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CGIAR is a global research partnership for a food secure future

CGIAR and Climate-Smart Agriculture

Alain Vidal

June 2014

Photo: A. Vidal

What is Climate Smart Agriculture?

Climate-smart agriculture combines policies on:

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Climate Change, Agriculture and Food Security

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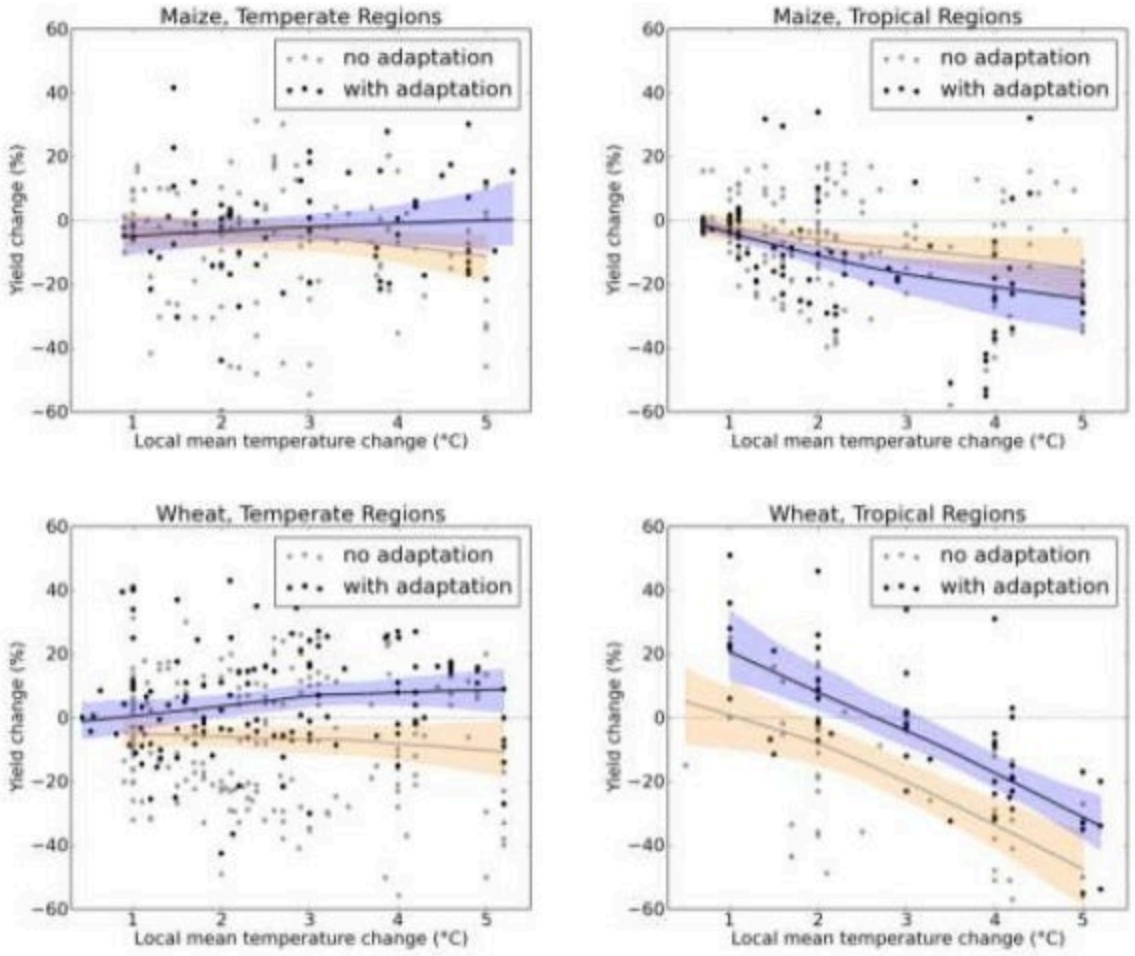
Why is CSA important? – Adaptation



