Vulnerability of agricultural sector to climate change & variability in West Africa

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ICRISAT Science with a human face

Outline

1. The global and African challenges
2. Looking for solutions
3. Conclusions

Commission on Sustainable Agriculture and Climate Change

- "Business as usual in our globally interconnected food system will not bring us food security and environmental sustainability"
- "The window of opportunity to avert a humanitarian, environmental and climate crisis is rapidly closing"

Beddington et al. (2012) Science 335: 289-290 *www.ccafs.cgiar.org/commission*

Challenge 1: Food security


A billion people go hungry
Another billion suffer nutrient deficiencies
Another billion over-consume
In 15 years time there will be another billion people to feed

With current trajectories of populations & diets

100% (+/- 11%) more food by 2050

This has major implications for land cover change

Tilman et al 2011
Proc. National Academy Science

Challenge 2: Adaptation to CC

Signs of Hope: Rehabilitation, Prevention

IPCC PROJECTIONS FOR AFRICA

- CO_2 enrichment
- Temperature increase of 1.5 to 4 ^{0}C in this century
- Fewer colder days and nights
- Frequent hot days and nights
- **Arid areas will become drier, humid areas wetter**
- **Increase in droughts and floods**
- **Sea level rise**
- High levels of desertification and soil salinization in some countries

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Length of growing season is likely to decline..

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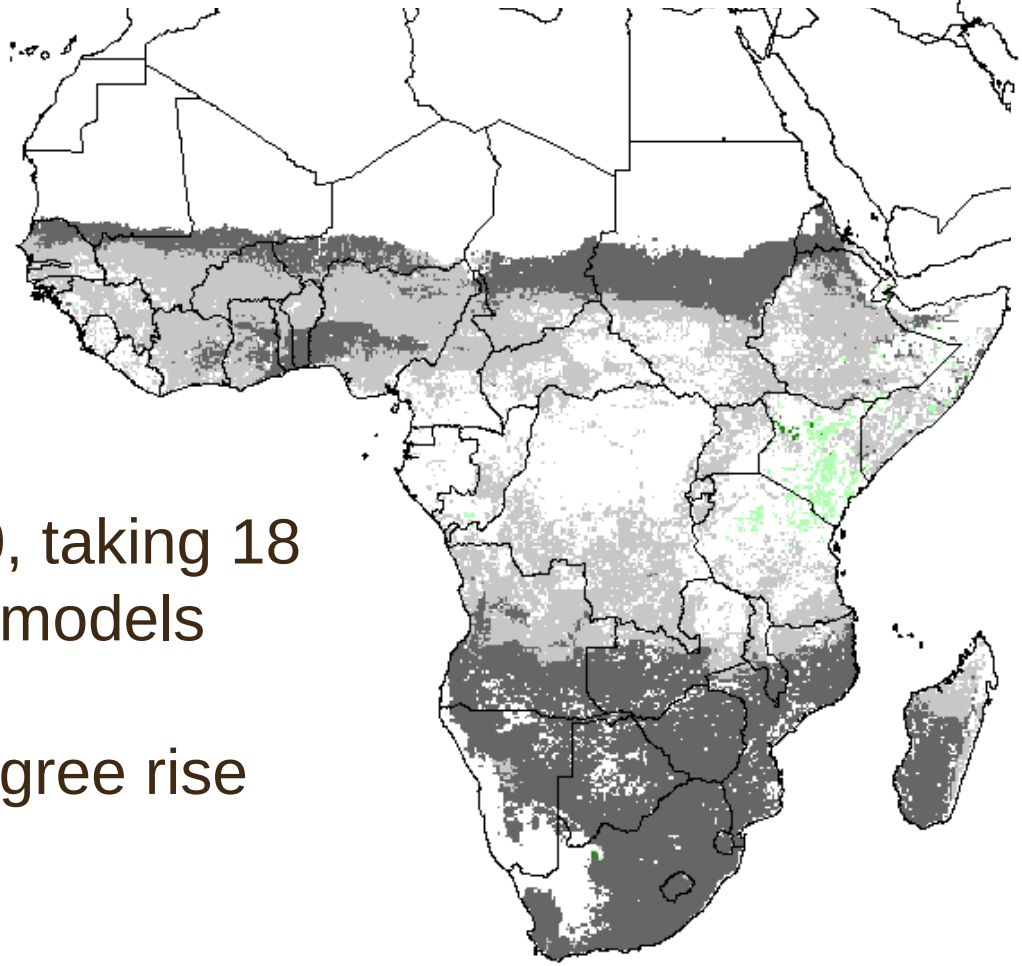


