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CGIAR is a global research partnership for a food secure future

Bridging the gaps between AR and ARD Challenges and Opportunities

Alain Vidal

AKIS-ARCH Workshop, Brussels, 26-27 May 2014

CGIAR Centers developed high yielding varieties for staple cereals that were the engine of the Green Revolution



CGIAR: agricultural research for a food-secure future

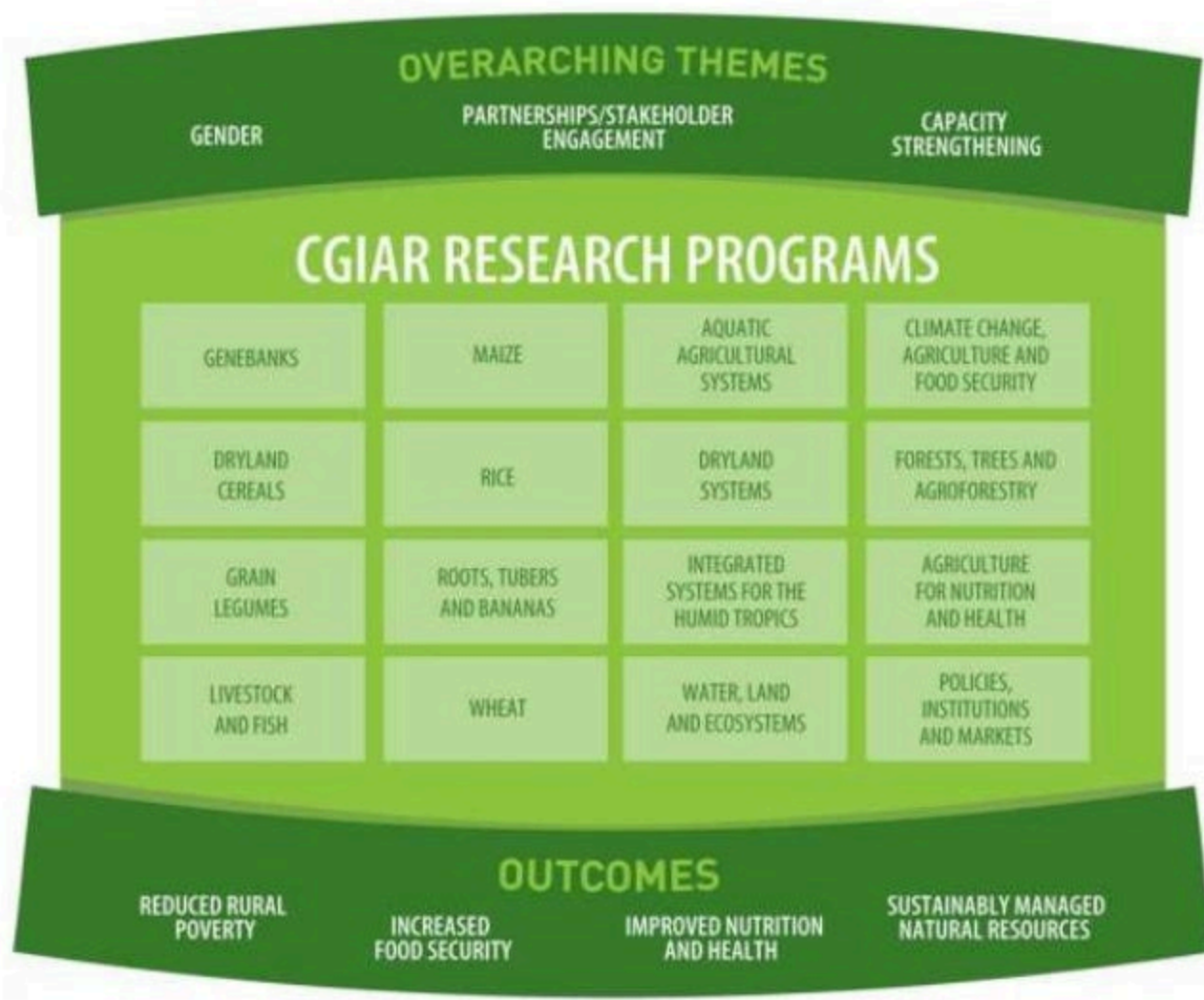


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CGIAR's research is carried out by 16 Research Programs (CRPs), working in close collaboration with hundreds of partners worldwide



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Bridging the gaps between AR and ARD

3 examples

- Climate-Smart Agriculture
 - Combining mitigation and adaptation
- The Wheat initiative
- Ecological intensification through healthier water, land and ecosystems



What is Climate-Smart Agriculture?