Global wheat and maize yields: response to warming

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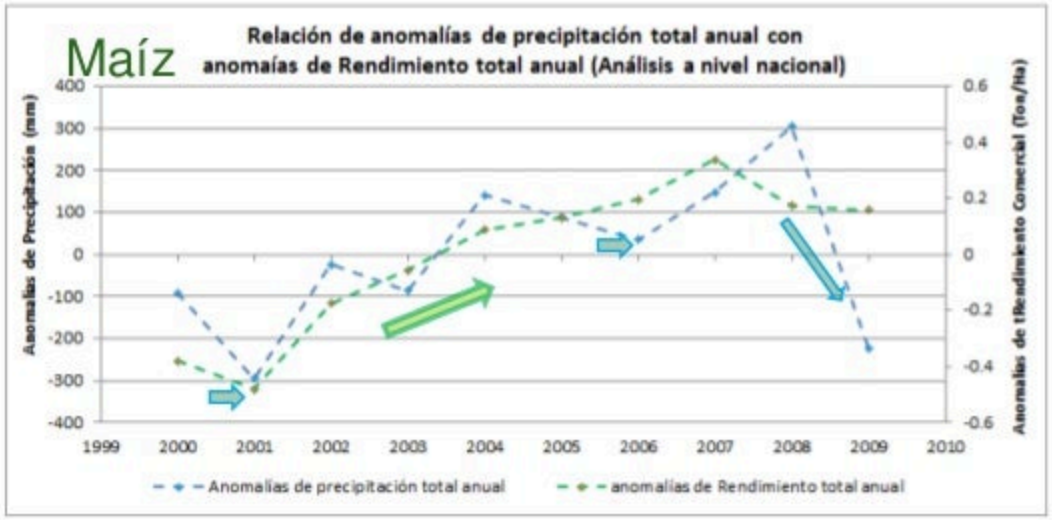
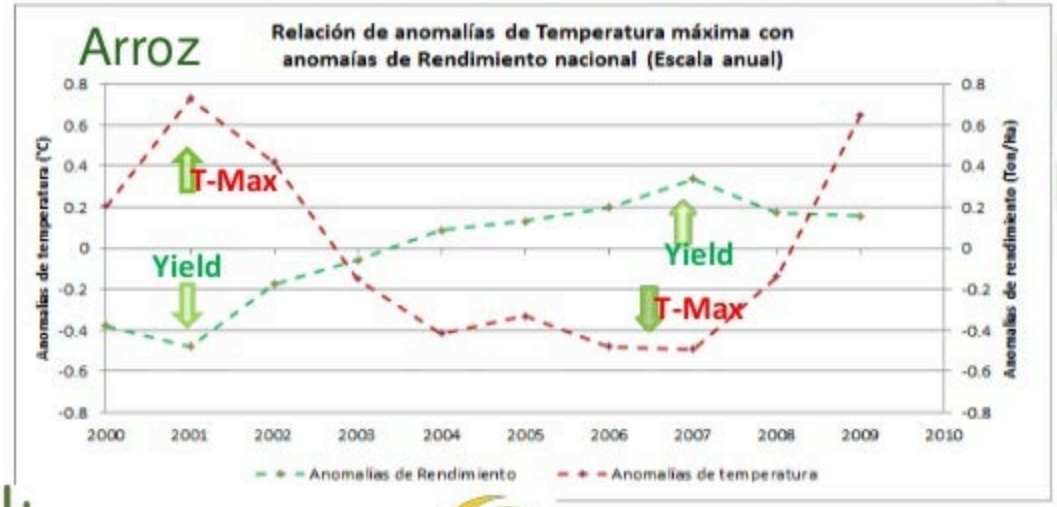
Why is CSA important? – Food





Climate drives yield variation: our systems are **sensitive** to climate, not *resilient* to it