To 2090, taking 18 climate models

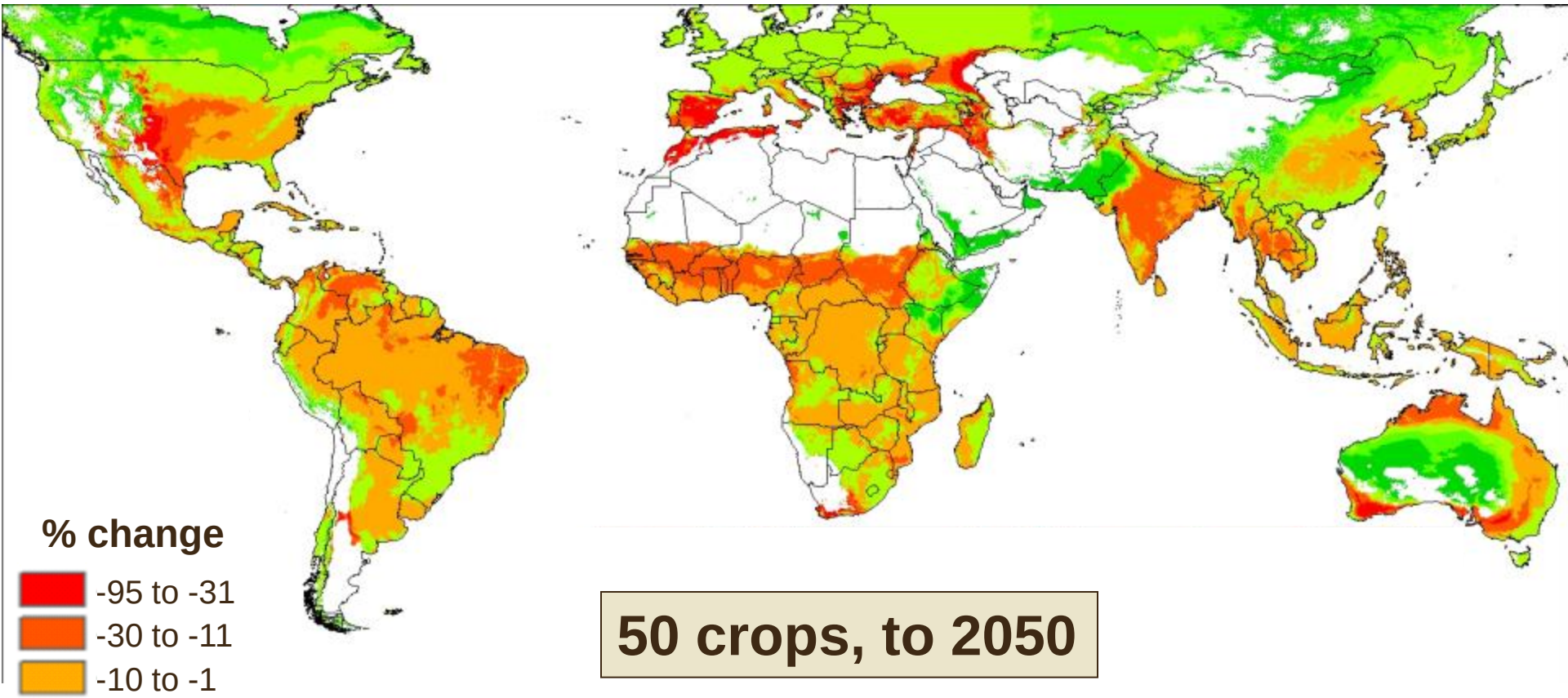
Four degree rise

Length of growing period (%)

