



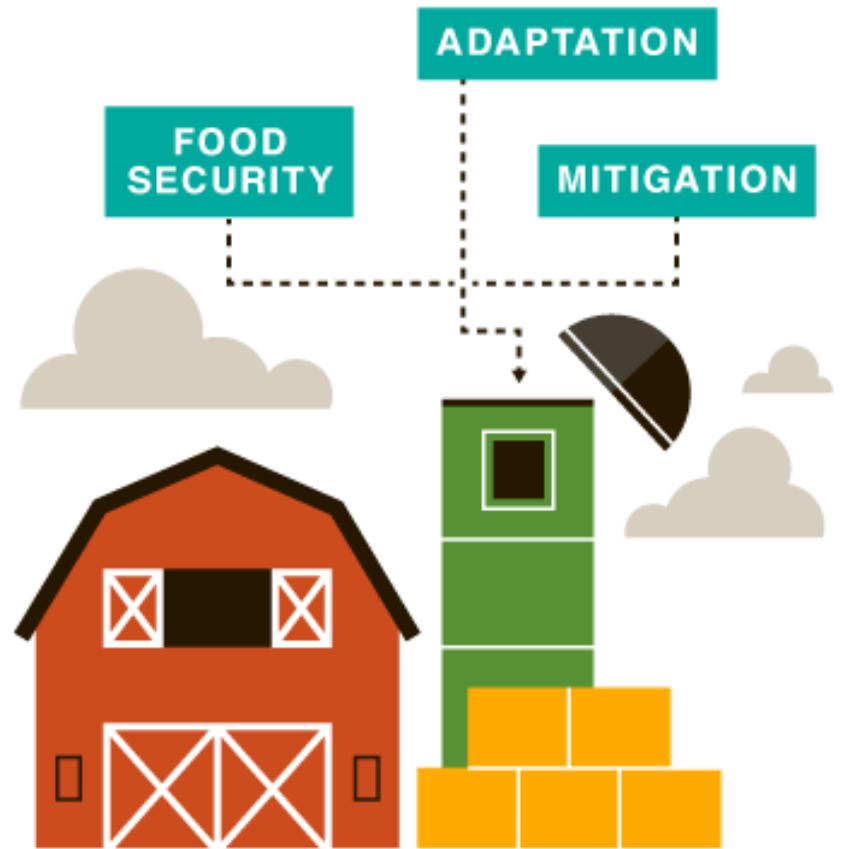
# Rising to the challenge of establishing a climate smart agriculture

Andy Jarvis, CCAFS

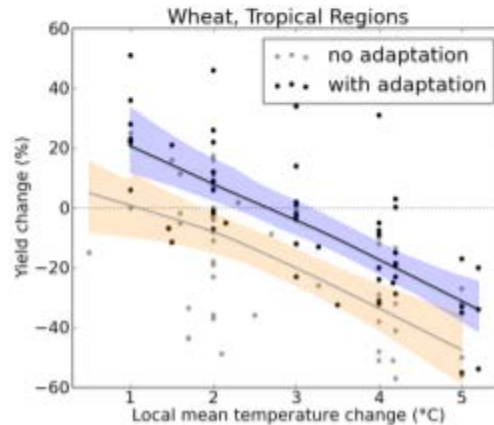
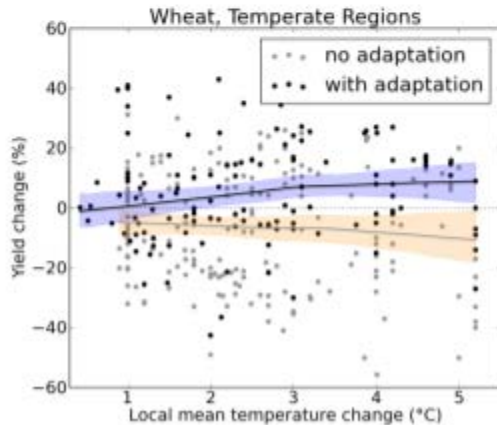
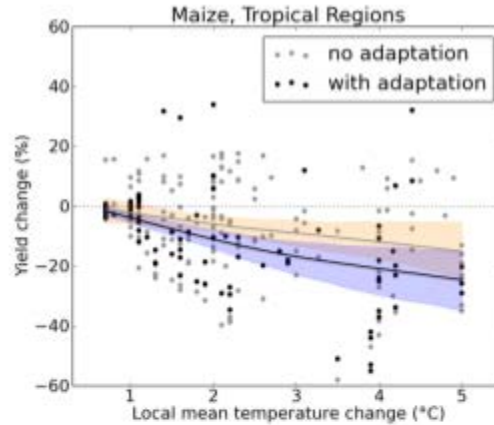
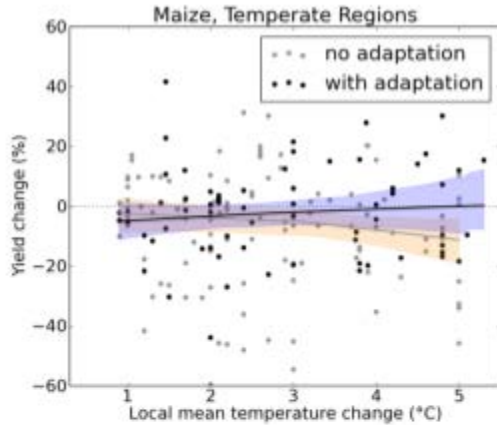


# What is Climate Smart Agriculture?

Climate-smart agriculture combines policies on:

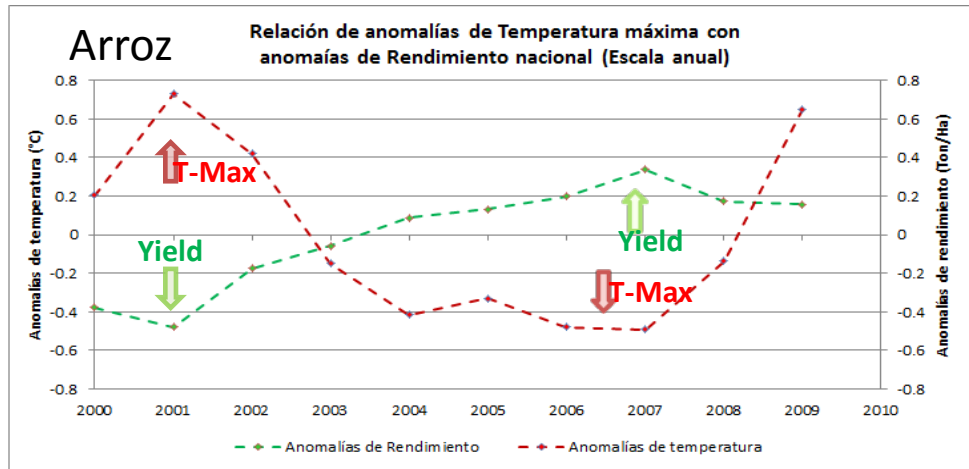
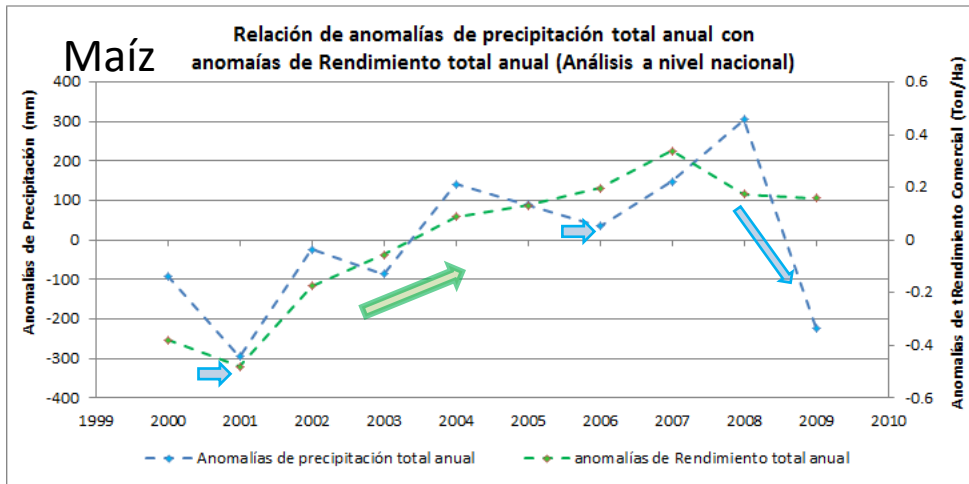