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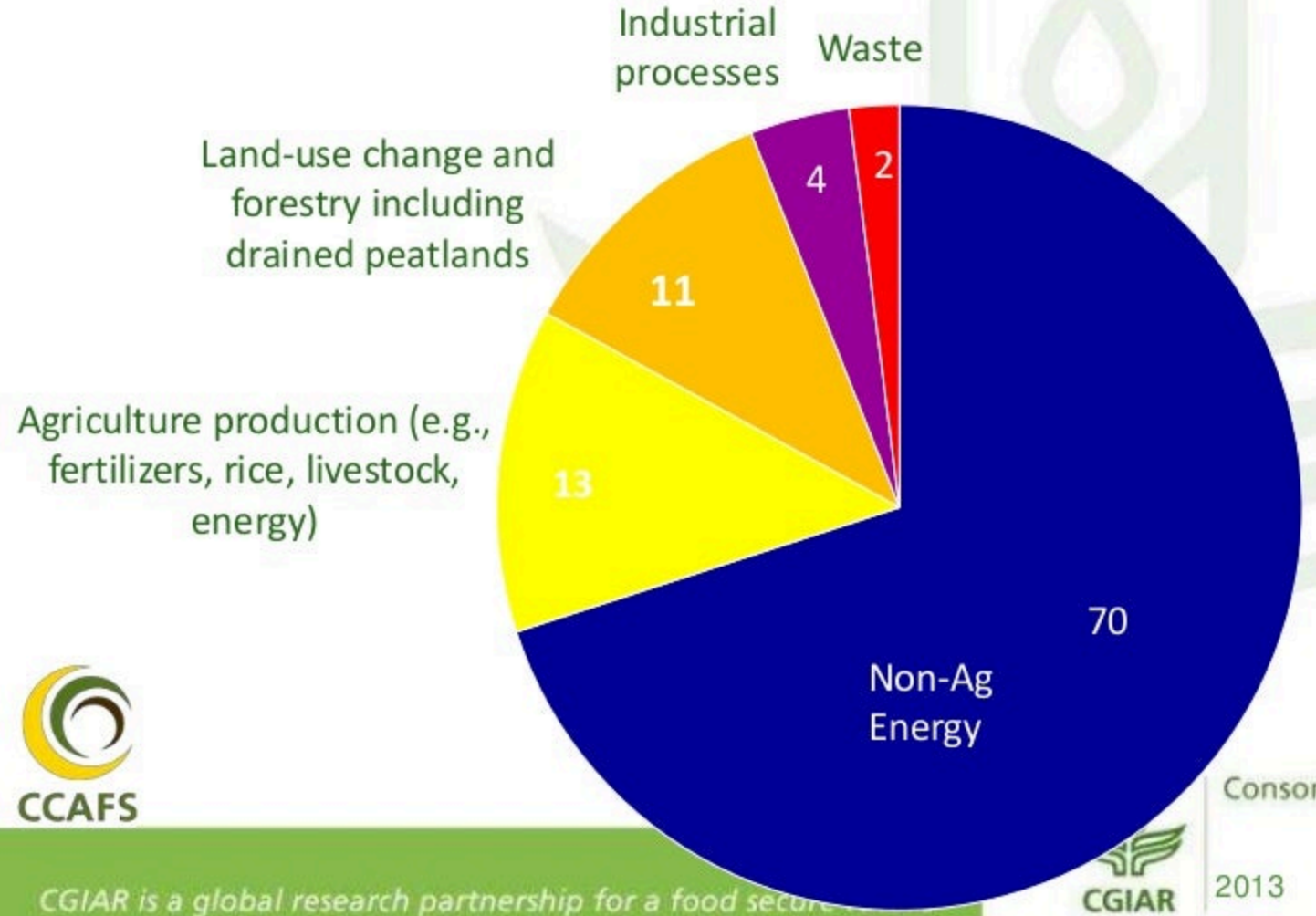
Why is CSA important? – Mitigation

Agriculture-related activities are 19-29% of global greenhouse gas emissions (2010)