- >20% loss
- 5-20% loss
- No change
- 5-20% gain
- >20% gain

Thornton et al. (2010) Proc. National Academy Science

Crop suitability will fall in many areas



50 crops, to 2050

Andrew Jarvis, CIAT/CCAFS

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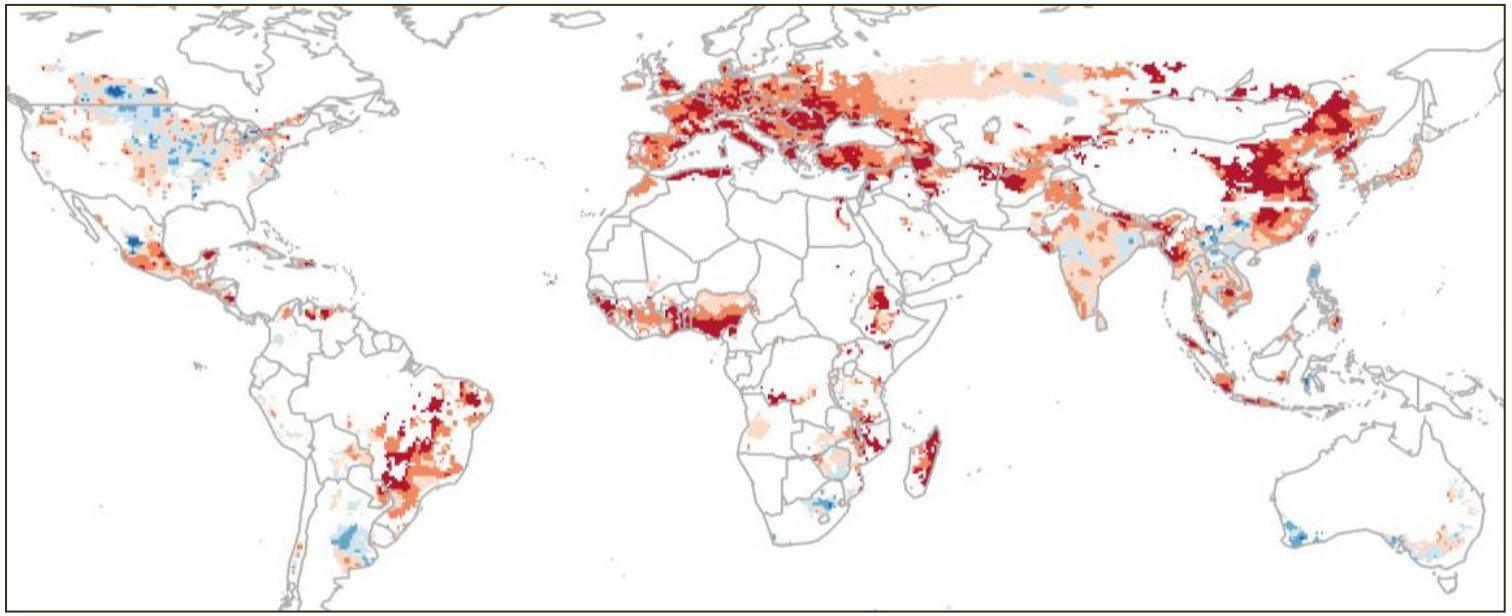
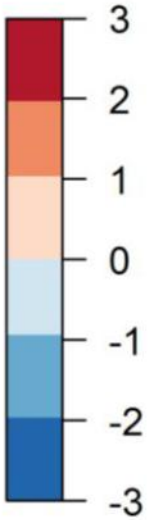
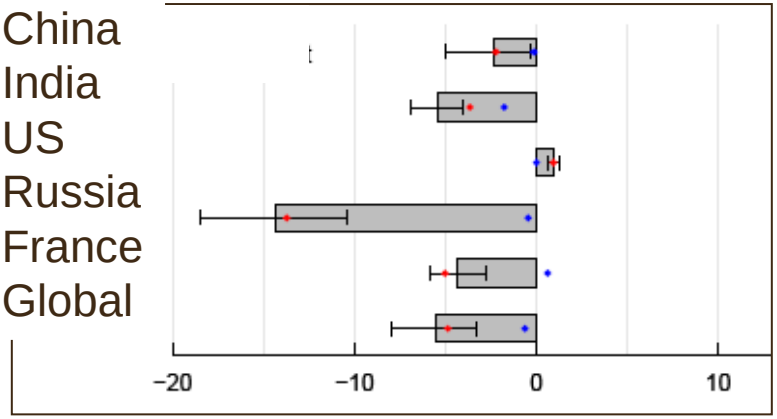
Historical impacts on wheat (1980-2008)