Climate-smart agriculture combines policies on:



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Climate Change,
Agriculture and
Food Security



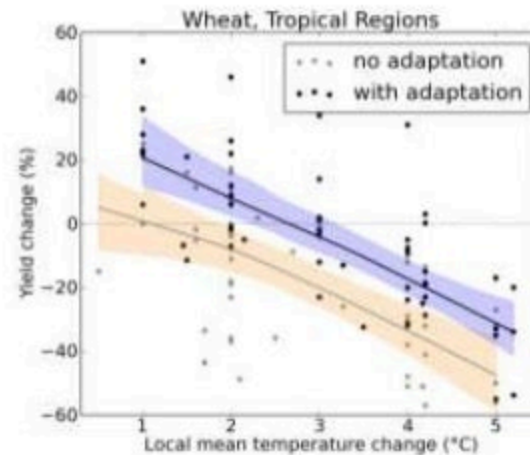
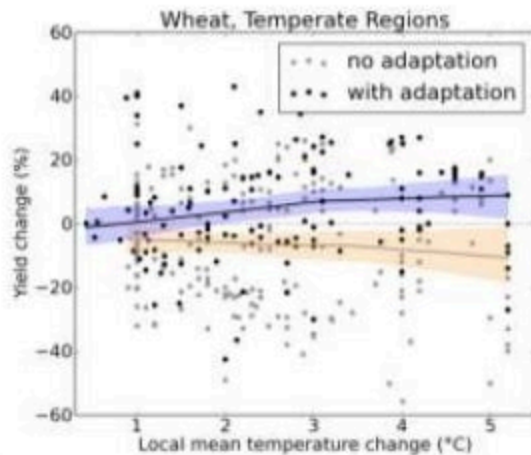
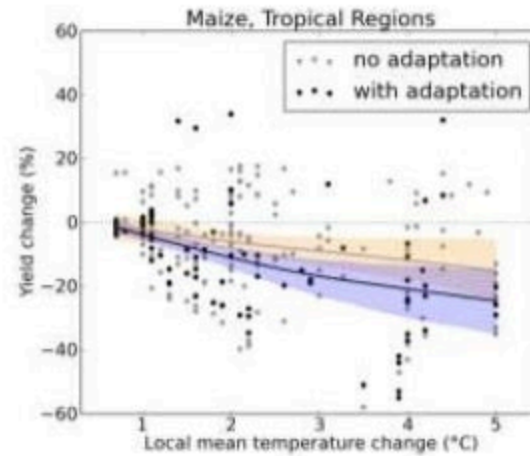
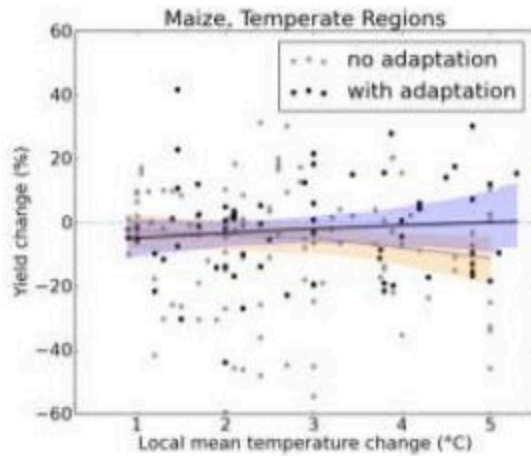
CCAFS



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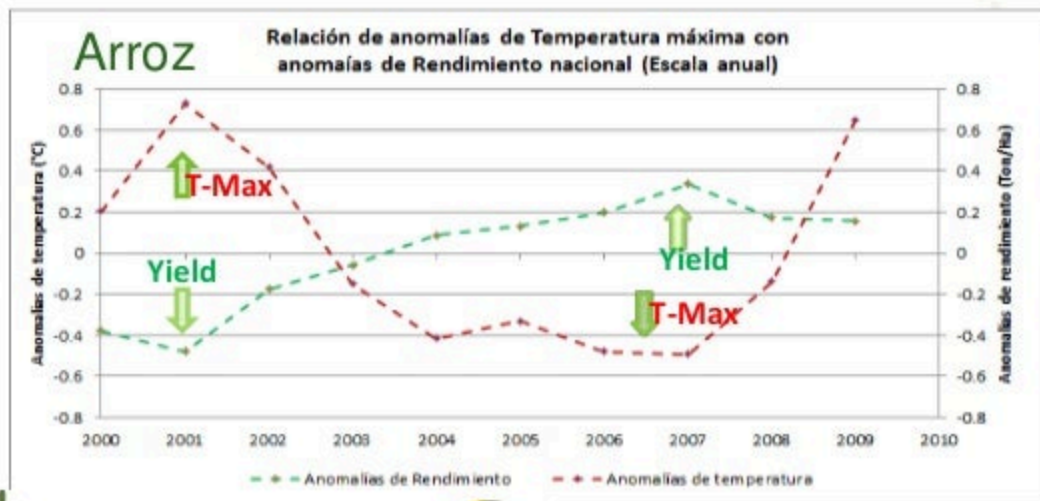
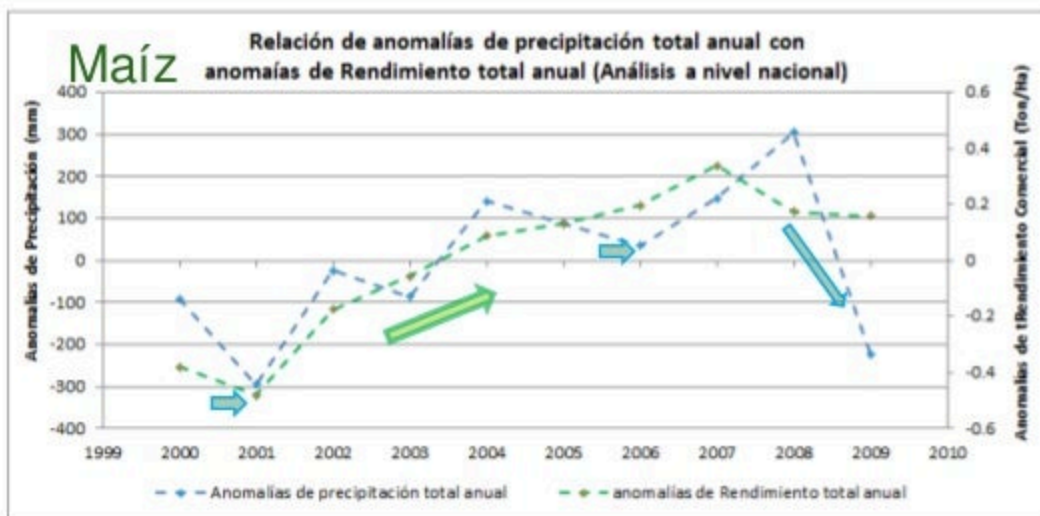
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Why is CSA important? – Adaptation