Percent, 100% = 50 gigatonnes CO_2e per year



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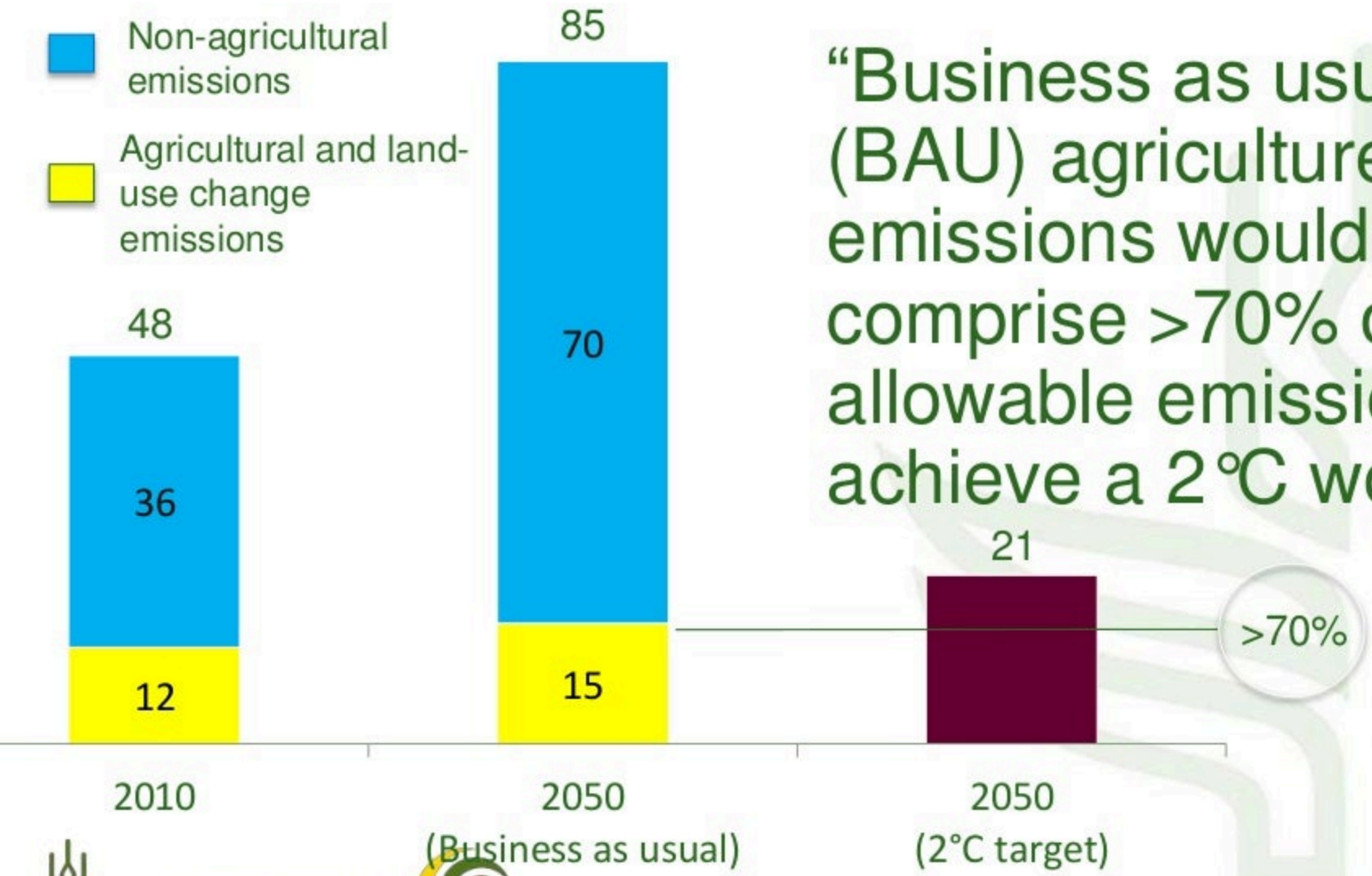
Why is CSA important? – Mitigation