# Why is CSA important? - Adaptation



Global wheat  
and maize  
yields: response  
to warming

# Why is CSA important? – Food Security

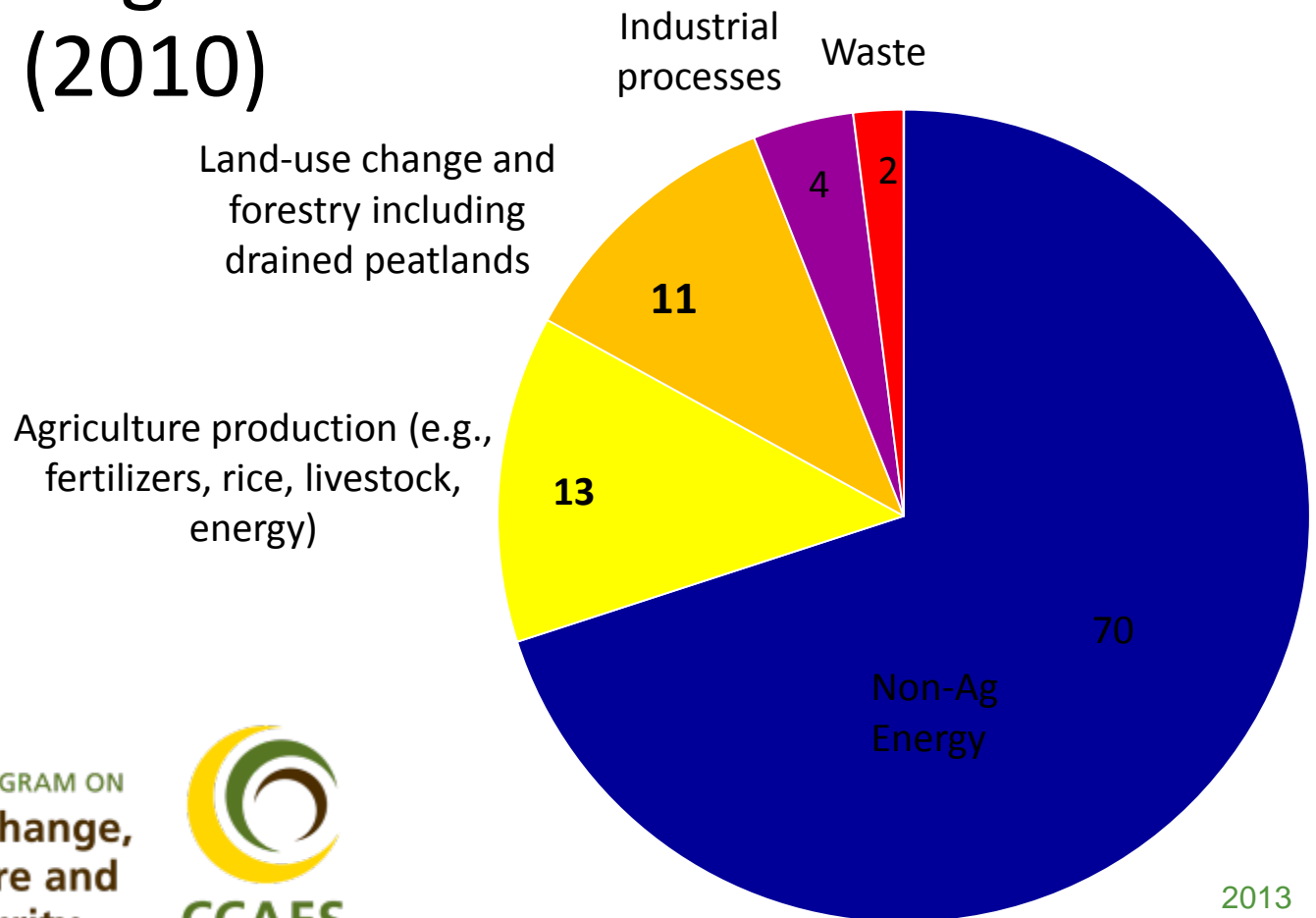


Climate drives yield variation: our systems are **sensitive** to climate, not *resilient* to it

