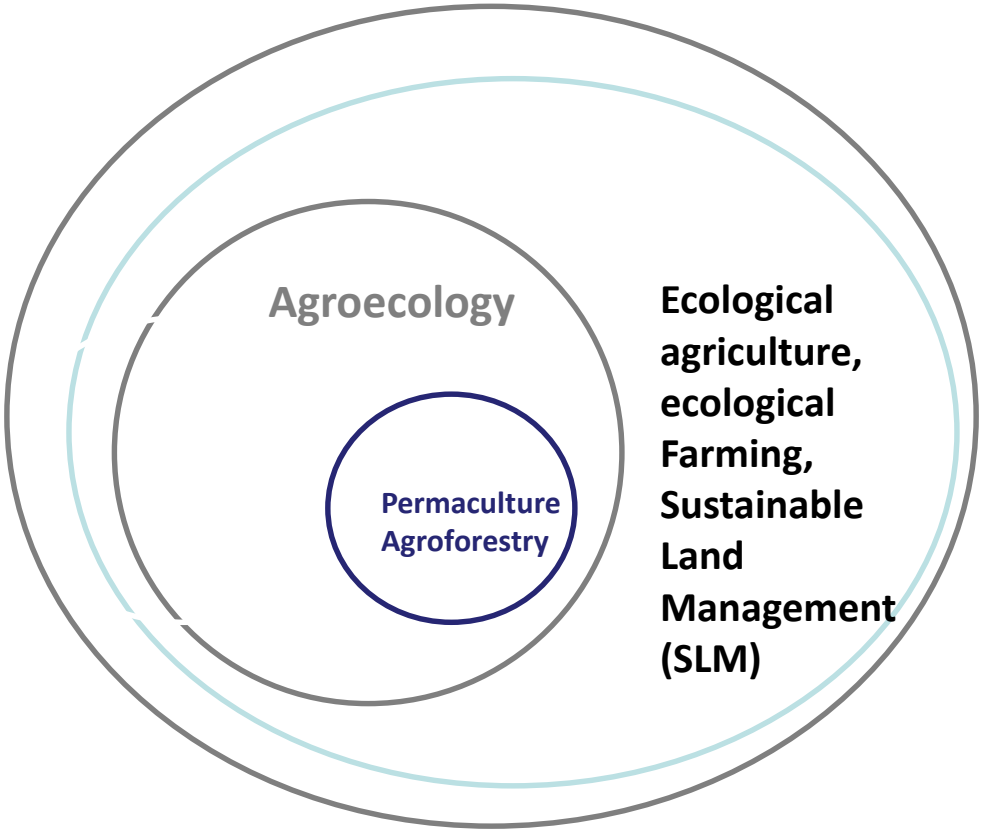
By 2035: 1500 m t CO2 annually

By 2050: 5000 m t CO2 annually

Ways to dramatically increase carbon stocks in agriculture (2 billion has)