Changes in growing season temperature





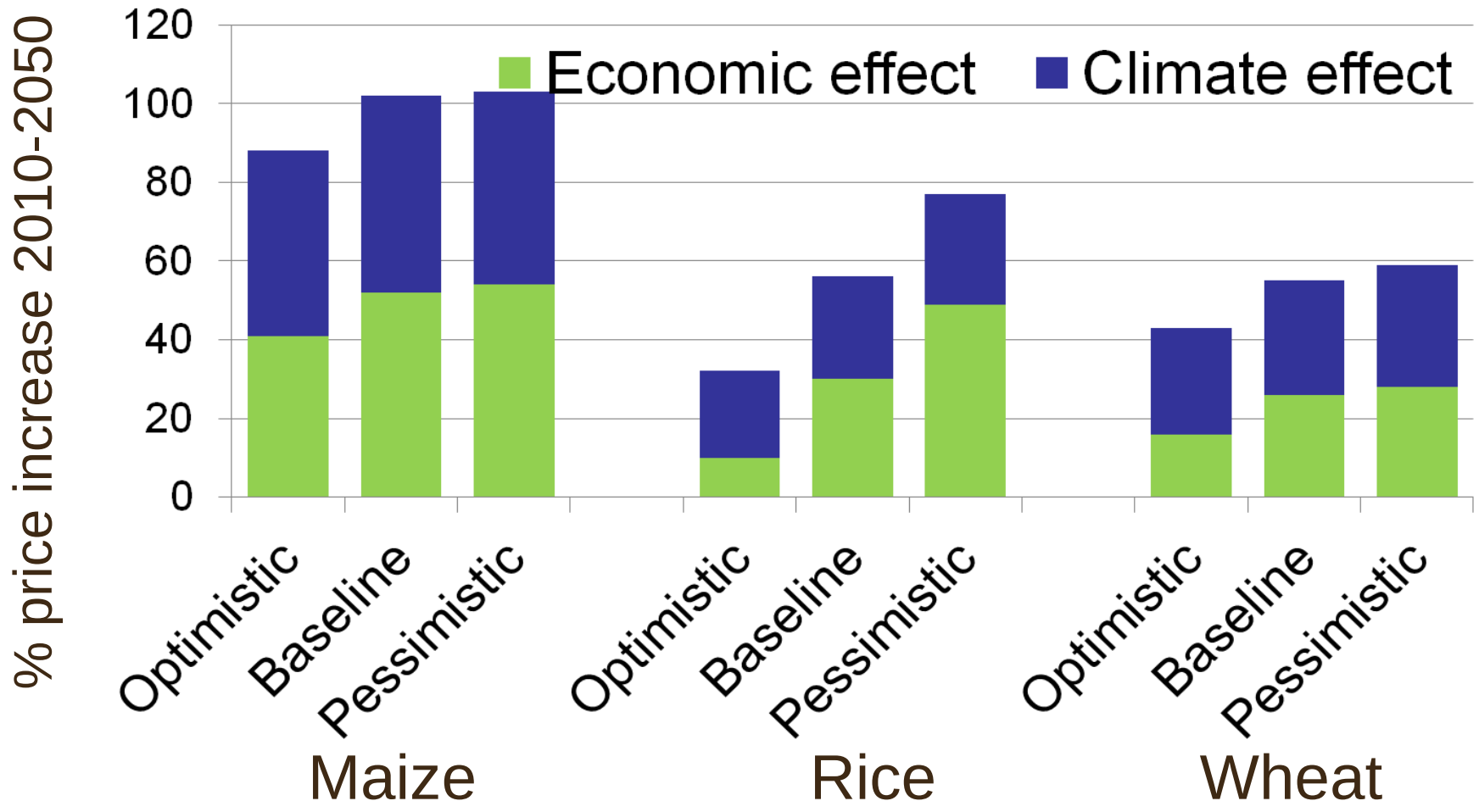
% Yield impact for wheat



Lobell et al (2011)