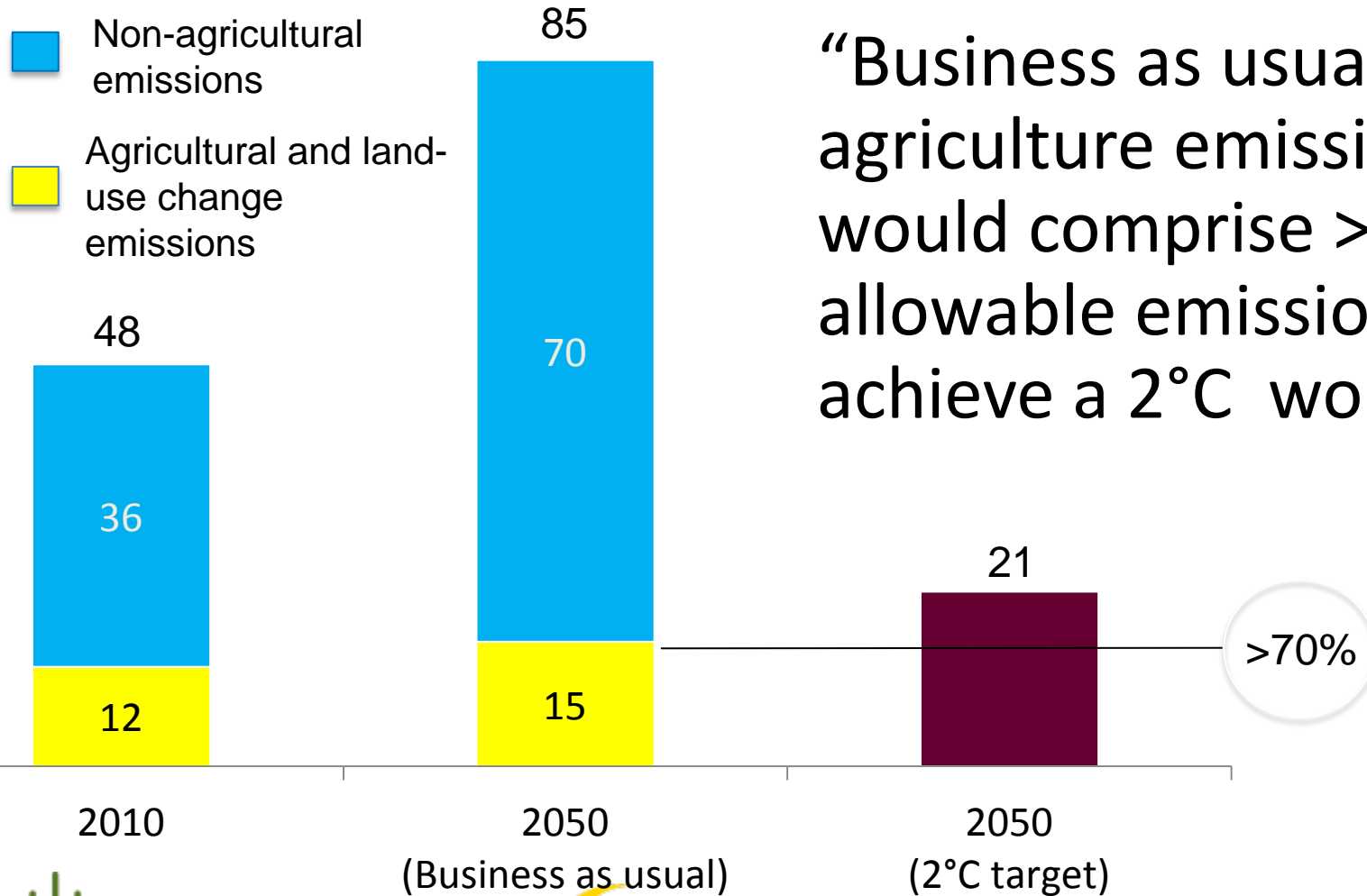
# Why is CSA important? - Mitigation

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

Percent, 100% = 50  
gigatonnes CO<sub>2</sub>e per  
year

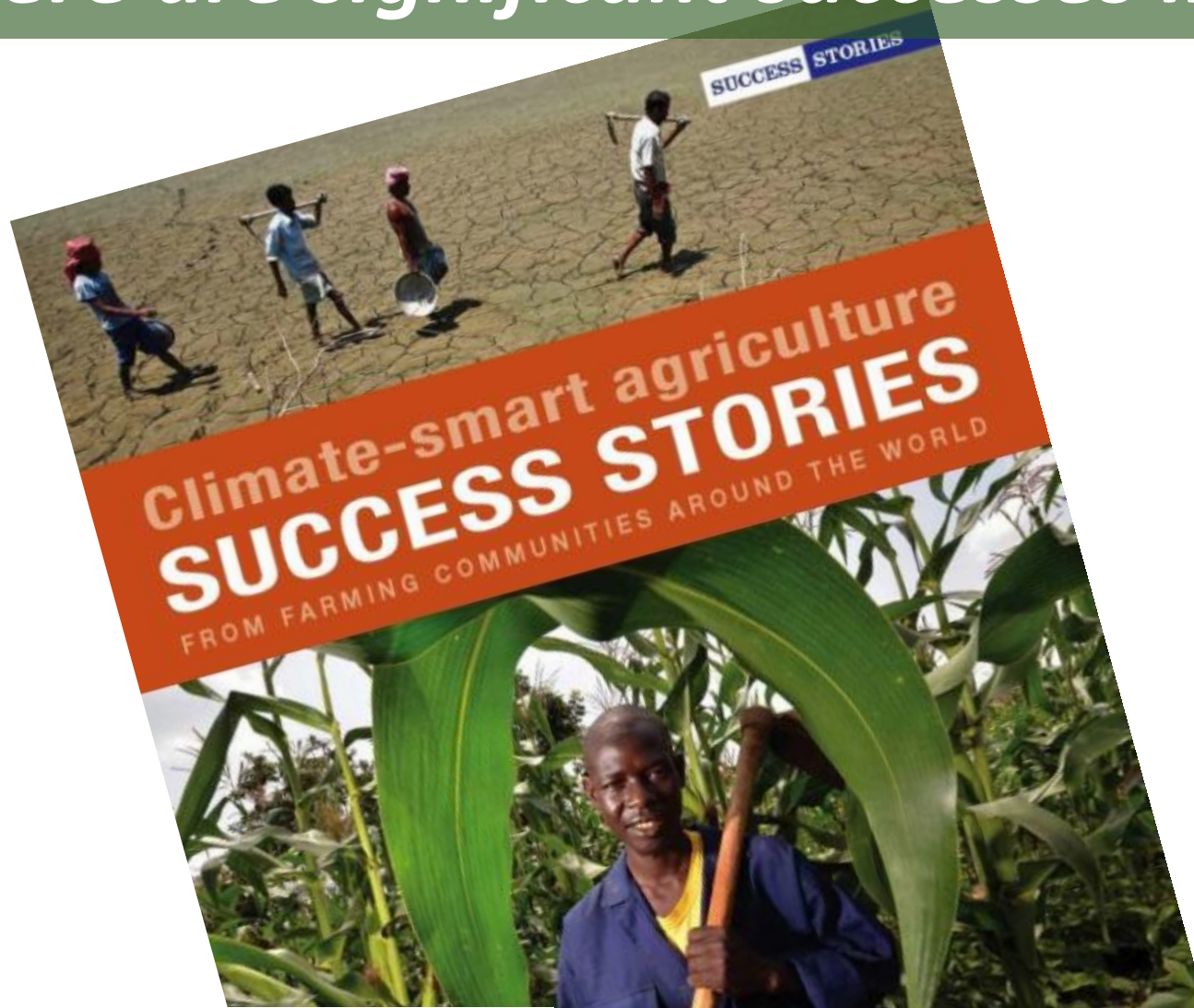


# Why is CSA important? - Mitigation



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

## 2. There are significant successes in CSA



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Food Security**



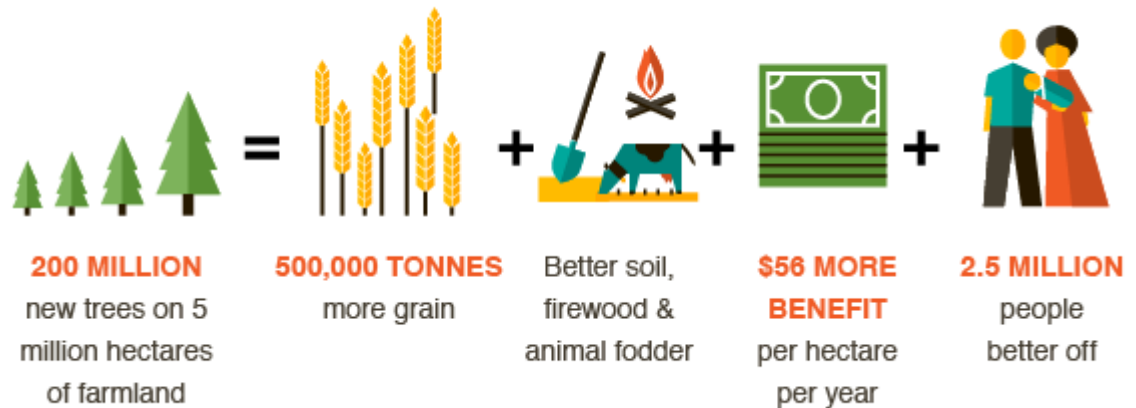


➤ **5 million ha of land restored, over 200 million trees re-established**

✓ **Additional half a million tonnes of grain per year**

**Reduces drought impacts**

✓ **Sequestration of carbon in soil and trees**







➤ **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**

- **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**

A satellite view of the Earth, showing the Americas, Europe, and Africa. The image is a circular crop of a larger satellite image, showing the curvature of the planet. The colors are vibrant, with deep blues for the oceans, greens and yellows for the continents, and white for the clouds. The text is overlaid on a semi-transparent dark blue rectangular background in the center of the image.