"Business as usual" (BAU) agriculture emissions would comprise >70% of allowable emissions to achieve a 2°C world

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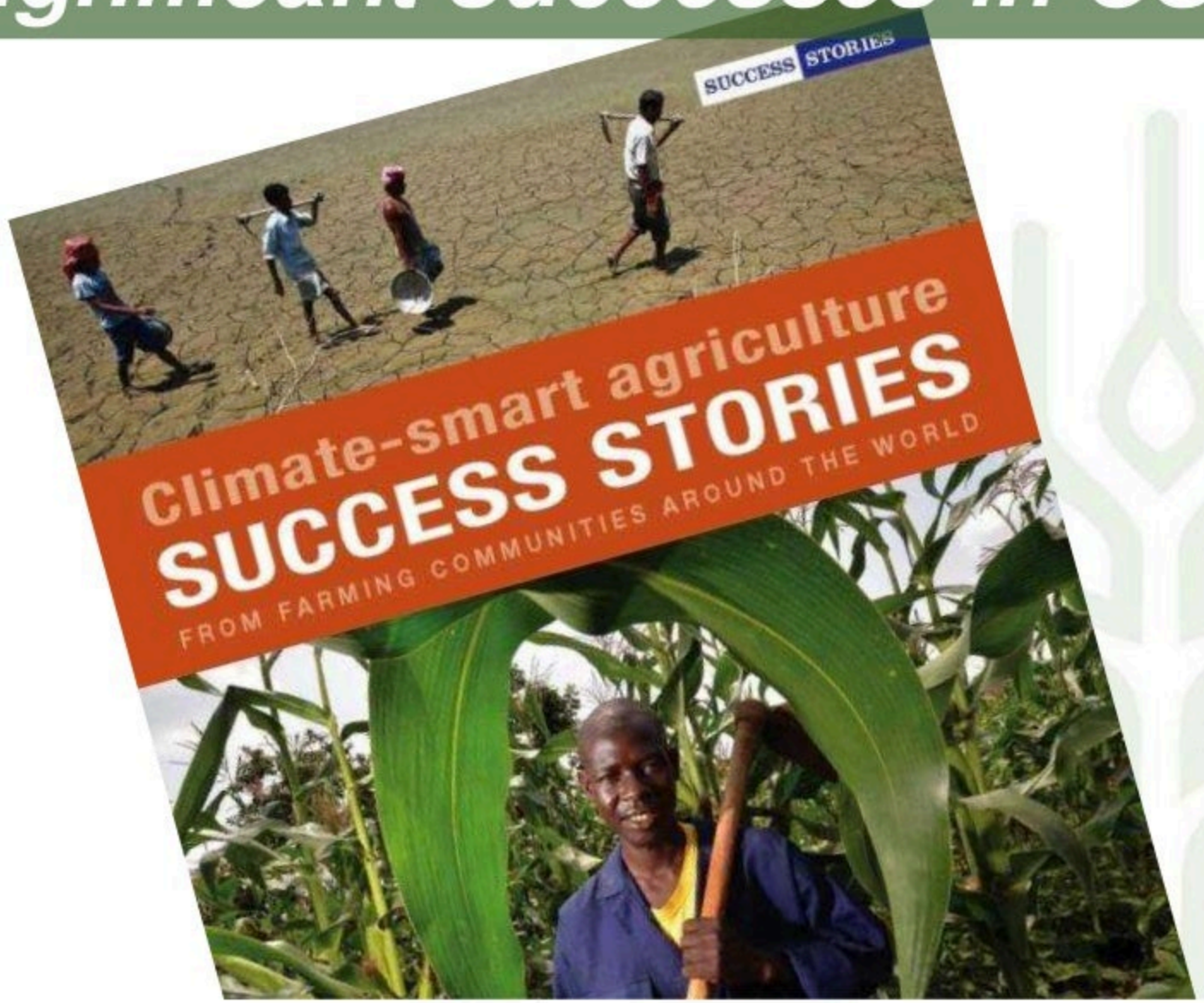
Significant successes in CSA