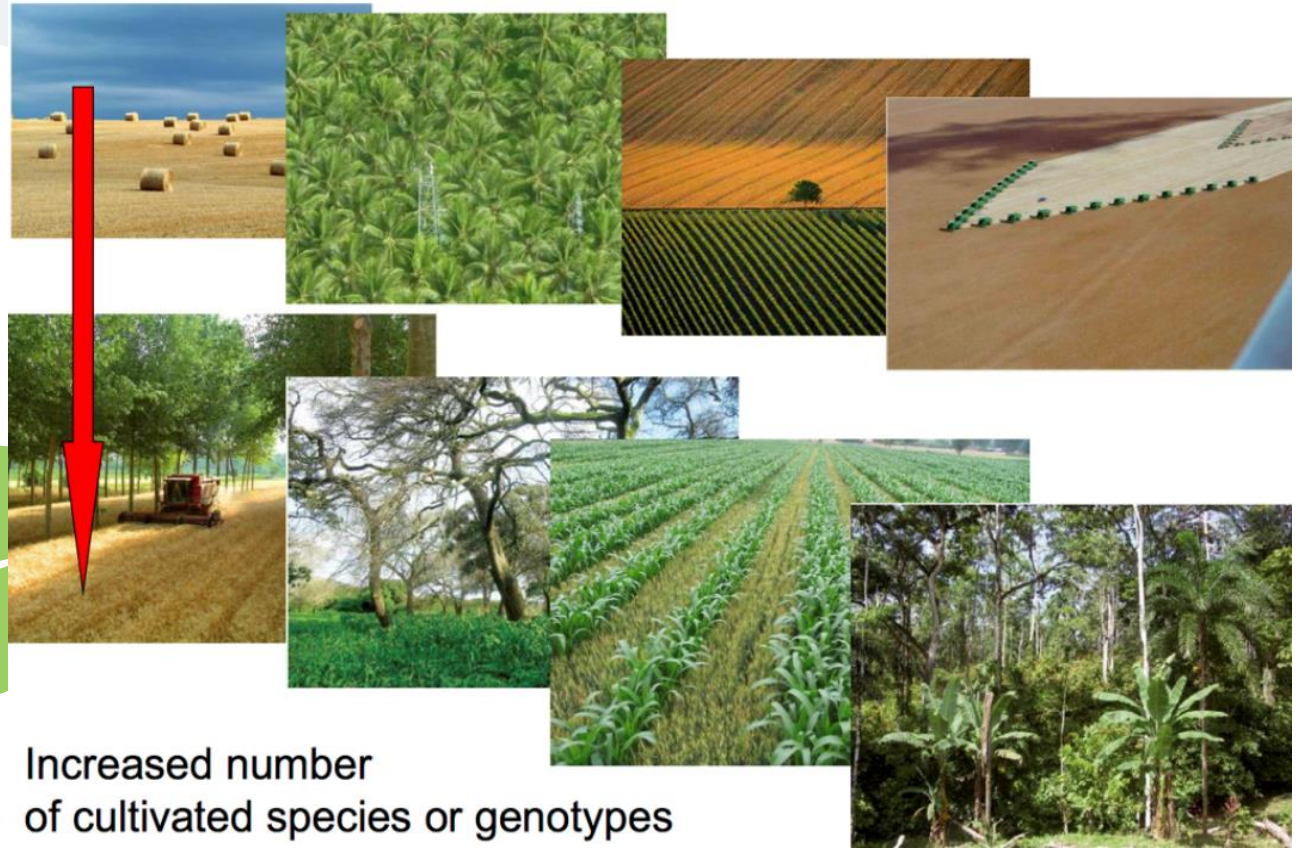
- **Trees on all field and farm boundaries** and in alleyways and contours.
- **Farmer-managed natural regeneration** across the drylands
- **Major increase in perennial crops for food production**
- **Farm woodlot expansion.**
- **Fertilizer and fodder shrubs** throughout crop fields.

Sustainable agriculture and food systems



From Uniformity to Diversity

(IPES-Food)



Dire Warning

The IPCC 1.5C Report

(1) **We must immediately decarbonize the entire global economy -- but that's not enough;**

(2) We must recapture hundreds of billions of tons of CO2 back out of the atmosphere.

IPPC: *Biological approaches to carbon capture are the most promising prospects for negative emissions*

- Protect current forests,
- Restore degraded forest lands,
- Increase tree cover on agricultural lands through agroforestry,
- Increase the biomass production of pasturelands

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- Restore degraded forest lands,
- Increase tree cover on agricultural lands through agroforestry,
- Increase the biomass production of pasturelands,
- **Convert up to 500 m ha agricultural land & 800 m ha pastureland into bioenergy crops for bioenergy carbon capture & storage.**

Are there alternative ways to vastly increase carbon capture that would not require the conversion of agricultural land?

Are there ways to deploy carbon capture on farmlands that would actually increase crop production?