Global wheat
and maize
yields: response
to warming

Why is CSA important? – Food



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



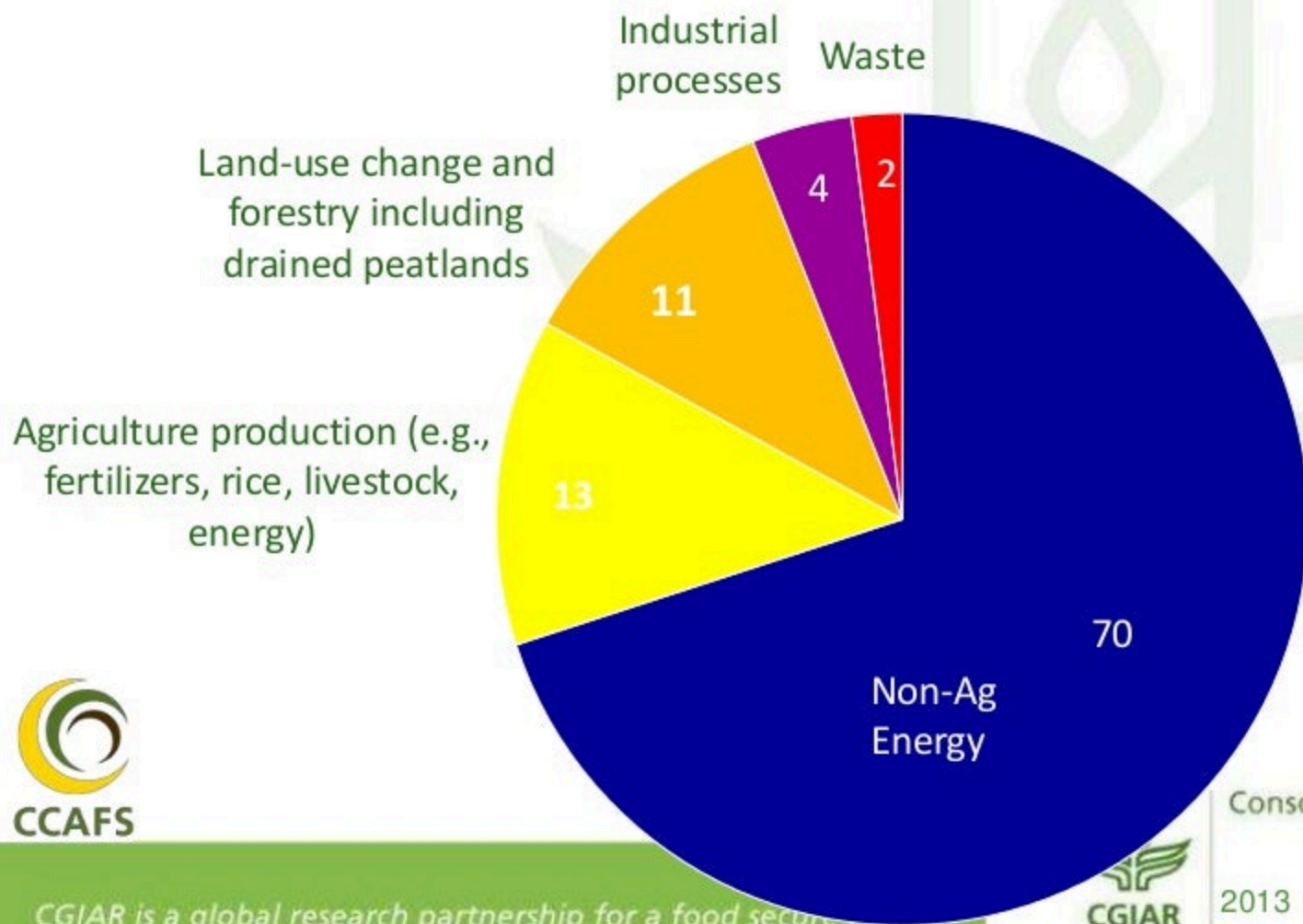
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Why is CSA important? – Mitigation