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CTA

CHINA

Paying for ecosystem services

- 2.5 million farmers paid to set aside land and plant trees

✓ Increased yields

✓ Sequestered over 700,000 tonnes of carbon

✓ 2 million ha rehabilitated – reducing erosion

Climate-smart coffee-banana systems

- Microclimate: shading can reduce temperature by >2° Celsius
- Shade biomass increases carbon stock→ CC mitigation
- Shade plants increase revenue and food security for smallholders

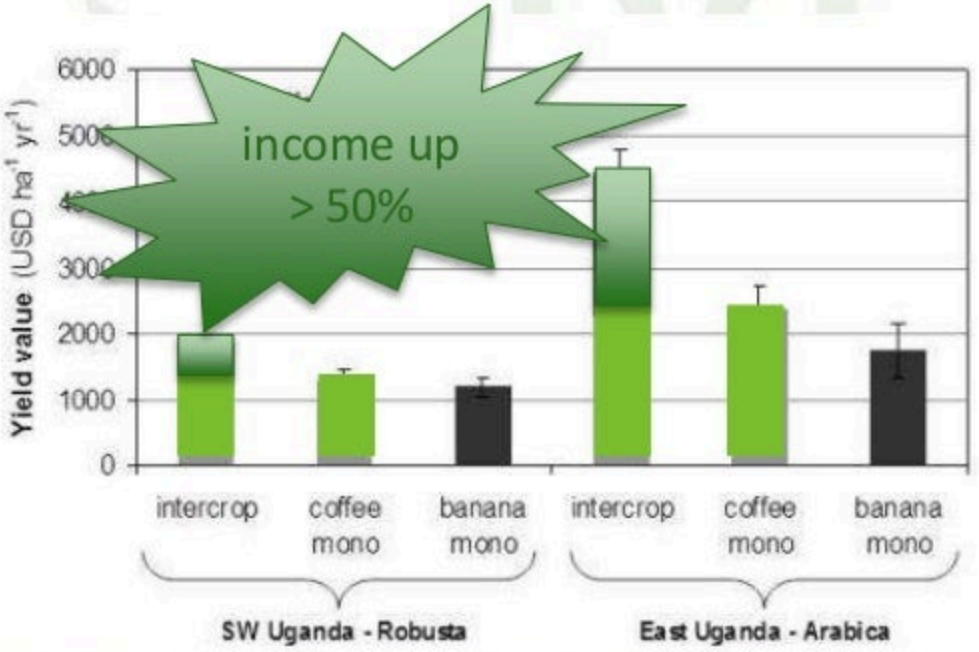
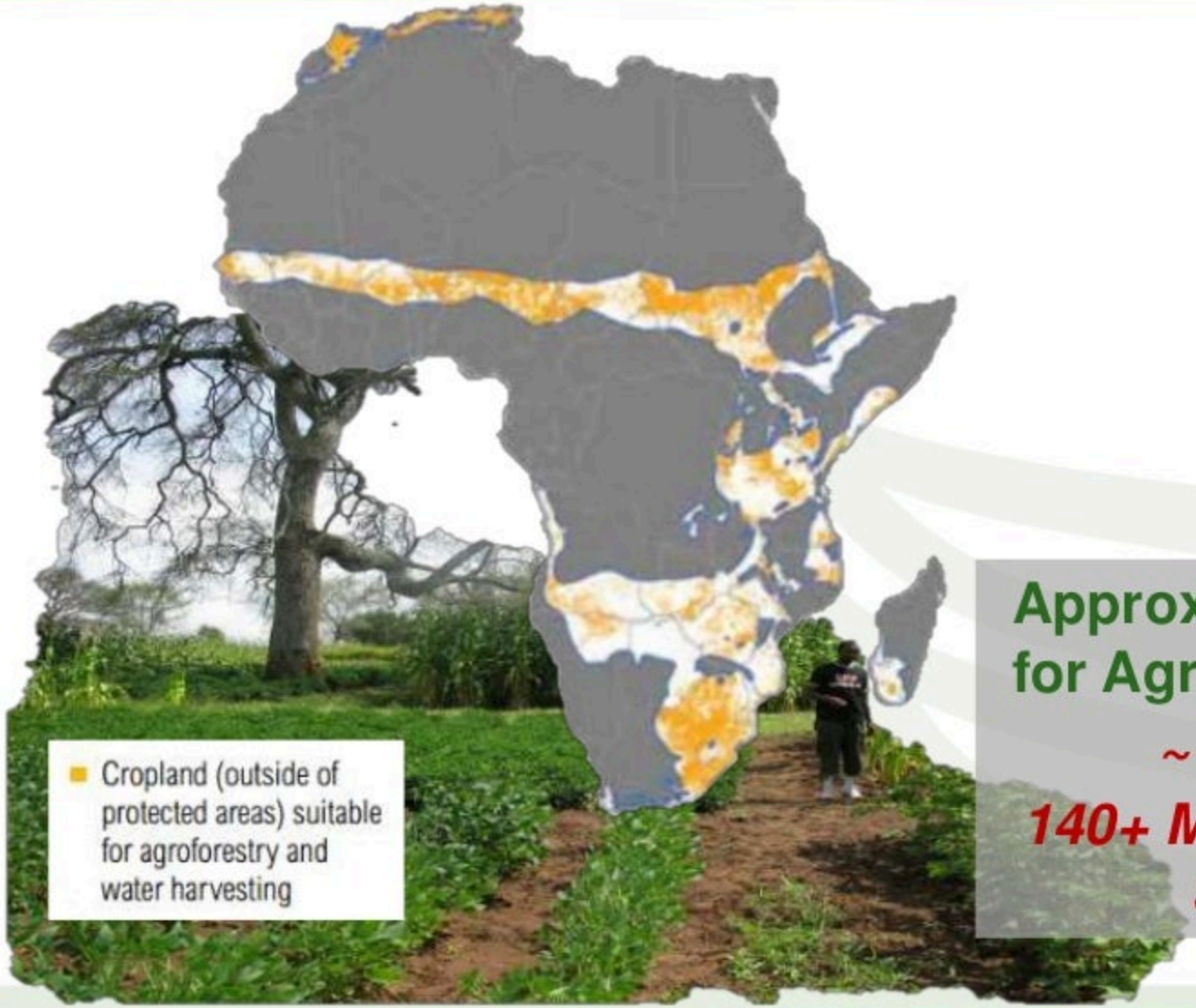