***2. But major  
scaling up  
is needed***



**1.4 billion** living in  
**Poverty**

**Nearly 1 billion**  
going **Hungry**

**1 billion** more  
**People** by 2030

**14% more**  
**Food needed** per  
decade

**1.5**  
**billion**  
people  
depend on  
**Degraded**  
**Land**

**USD 7.5 billion** lost to  
extreme **Weather** (2010)

# So, what are the targets?

**Target: Half a billion farmers practicing CSA**

**Target: Half a billion with enhanced adaptive capacity**

## Mitigation targets?

### **DC Targets (2035)**

- **22% reduction in agricultural emissions relative to the 'business as usual' baseline**
- **46% reduction in forestry and land use change, relative to a projection of current trends**

## Requires a comprehensive approach

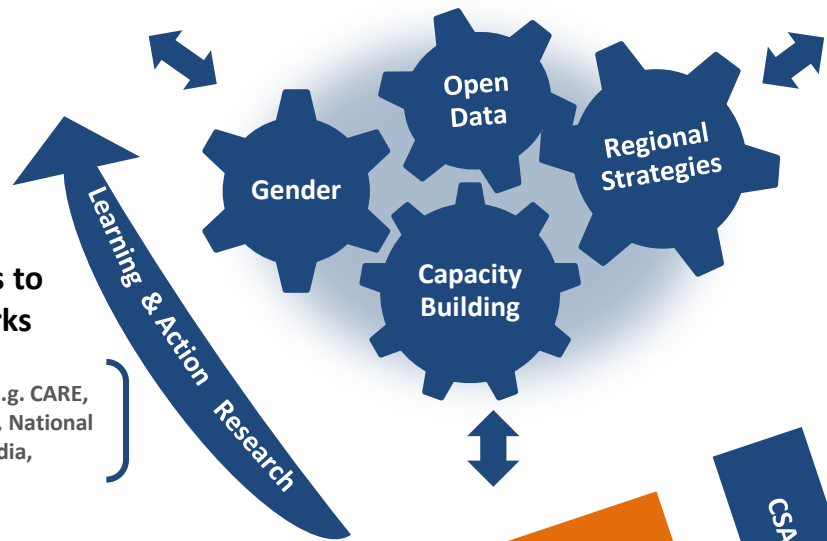
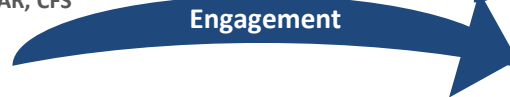
- Partnerships: research and development, science and policy, public and private
- Knowledge generation: practices/technologies, programmatic elements (insurance, climate information services)
- Work on CSA enablers: (sub-)National policies, UNFCCC global process, donor agendas
- Incentive mechanisms: innovative finance, private sector

## Working with partners to collect the evidence and to change opinions and worldviews

1. CSA Alliance, World Bank, IFAD, Climate Finance Orgs, Ministries
2. World Vision, National Meteorological Agencies, Disaster Risk Agencies, Insurance Agencies
3. IIASA, FAO, Global Research Alliance for Agricultural GHGs
4. Food security and climate adaptation agencies, GFAR, CFS



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## Working with partners to understand what works

- Multiple local partners (e.g. CARE, Vi Mediae, PROLINNOVA, National Insurance Company of India, NARES)



## Working with partners to make it happen

- 1&3: CSA Alliance, World Bank, IFAD, Green Climate Fund, PROLINNOVA, climate finance orgs, ministries
- 2: World Vision, National Meteorological Agencies, Disaster Risk Agencies, Insurance Agencies



- IDO1: Enhanced food security
- IDO2: Benefits to women and marginalised groups
- IDO3: Enhanced adaptive capacity to climate risks
- IDO5: Reduced GHGs and forest conversion



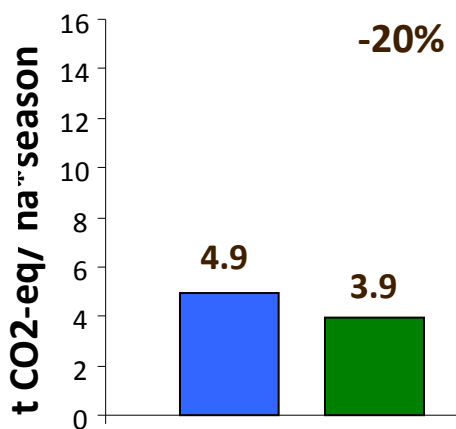
Key

# Alternate-Wetting-and-Drying (AWD)

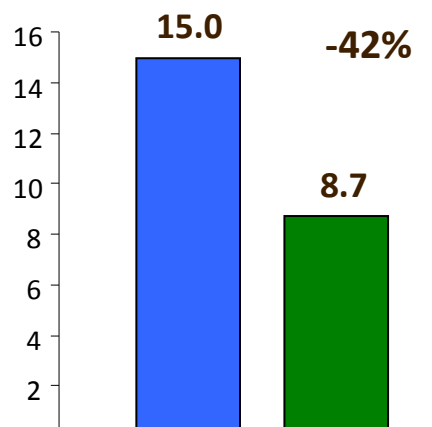


Summer-Autumn

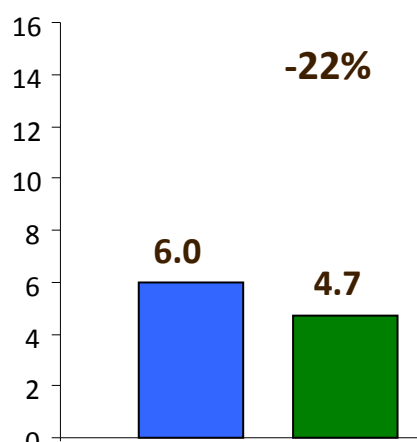
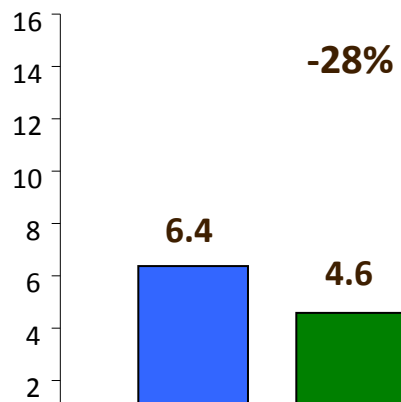
Hilly mid-slopes



Delta low-lying



Winter-Spring



- Keep flooded for 1<sup>st</sup> 15 days and at flowering
- Irrigate when water drops to 15 cm below the surface