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

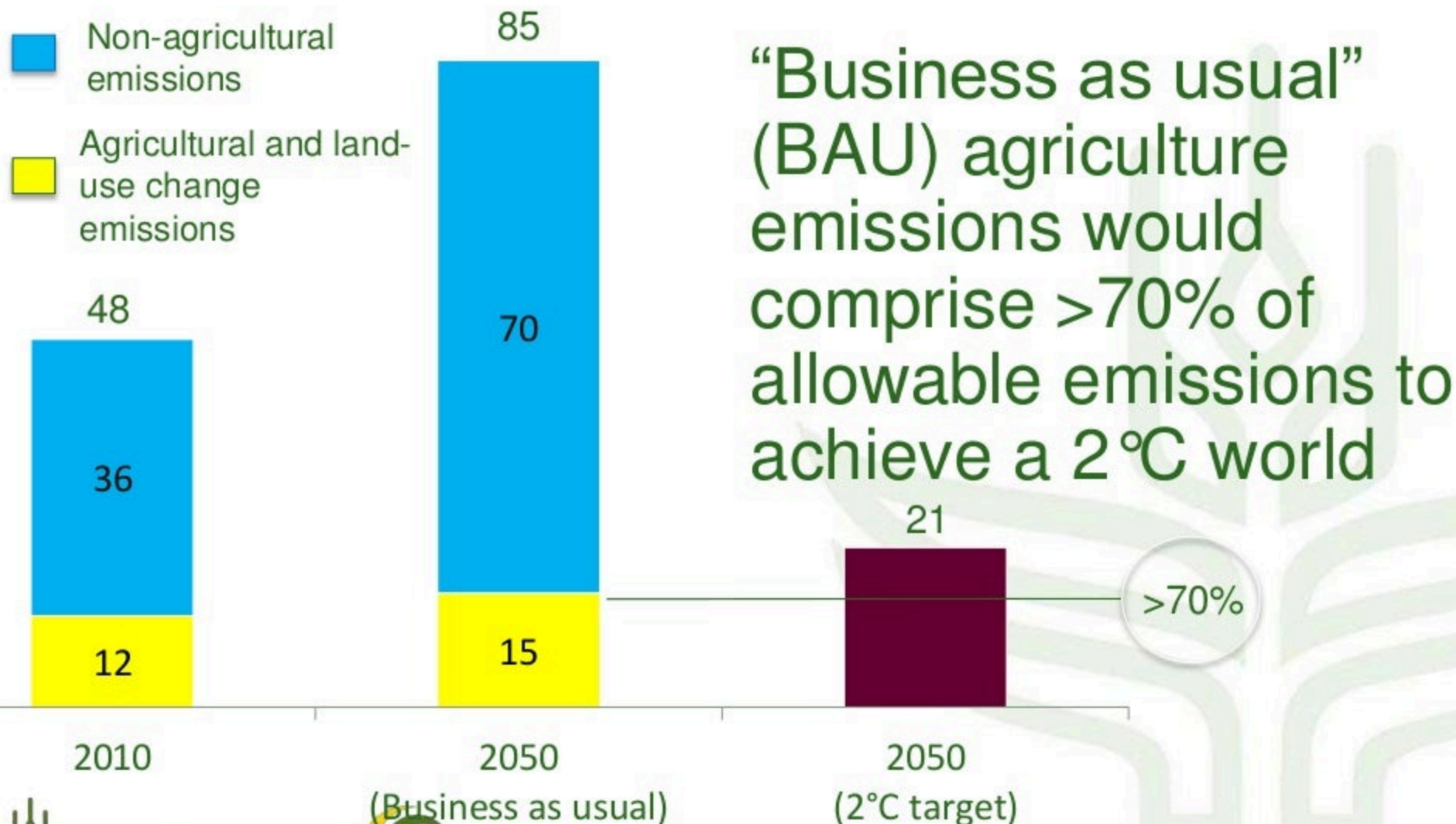
Percent, 100% = 50
gigatonnes CO₂e per year



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Why is CSA important? – Mitigation