Figure 1: The total yield value of intercropped fields was much higher than monocropped coffee or banana in farmer control fields

Van Asten et al (2014)

What if…
- we spread agroforestry across Africa?



Approximate area suitable for Agroforestry in Africa:

~ 300 Million Ha

140+ Million People below $1.25 per day

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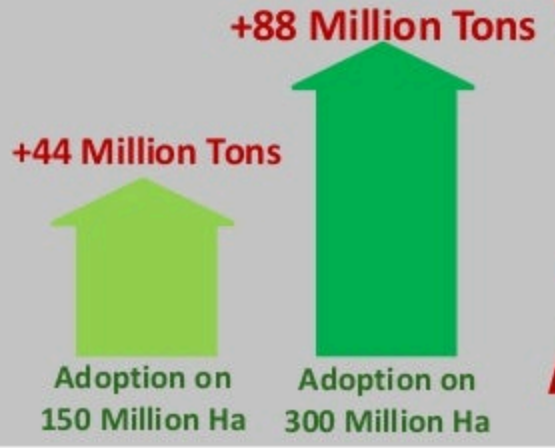
Analysis based on WRI 2013

What if…

- we spread agroforestry across Africa?

PRODUCTIVITY

Food Production



- **+615 Calories per person/day for 140+ Million poor people**
- Average yield increase 50%
- Savings of over 6 Million tons of synthetic fertilizer

FOOTPRINT

Carbon Sequestration

- 2 Gt Co_2e storage per year corresponds to **~1/3 of Global Direct Ag Emissions**
- Significantly higher mitigation potential by further increasing tree density and in humid systems

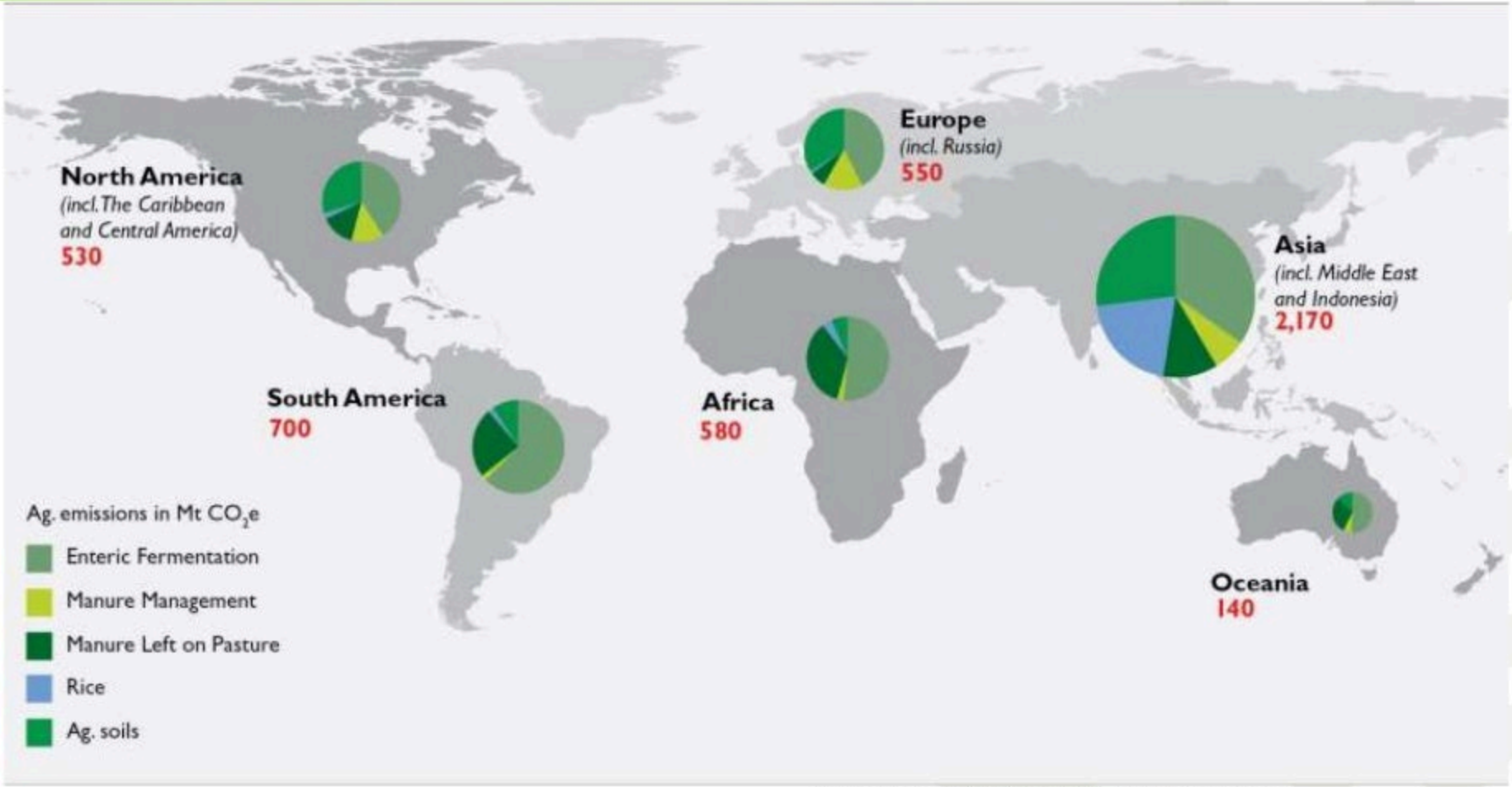
RESILIENCE

Multiple benefits include:

- Reduced soil erosion
- Additional diversified income from wood products
- Strengthened drought resistance from increased water storage

Agroforestry can be combined with other practices such as water harvesting for additional impact.