30% water

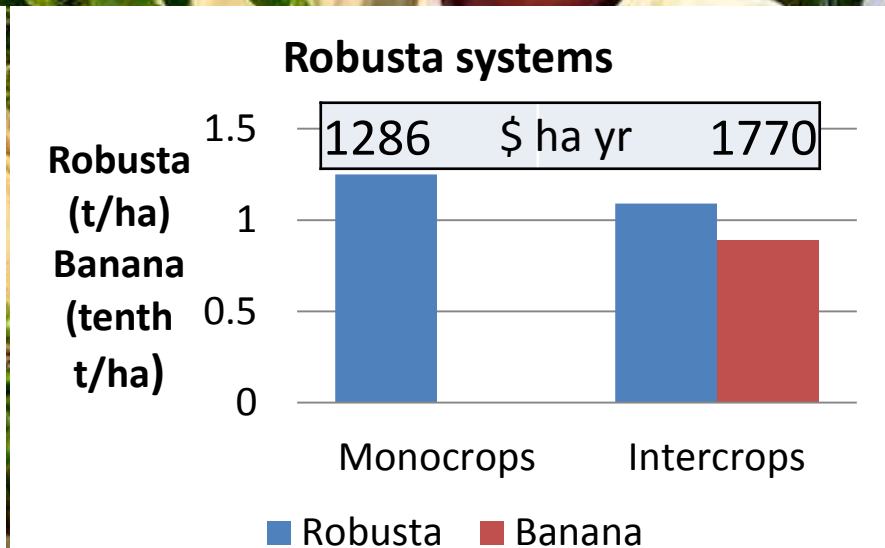
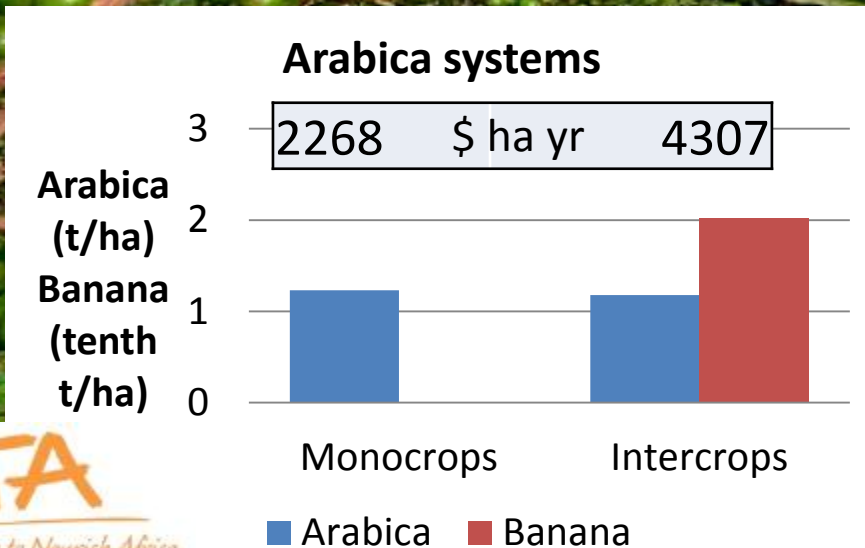
20-50% GHG

Without compromising yield

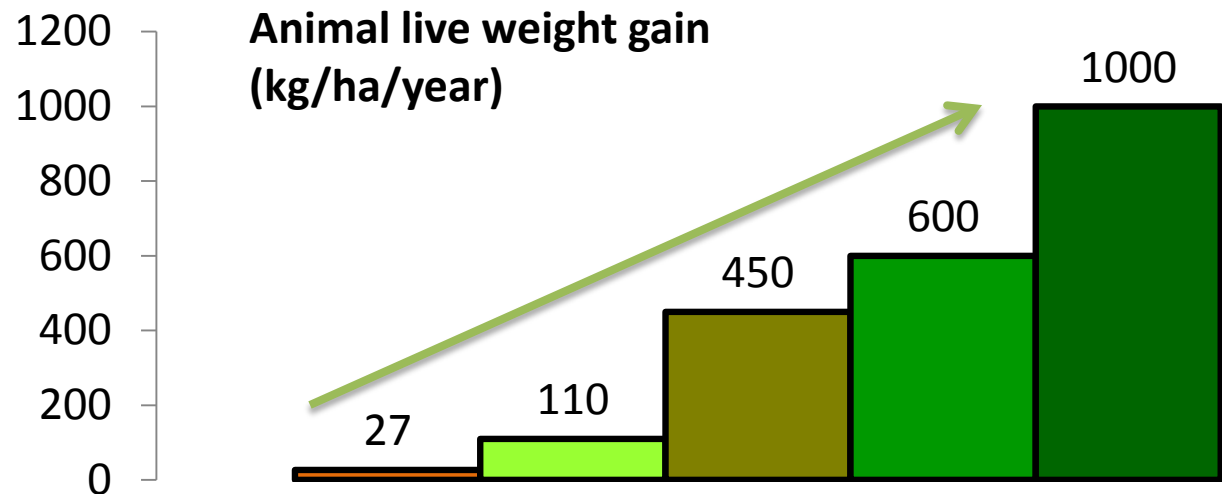


# Coffee-banana intercropping

Increased income  
Enhanced food security  
Diversification  
Decreases drought impacts  
More carbon in the system



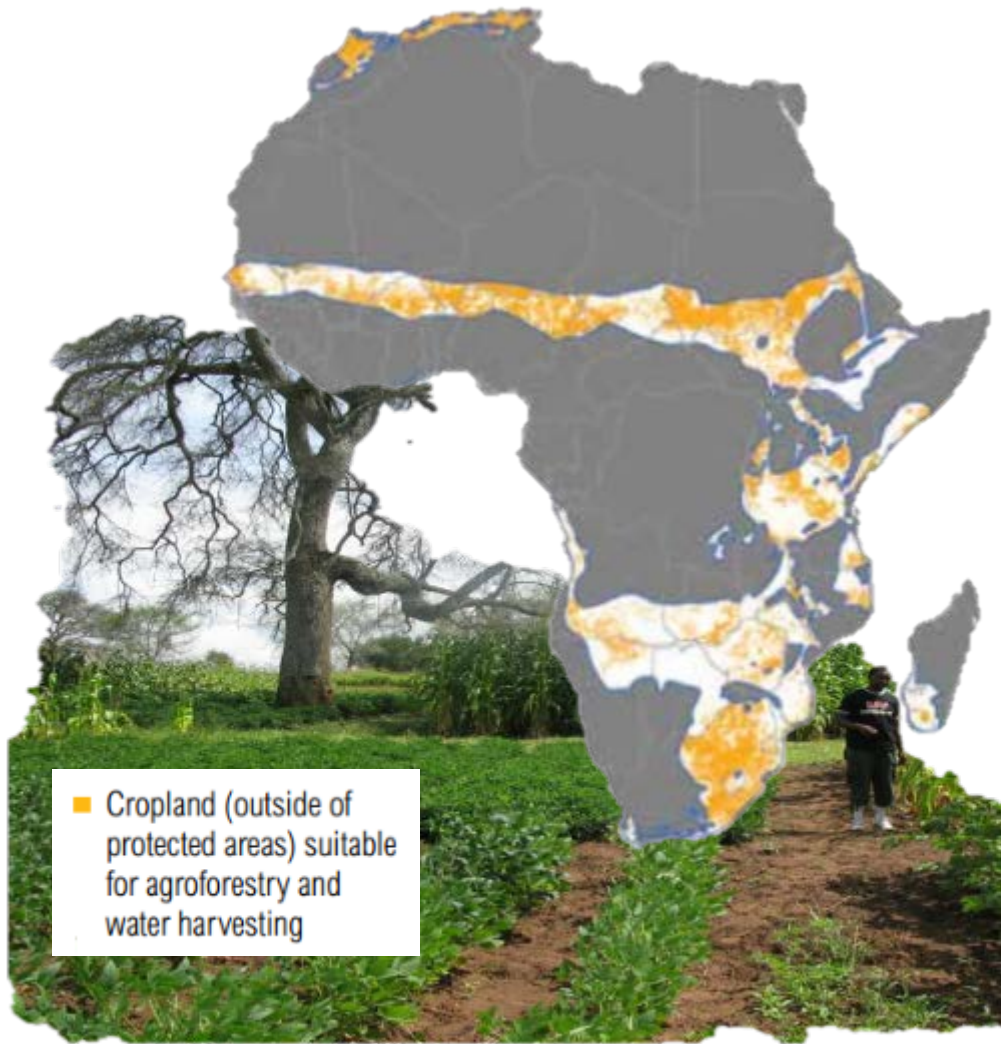
# Crop-livestock integration to increase animal live weight gain (kg/ha/year) in the acid soil savannas of Colombia