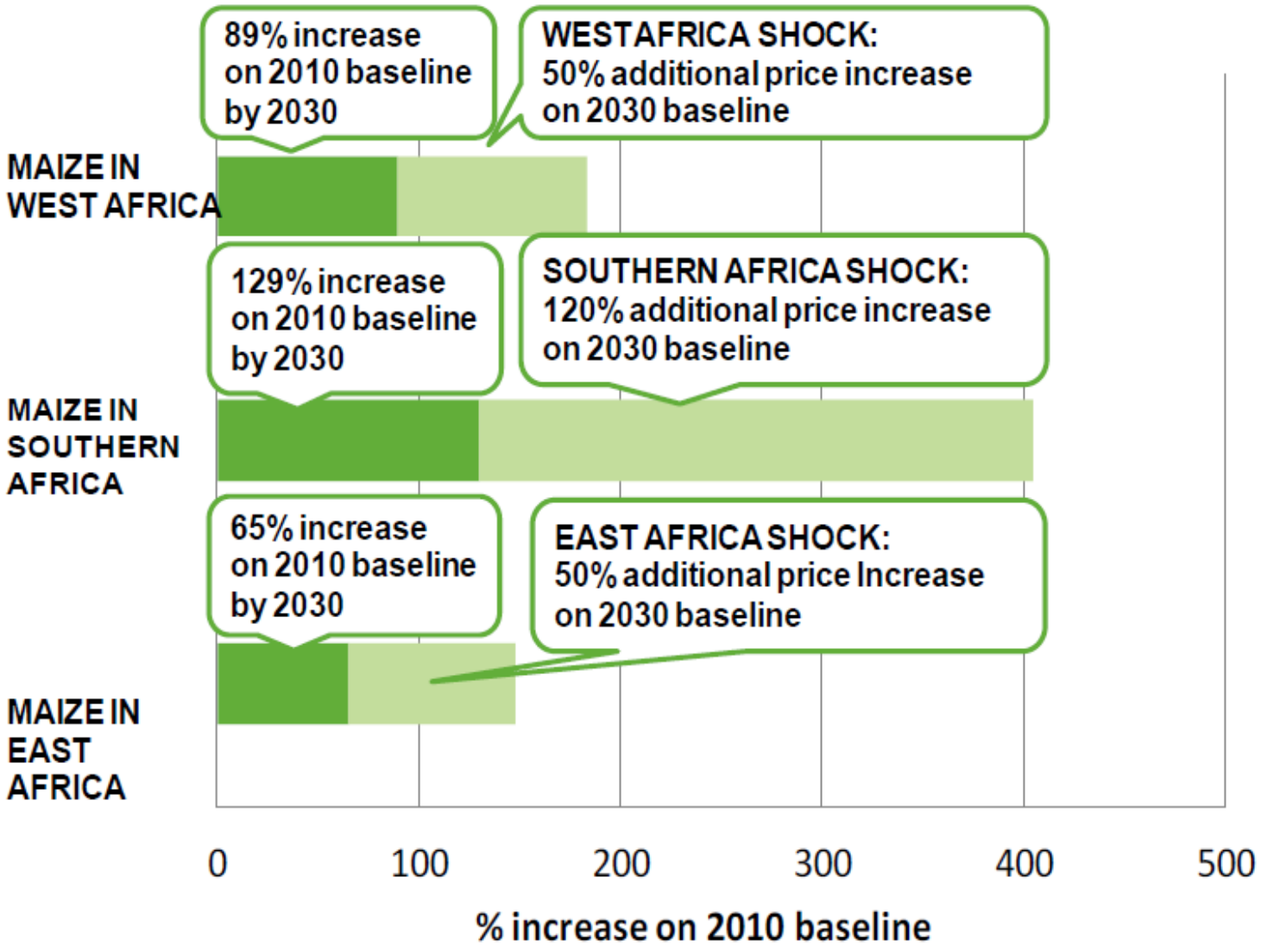
- **Greater frequency of extreme events**
- **More severe extreme events**