Direct agricultural emissions are spread across regions and across production sectors

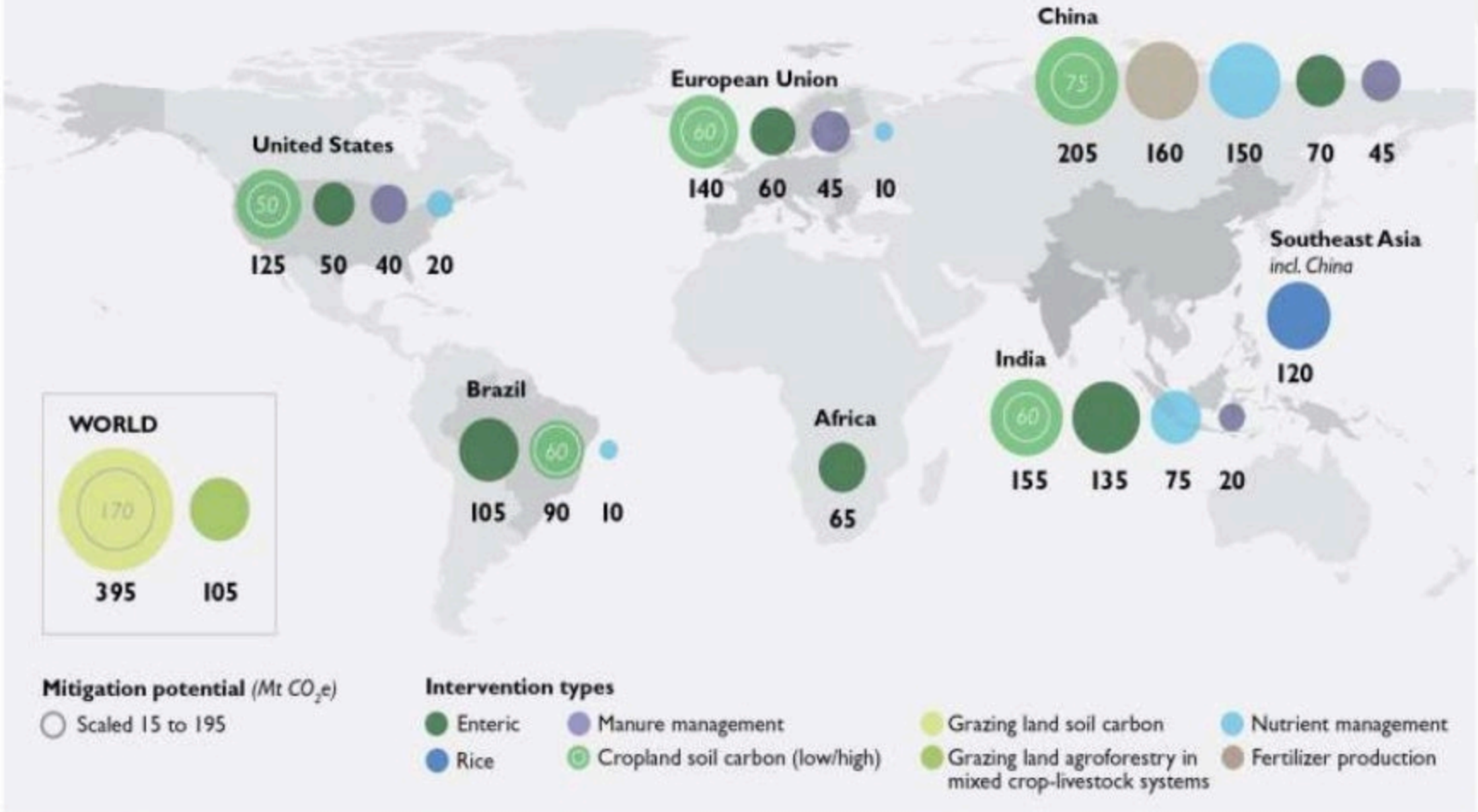


Source: FAOStat data from 2010 (accessed 2013); area of pie charts scaled to regional emissions.

"Ag soils" includes synthetic fertilizers, manure applied to crops, field application of crop residues, and nitrous oxide from cultivated organic soils.

Mitigation opportunities by country

Mitigation opportunities are clustered primarily in the major agricultural economies.



Source: CEA analysis.

INDIA

Weather-based insurance

- 12 million farmers & 40 different crops insured

- ✓ Allows farmers to access fertilizer and better seed
- ✓ Reduces pressure to bring more land under cultivation
- ✓ Reduces risks

Adaptations to deal with higher climate variability and climate risks

- Better weather forecasts and climate information reaching farmers, governments, emergency relief
- Social safety nets to help vulnerable people recover from climate shocks
- Weather insurance in agriculture reaching more farmers

We will need major innovations in how we eat and farm

To cope with climatic changes, we may need to consider:

Completely different diets

Shifting production areas for familiar crops, livestock and fisheries

New approaches to managing waste, water and energy in food supply chains

Restoring degraded farmlands, wetlands and forests

CSA Alliance: AR and ARD institutions united with International Organizations and NGOs

CLIMATE SMART Agriculture

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Food security and climate change can be addressed together by transforming agriculture and adopting practices that are "climate-smart".

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THANK YOU

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www.cgiar.org

www.slideshare.net/cgiar