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Gt CO₂e per year

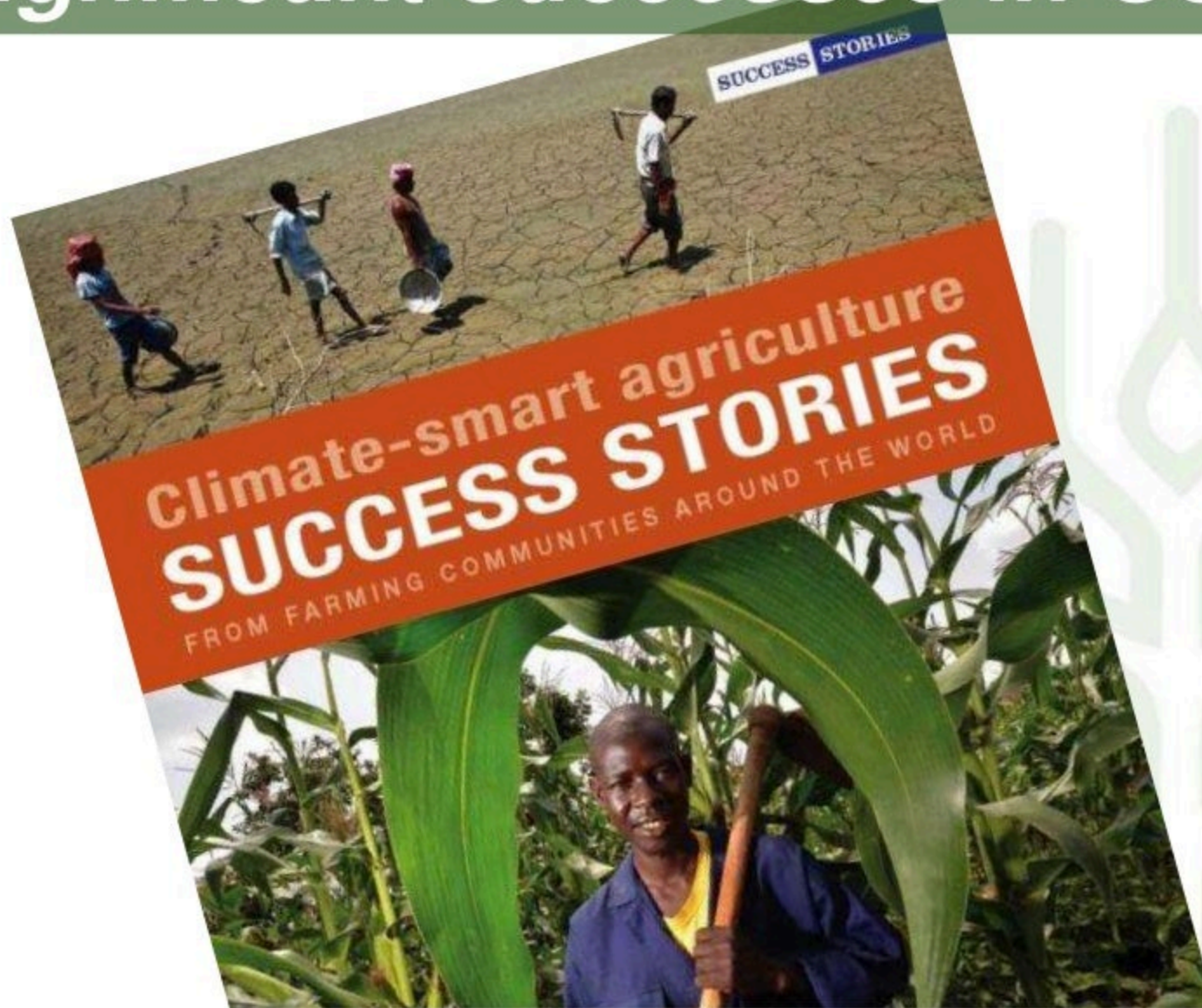


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2013

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Significant successes in CSA



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- **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 $>2^{\circ}$ Celsius
- Shade biomass increases carbon stock \rightarrow CC mitigation
- Shade plants increase revenue and food security for smallholders