Climate change will add greatly to price increases…



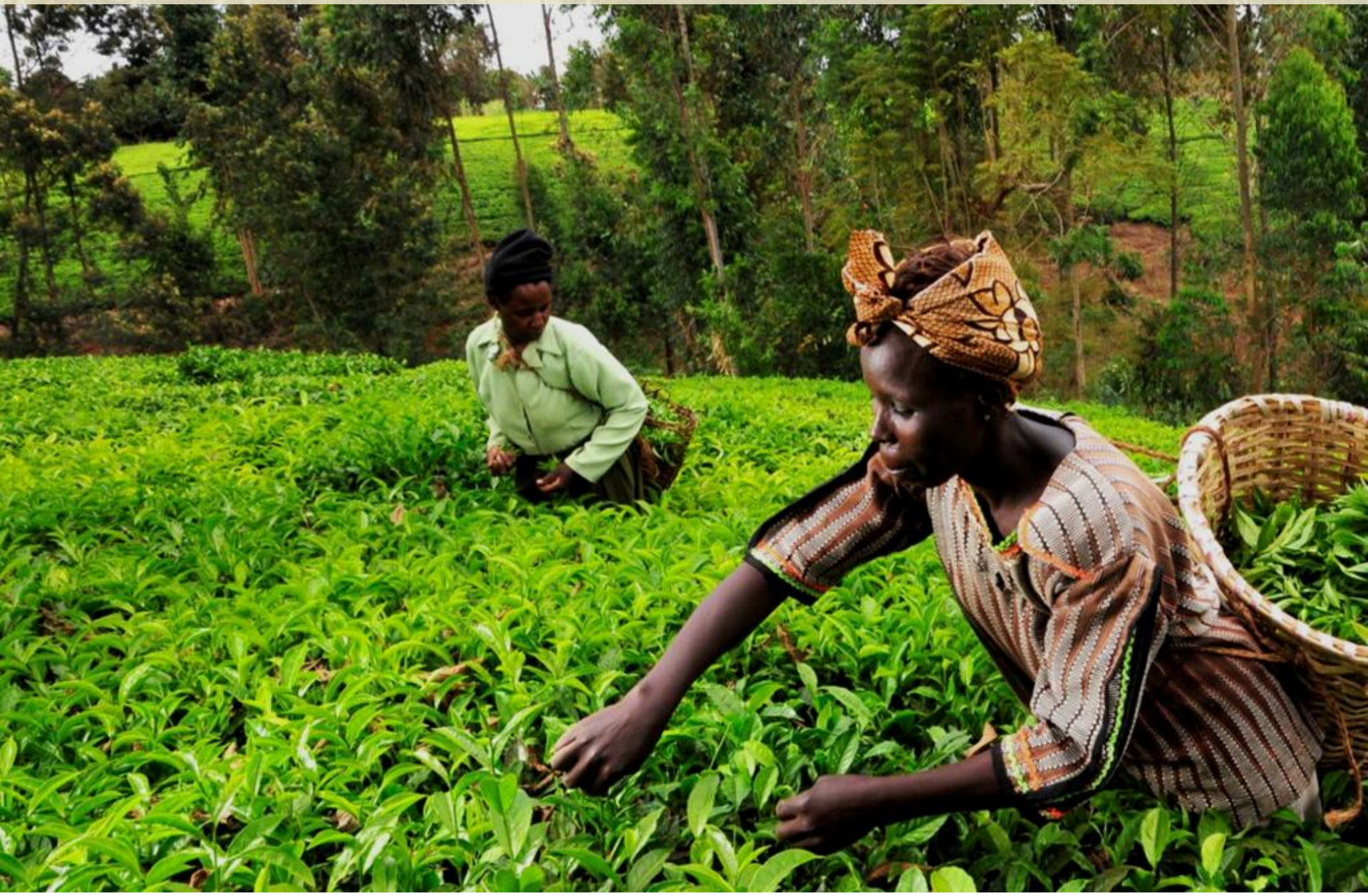
Nelson et al., 2010 IFPRI

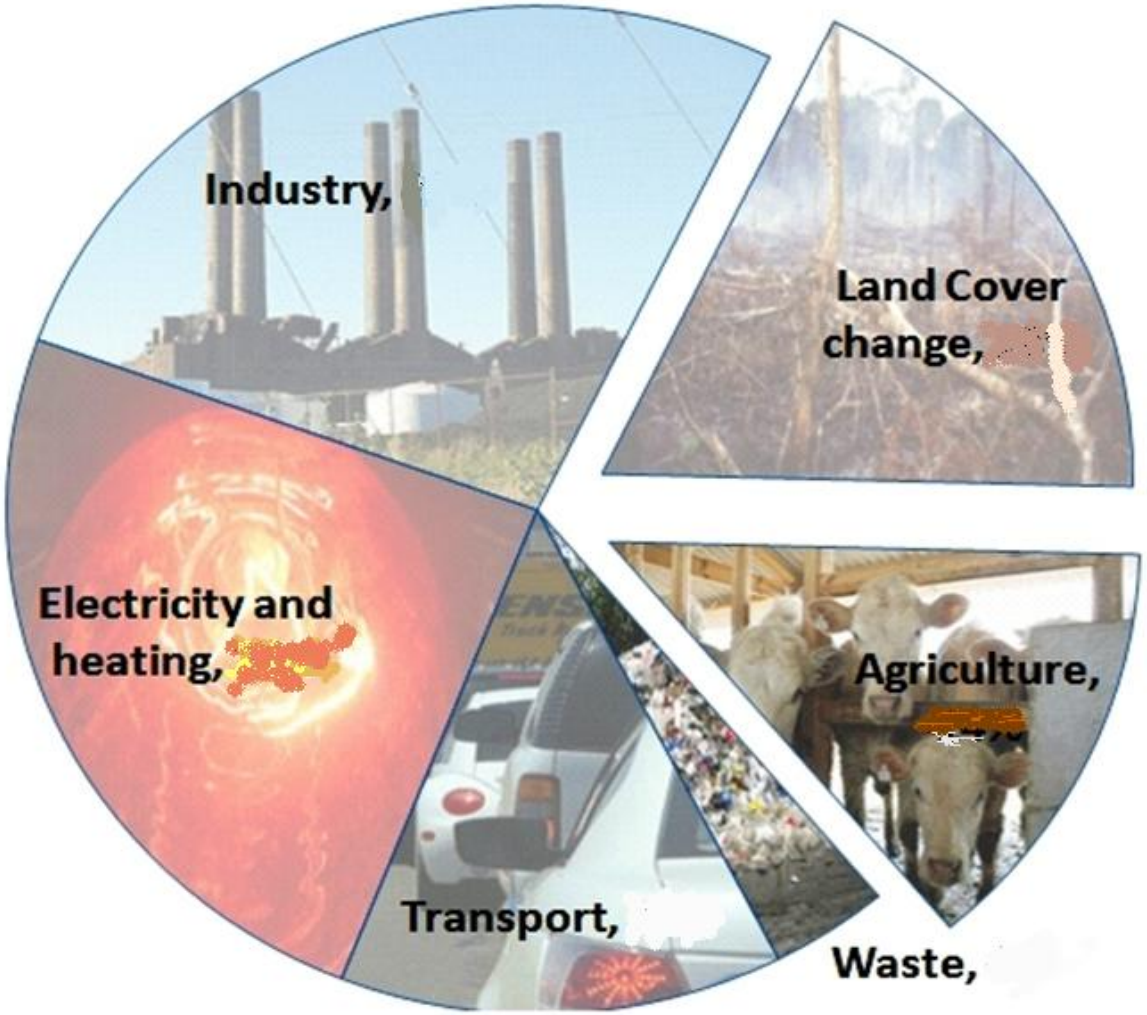
Impact of weather shocks



Oxfam (2012) based on D. Willenbockel (2012)