- Native savanna
- Degraded pasture
- Grass/legume pasture with fertilizer
- Improved pasture planted with maize
- Pasture after 3 years of maize-soybean rotation

***What if...***

***- we spread agroforestry across Africa?***



**Approximate area suitable for Agroforestry in Africa:**

***~ 300 Million Ha***

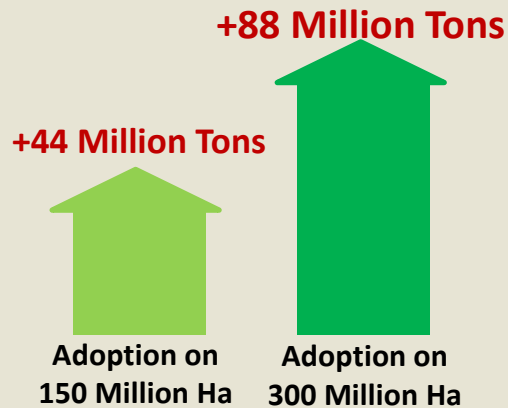
***140+ Million People below \$1.25 per day***

# What if...

## - we spread agroforestry across Africa?

### PRODUCTIVITY

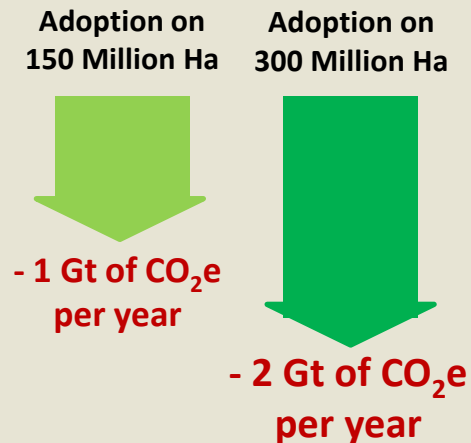
#### Food Production



- +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 CO<sub>2</sub>e 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

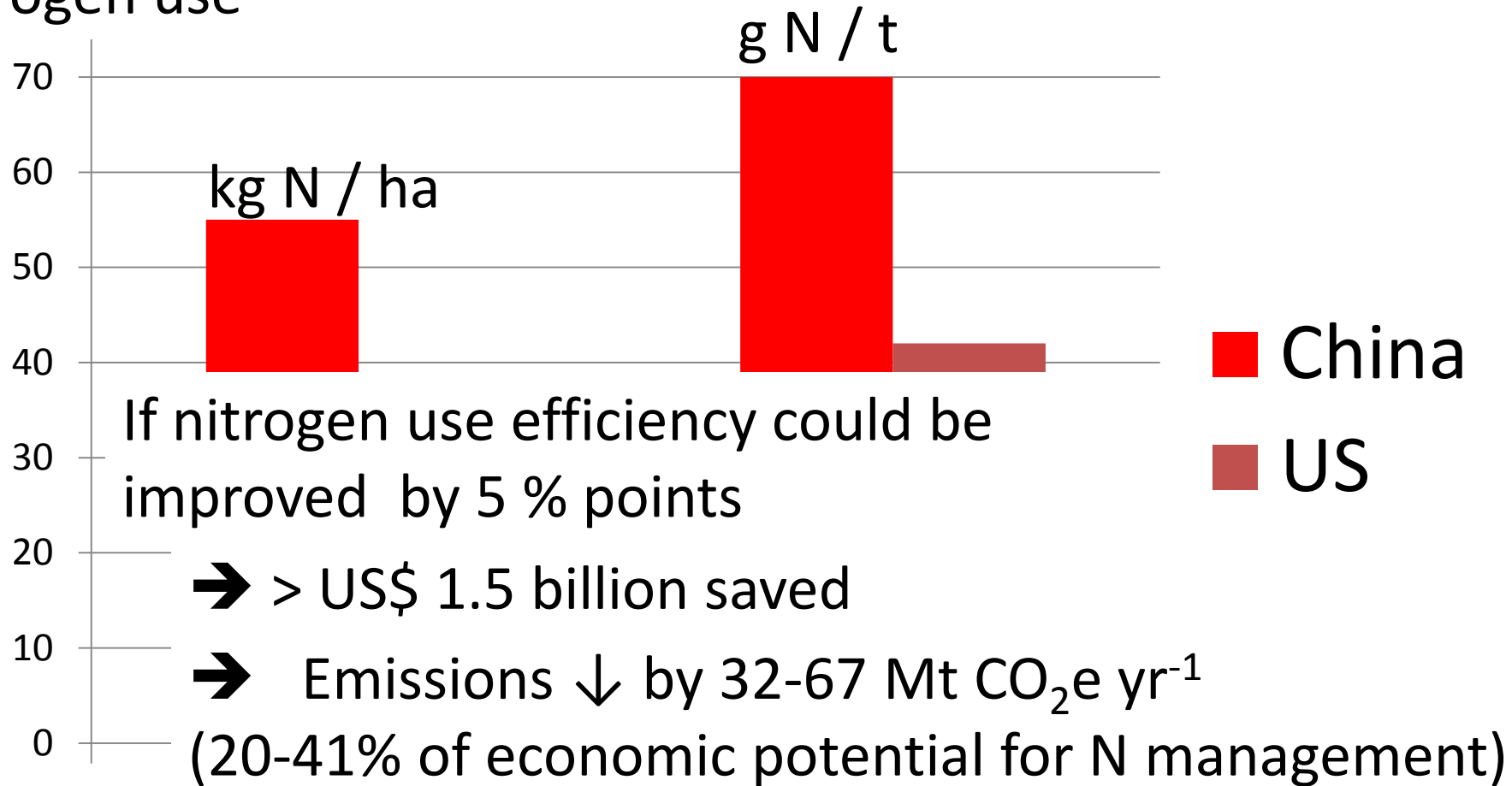
#### Multiple benefits include:

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

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

# Cereal production

Nitrogen use



# CSA Alliance

- Finance working group
- Policy working group
- Knowledge working group (FAO & CCAFS)
  