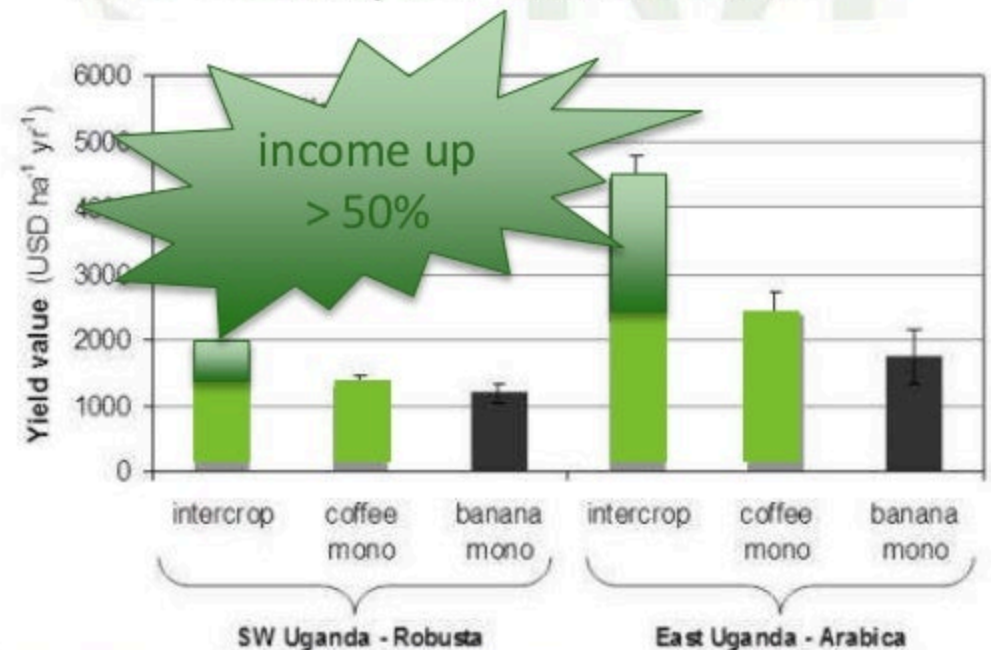
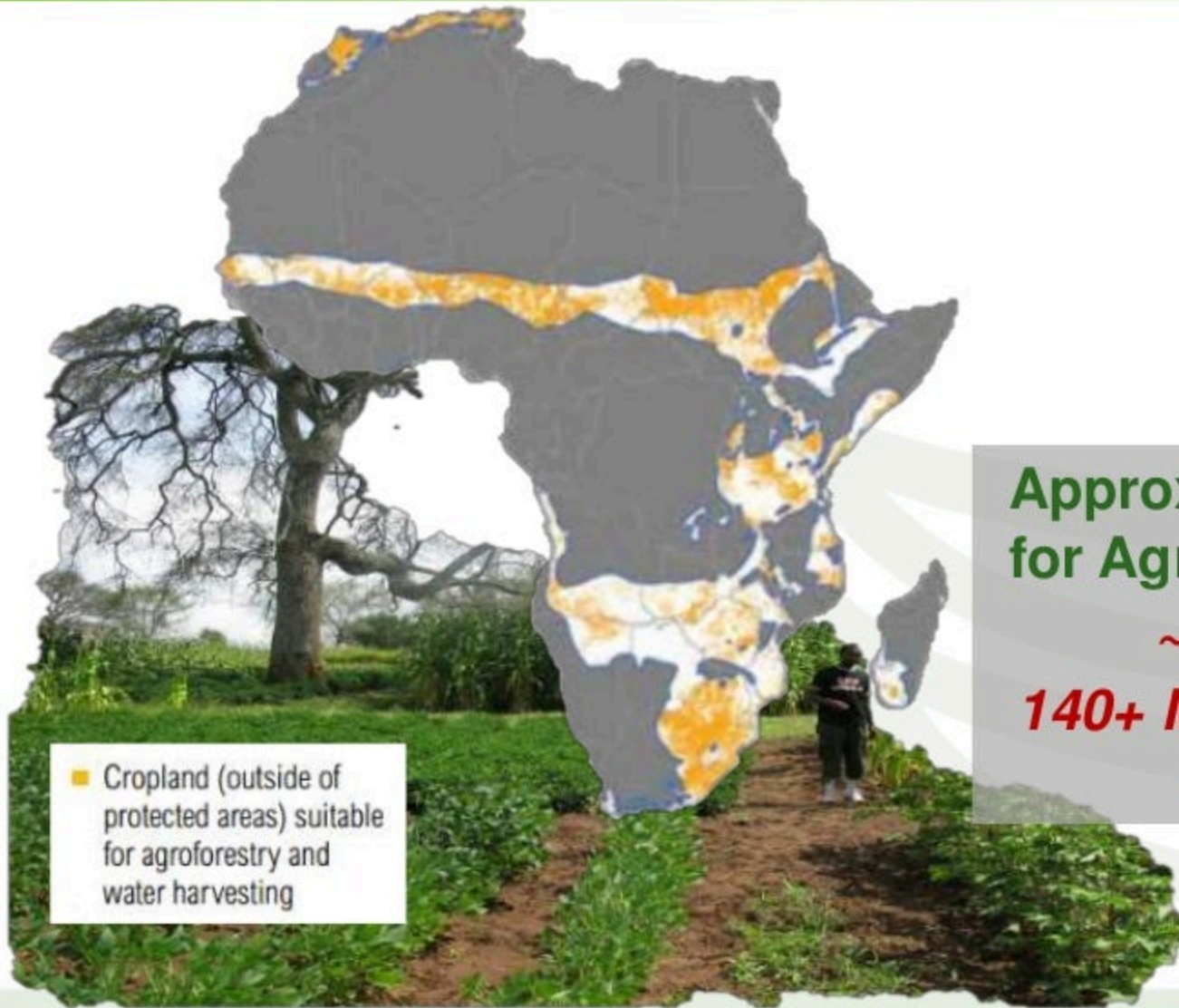


Figure 1: The total yield value of intercropped fields was much higher than monocropped coffee or banana in farmer control fields

What if...

- we spread agroforestry across Africa?



Approximate area suitable for Agroforestry in Africa:

~ 300 Million Ha

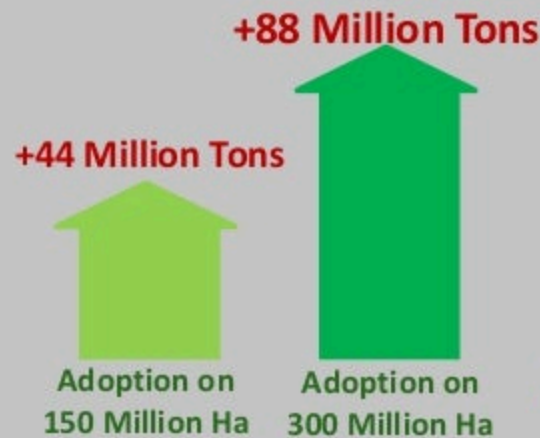
140+ Million People below \$1.25 per day

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 CO₂e 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.