Environmental challenge



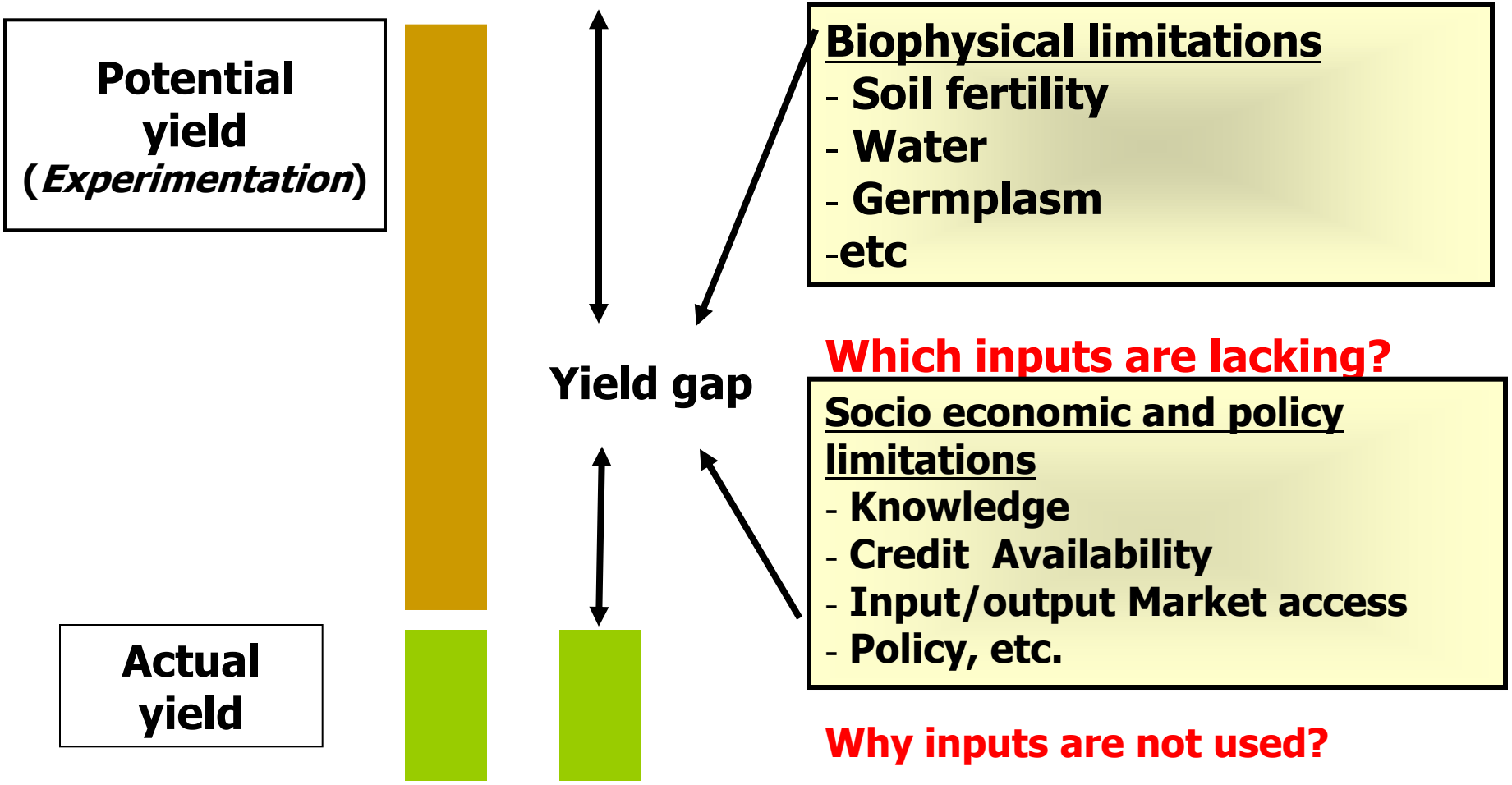


19-29% global GHGs from food systems

Vermeulen et al. 2012
Annual Review of Environment and Resources (in press)