Indeed, there are:
EverGreen Energy

A nature-based agroecological solution

Gliricidia shrubs intercropping in crop production


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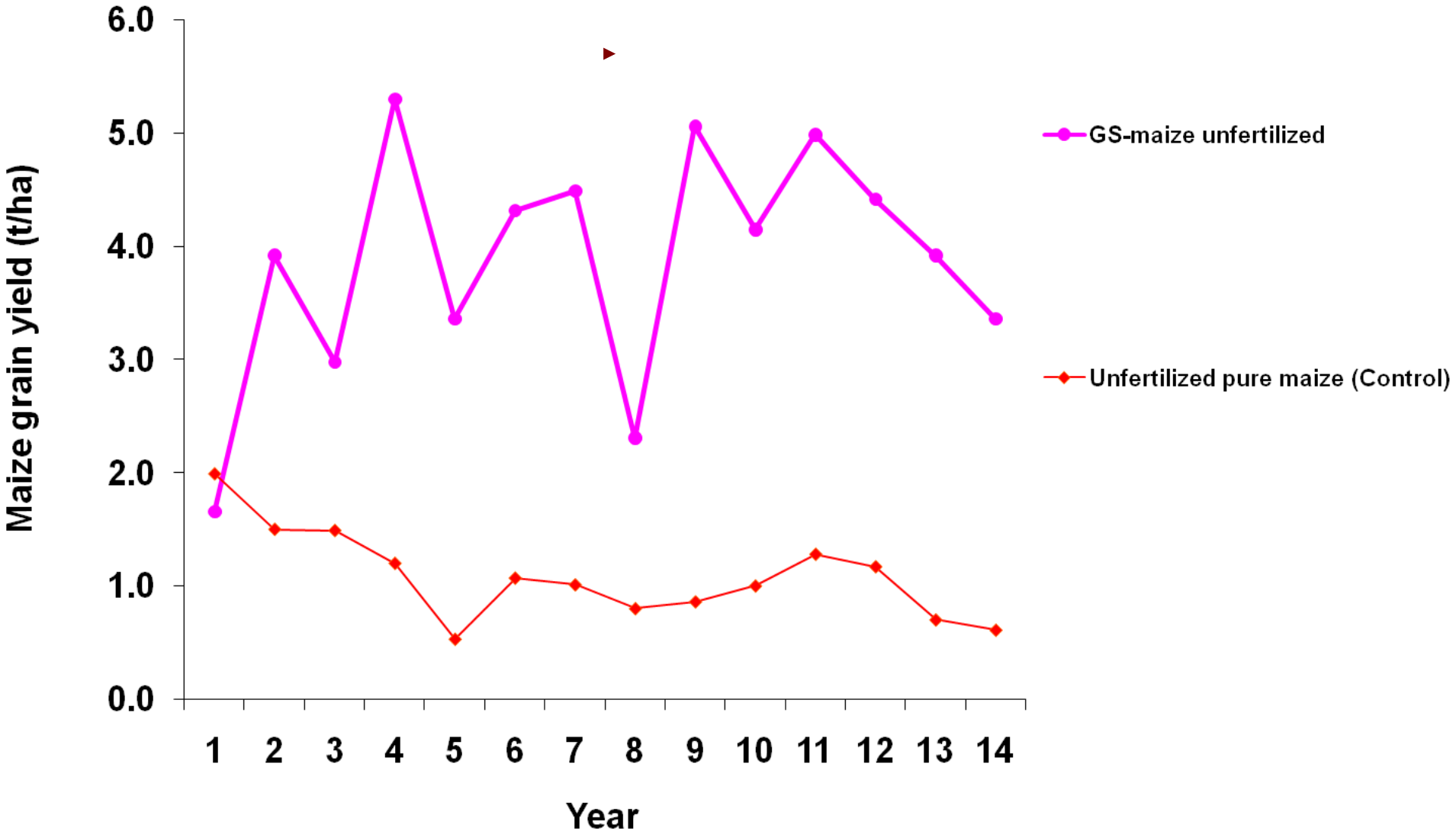
Long-term maize yield without fertilizer in a *Gliricidia* system