- UN SG Climate Summit in Sept
  - One element: CSA
  
- Separate, but related:
  - CSA Science Conference March 2015 France



World Vision



OXFAM



NEPAD

A PROGRAMME OF THE AFRICAN UNION



# Partnerships for Scaling Climate-smart Agriculture (P4S)



World Agroforestry Centre



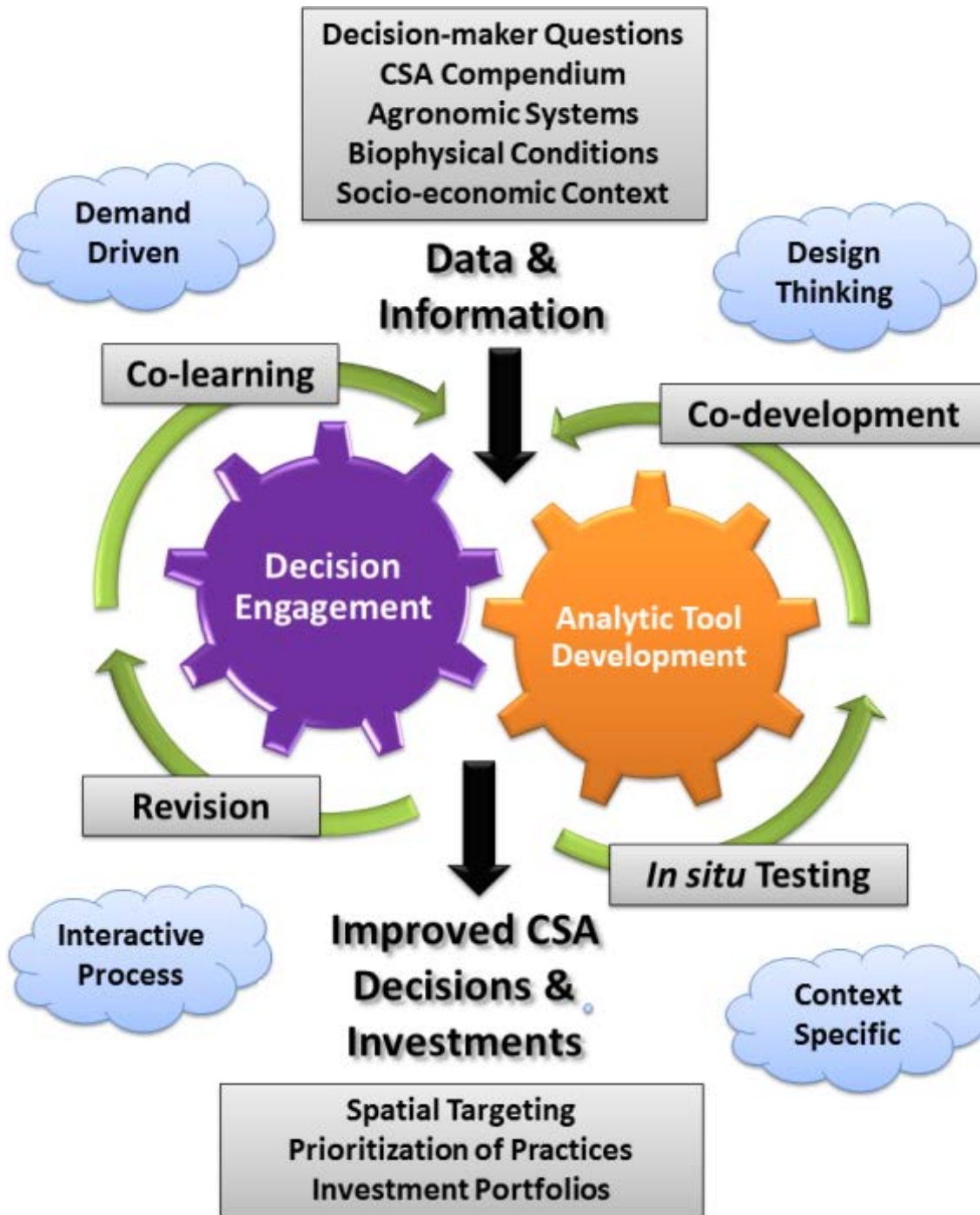
CLIMATE CHANGE AGRICULTURE AND FOOD SECURITY



CIAT

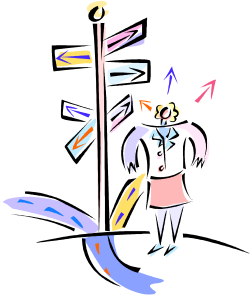
International Center for Tropical Agriculture  
Since 1967 / Science to cultivate change

# Research in Development



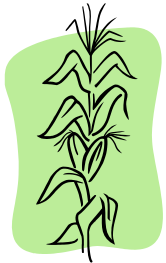


# CSA Compendium



Informs CSA prioritization tool

- Overcome barrier of lack of information about possible CSA options in a given context



Informs future research agendas

- Identify gaps in the literature based on CSA pillar, CSA practice, geographic region, etc.



Knowledge Hub for CSA researchers and practitioners

- Crowdsourcing to develop database, with reliability of data marked

# Scalable climate smart technologies...

The image displays a grid of 45 small thumbnail images, each representing a different agricultural technology or practice. The thumbnails are arranged in a 5x9 grid, with the bottom-right cell being empty. Each thumbnail shows a different aspect of modern agriculture, such as precision farming, irrigation systems, crop management techniques, and various types of farming equipment. The images are small and somewhat blurry, but they clearly show a variety of agricultural technologies and practices.

# Results

Silvopastoral Systems Wather harvest stru... Diseases Managem... Silage, haylage and ... Efficient Use of Ferti... Improved Forages

## Results for Silvopastoral System

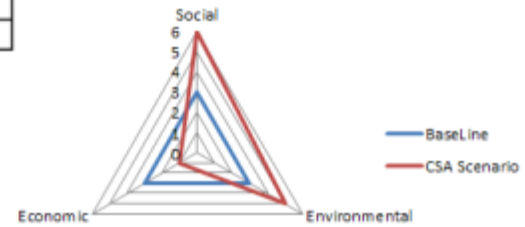
Silvopastoral Systems	Social	Environmental	Economic	
Food Security	PRO & EMP 2	EFF 2	FBP & HVP 1	5
	RES 2	ERS & LUC 1	FBP 0	
Adaptation				3
Mitigation		MIT 2		4
	6	5	3	

Quality		
General	Base Scenario	CSA Scenario
2.11	2.3	2
	★ ★ ★	

Total Score  
**10**  
CBA = 1.5

### Dimensions



### CSA Pillars



Barrier	Able to be Overcome
Low economic investment capacity for establishing silvopastoral systems	✓
Insufficient degree of diffusion and adoption	✓
Narrow germplasm base for perennial breeding	✓
Long waiting period for the establishment of trees	✗
Uncertainty about the applicability of research results to local contexts	✓
	80%

Continue

## Partners



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THE WORLD BANK

## Ranked List of Practices

	Practice	CBA	Quality
1	Silvopastoral Systems	1.5	2.11
2	Efficient Use of Fertilizer	1.4	2.87
3	Improved Forages	1.3	2.85
4	Biogas	1.2	2.36
5	Grass-Legume Association	1.2	2.11
6	Water harvest structure	1.2	2.08
7	Silage, haylage and nutritional blocks	1	2.01
9	Early warning systems	1	1.89

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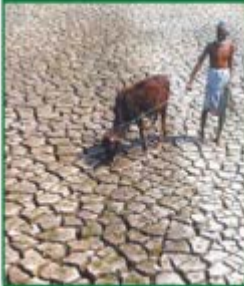
THE WORLD BANK

# Climate smart villages: Key agricultural activities for managing risks

## CLIMATE SMART VILLAGE / FARM

### Weather smart

- Seasonal weather forecasts
- ICT based agro-advisories
- Index based insurance
- Climate analogues



### Water smart

- Aquifer recharge
- Rainwater harvesting
- Community management of water
- Laser leveling
- On-farm water management



### Carbon smart

- Agroforestry
- Conservation tillage
- Land use systems
- Livestock management



### Nitrogen smart

- Site specific nutrient management
- Precision fertilizers
- Catch cropping / legumes