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Direct agricultural emissions are spread across regions and across production sectors

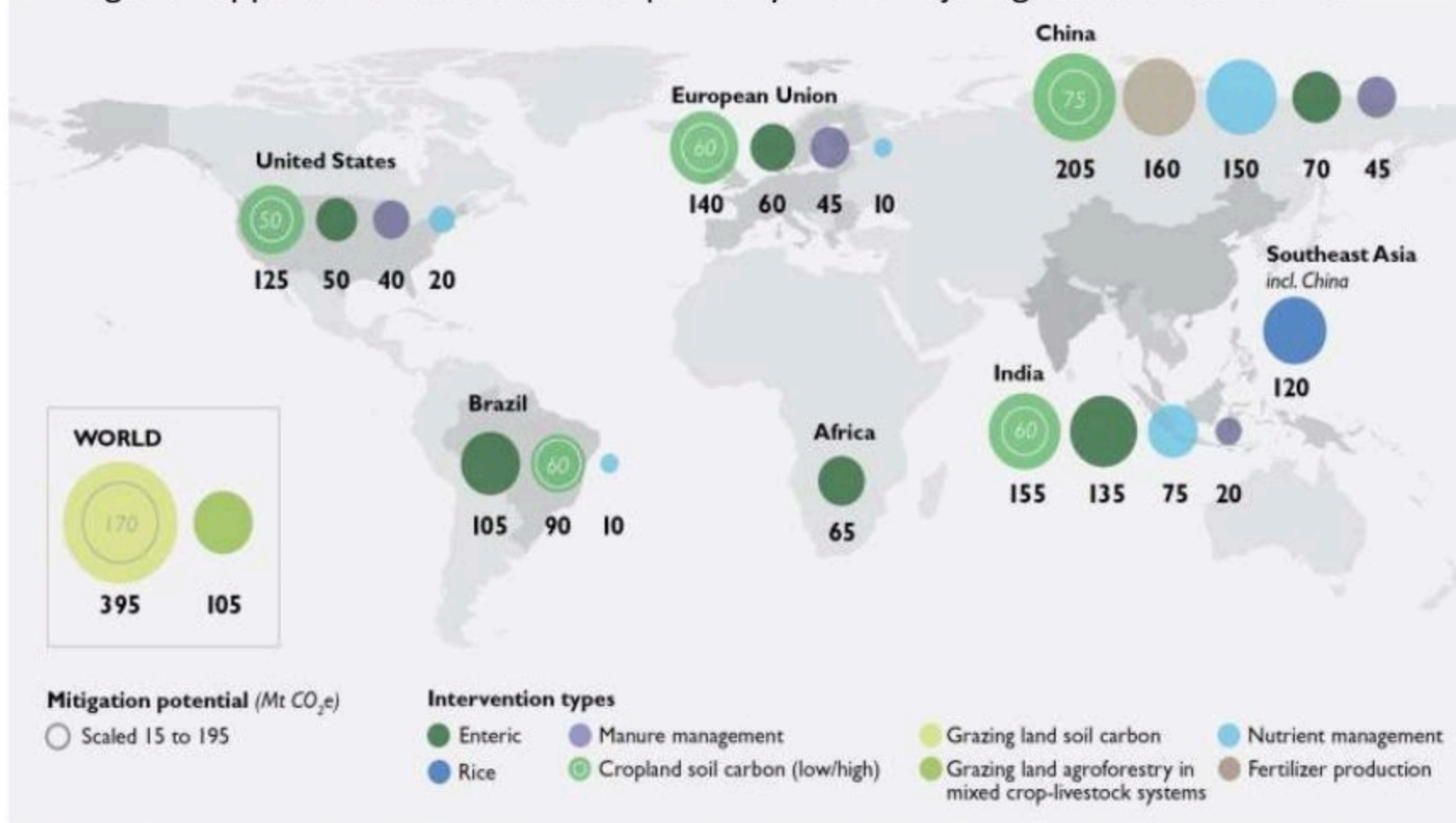


Source: FAOStat data from 2010 (accessed 2013); area of pie charts scaled to regional emissions.

"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.

➤ **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



english

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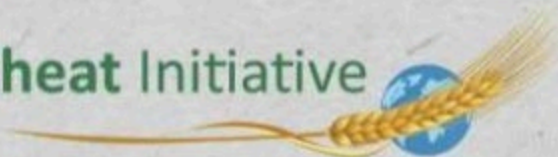


Food security and climate change can be addressed together by transforming agriculture and adopting practices that are "climate-smart".