Impact of fertilizer trees on maize yield under farmer management

Plot management	Yield (t/ha)
Maize only	1.30
Maize + fertilizer trees	3.05

2011 Survey of farms in six districts (Mzimba, Lilongwe, Mulanje, Salima, Thyolo and Machinga)

35 kv gasifier: Village-sized unit

Industrial size: Large plants of 5-15 MW

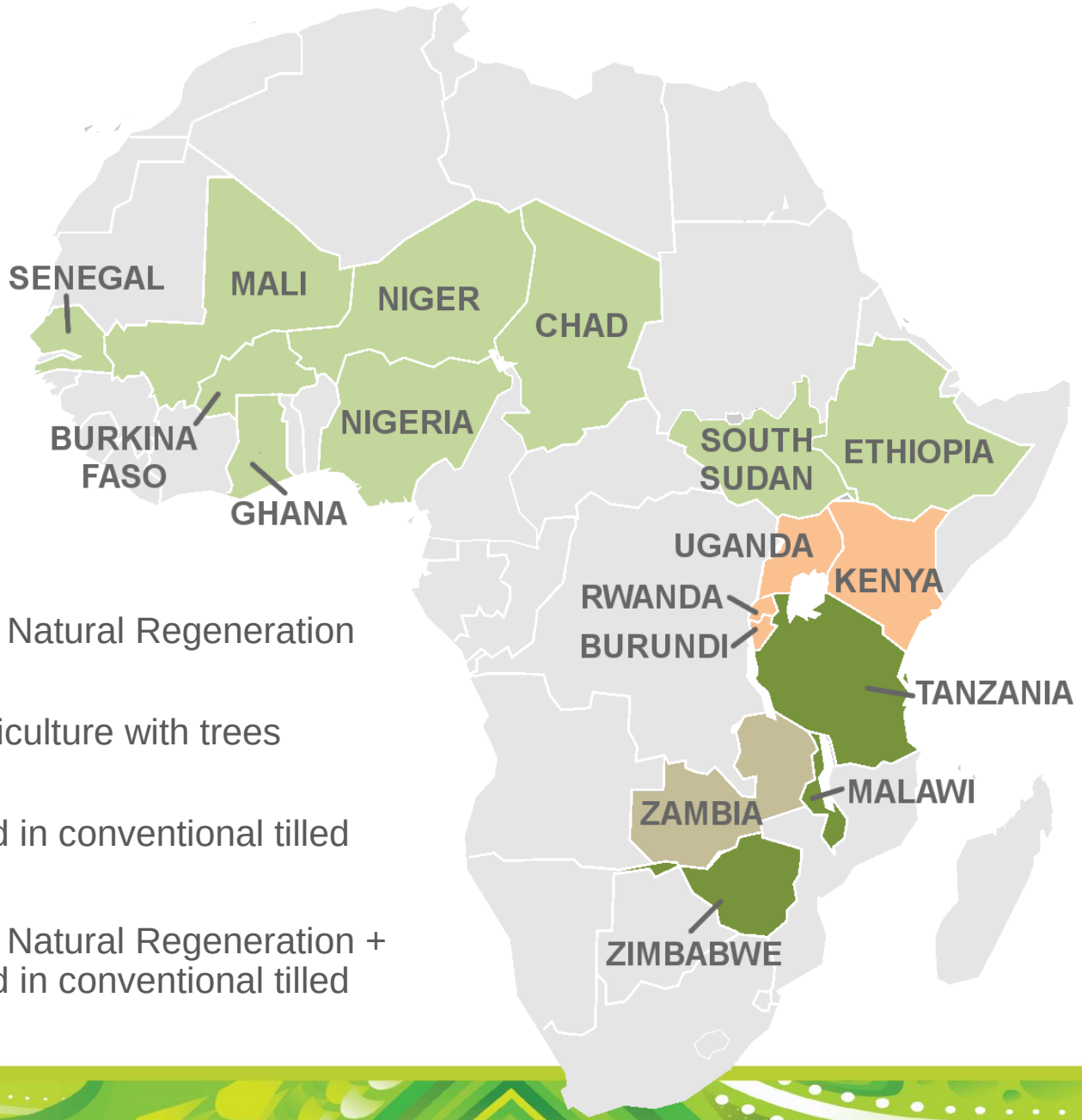
Multiple Benefits to Local Communities

Social benefits: Increased income and employment, empowerment of rural communities.

Economic benefits: Improved agricultural productivity, production of biofertilizer, and development of rural electrification infrastructure areas.

Environmental benefits: Reduced carbon emissions, land restoration, enrichment of soil nutrients.

17 Countries engaged in evergreen agriculture in Africa



- Farmer Managed Natural Regeneration
- Conservation Agriculture with trees
- Trees interplanted in conventional tilled cropland
- Farmer Managed Natural Regeneration + Trees interplanted in conventional tilled cropland

EverGreening
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Evergreening.org
d.Garrity@evergreening.org

Development NGOs: SOS Sahel, World Vision, CRS, OxFam, CARE, etc

Conservation NGOs: Conservation Interantional, TNC, etc

Research organizations: WRI, ICRAF, etc

You never change things by fighting the existing reality.

To change something, build a new model that makes the existing model obsolete.

-- R Buckminster Fuller