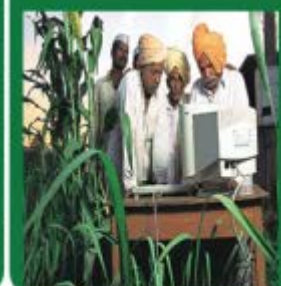
### Energy smart

- Biofuels
- Fuel efficient engines
- Residue management
- Minimum tillage



### Knowledge smart

- Farmer-farmer learning
- Farmer networks on adaptation technologies
- Seed and fodder banks
- Market info
- Off-farm risk management-kitchen garden



# Clima y Sector Agropecuario Colombiano

Adaptación para la Sostenibilidad Productiva



MinAgricultura  
Ministerio de Agricultura  
y Desarrollo Rural

100  
AÑOS

PROSPERIDAD  
PARA TODOS



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Strong national engagement

# Clima y Sector Agropecuario Colombiano

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100 AÑOS

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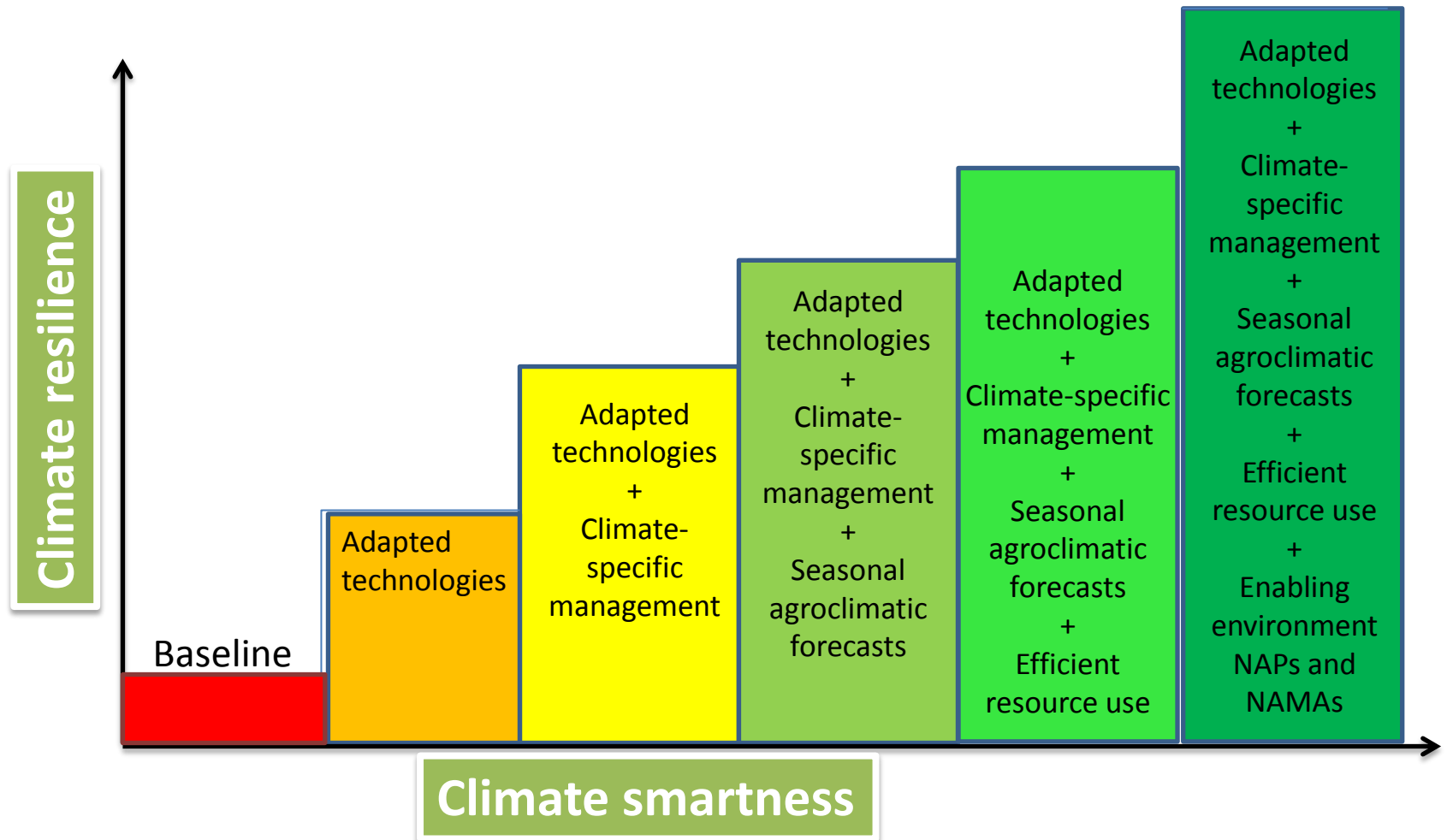


PROSPERIDAD  
PARA TODOS



CIAT

## Pulling the pieces together







# Kenya's First TV Makeover Show Returns **SHAMBA SHAPE-UP!**

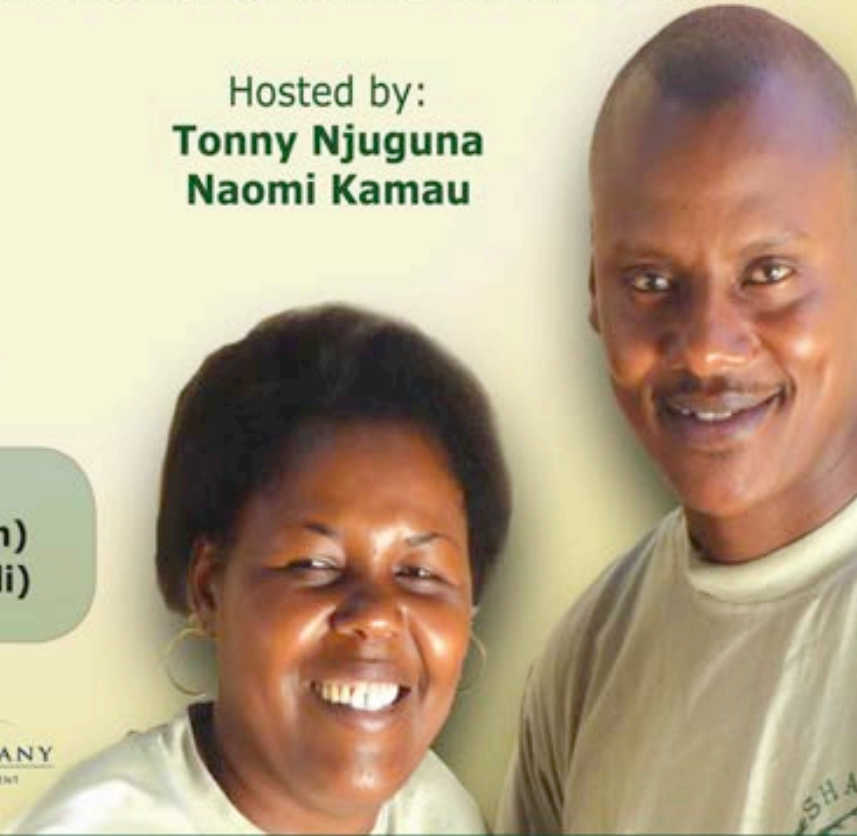
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Series 2

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**Tonny Njuguna**  
**Naomi Kamau**

Starting on:  
**16th & 17th March**

Time:  
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