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An information resource for the Wheat Initiative and a forum for the international wheat research community

A central resource where you can find out about the **Wheat Initiative**, access **wheat databases**, find researchers for collaboration, participate in **discussions** and keep up-to-date with the **latest publications, news and events**

[OBJECTIVES](#) ▶

What the Wheat Initiative wants to achieve

[GOVERNANCE](#) ▶

How the Wheat Initiative works

[MEMBERS](#) ▶

Countries, organisations and stakeholders

[REPORTS](#) ▶

Publications from the Wheat Initiative

[ORGANIZATIONS](#) ▶

Institutes & units conducting wheat research

[RESEARCH](#) ▶

Wheat databases, top wheat research publications and details of institutes, units and projects

LATEST NEWS & JOBS



KWS Borlaug Fellowship applications now open

Seminar "One Century of Wheat Breeding"

New international partnership aims to unlock wheat's potential

[WORKSPACES](#) ▶

Collaborative workspaces to help you work remotely and securely with peers and colleagues around the world



Building a better future: Sustainable intensification the key to food security

Andrew Noble
May 2014

Uniting agriculture and nature for poverty reduction

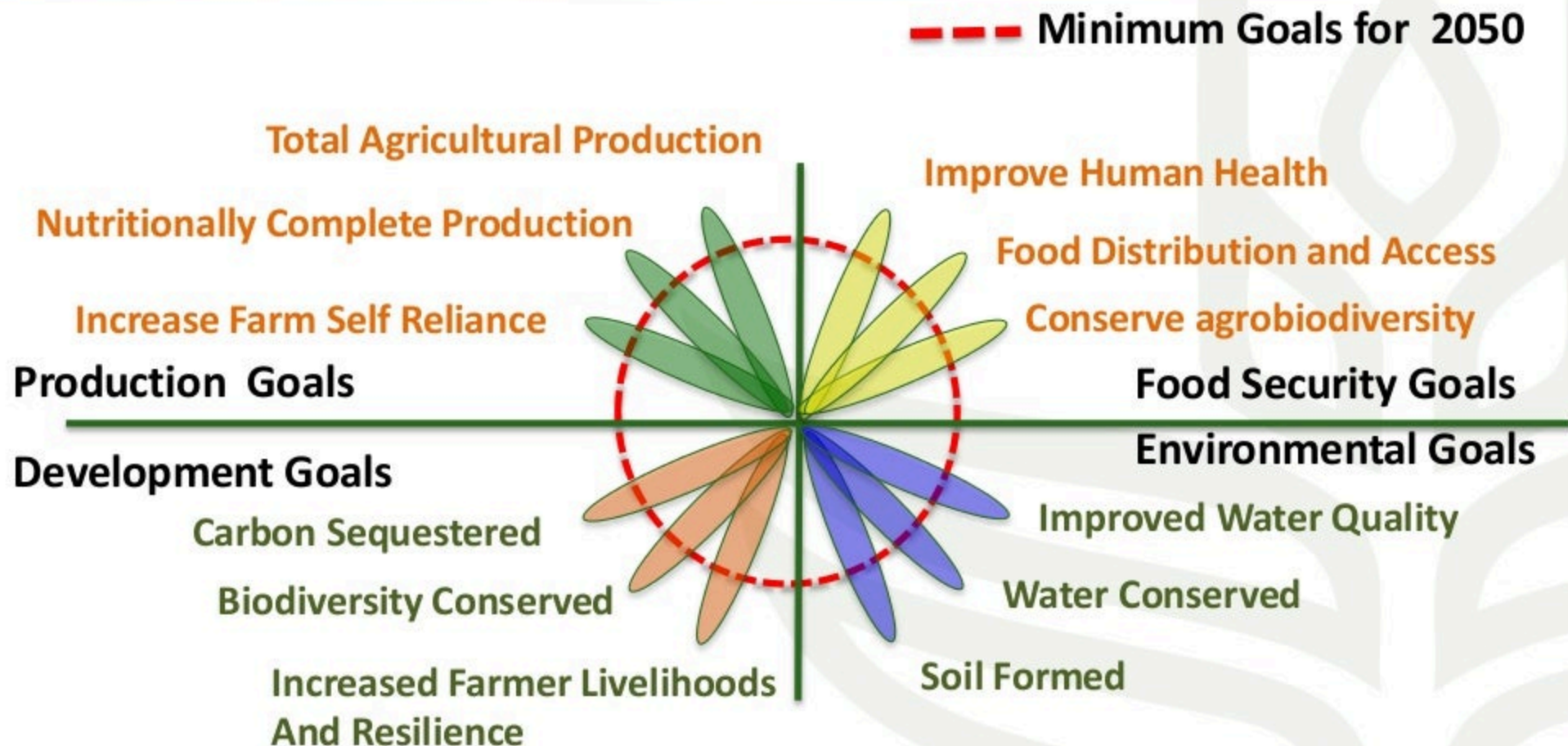
We need a food revolution!

We need to shift from **productivity enhancement** while reducing **environmental impacts**



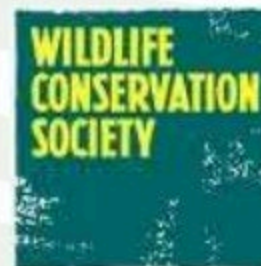
Sustainable governance and management of **ecosystems, natural resources** and Earth system processes at large, provides the basis for practical solutions towards a sustainable resilient **agriculture.**

An agriculture that contributes to environmental protection rather than environmental degradation



Adapted from Foley et al 2011

N-S Partnerships for ecological intensification



landscapes for people, food and nature



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THANK YOU

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www.cgiar.org

www.slideshare.net/cgiar