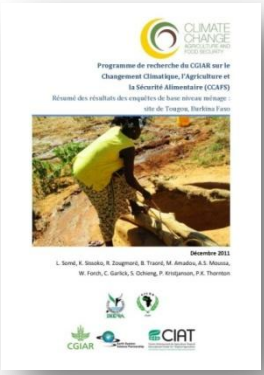

2) Looking for solutions

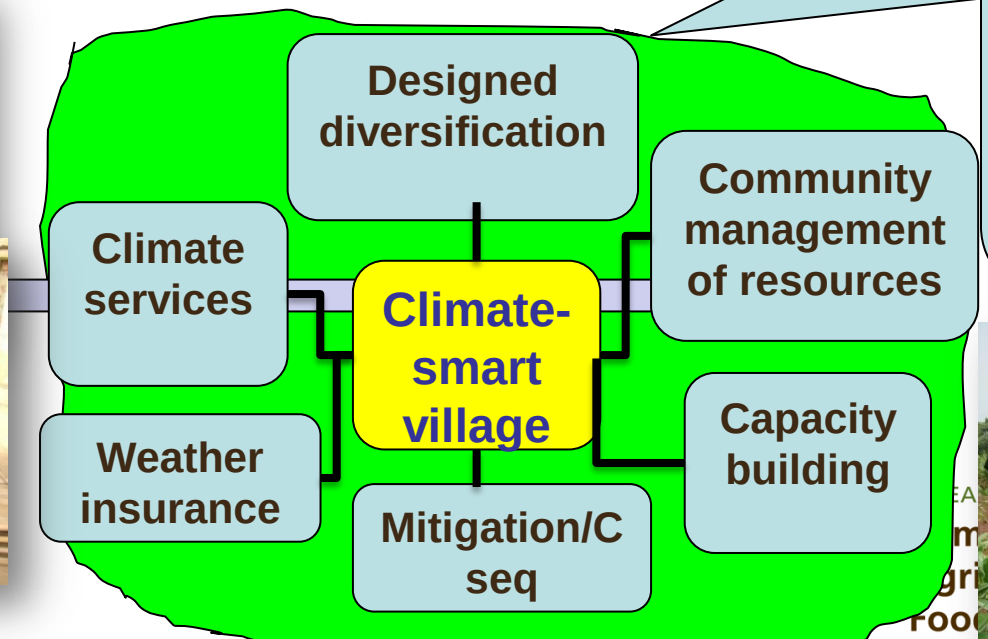
The yield gap and its' limitations



1. Making the research user-driven

- **Regional Learning Platform launched in 2012**
- **4 National stakeholder workshops:** Setting policy and research priorities
- **Baseline studies** (HH, VBS, OBS)
- **M&E planning for PAR work across 5 sites** (climate smart villages)





Partnership
- NARS
- Extension
- NGOs
- Universities
- Development
- Private sector
- CBOs
- Local leaders

2. Focus on achieving outcomes

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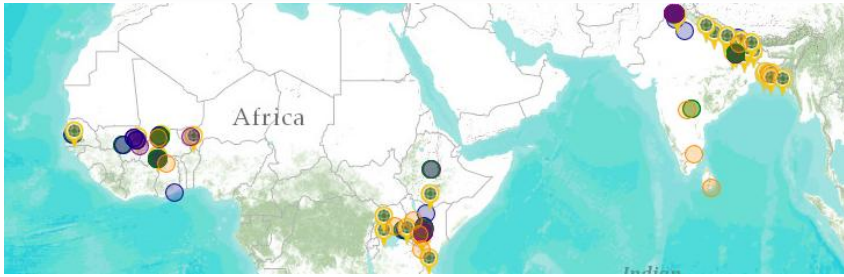
Illustrative 3-yr outcome targets

1. *CCAFS (and partner) science used by key stakeholders to ensure that* ***agriculture is appropriately incorporated into the international climate agreements***
2. *CCAFS (and partner)-produced* ***tools and approaches used by the UNFCCC in the guidelines for national adaptation planning*** *and* ***used in adaptation planning in at least 10 countries***
3. *CCAFS (and partner) science used by* ***at least 6 major global agencies to provide incentives for women and men to do pro-poor mitigation***

3. Focusing on women farmers

- Climate-related shocks have had much greater negative impacts on women than men
- Women have less access to climate information than men
- Women crucial for food security – when have more power, access and earnings, then more income allocated to food, child nutrition and education

4. Visioning the future, together: regional socio-economic scenarios for West Africa



What?

- Developing socio-economic **scenarios** for West Africa for food security, environments and livelihoods
- Scenarios: multiple **plausible** future conditions used to **test** policy planning and research (narratives, conceptual models, images, videos or graphs, maps, interactive models)
- CCAFS West Africa combines socio-economic scenarios created by **key regional actors** with economic **modelling** and with **climate** scenarios

Why?

- To explore key socio-economic **uncertainties** for future food security, environments and livelihoods in the region
- To support **collaborative decision-making** among regional actors in different sectors

Regional socio-economic scenarios for West Africa

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What has been done?

- **Four scenarios** have been created with actors from governments, private sector, civil society, academia and media including support from regional bodies ECOWAS and CORAF

- Scenarios explore food security, environmental change and livelihoods under different contexts of state, private sector and civil society **power** and policy **priorities**

		Policy driver	
		Short-term priorities	**Long-term priorities**
Dominant Force	**State Actors**	Governments facilitate short-term gain: cash, carbon and calories	A slow and painful transition to sustainable states
	Non-state Actors	Ungoverned, quick and chaotic development; dealing with crises at the expense of investment	A struggle between civil society and the private sector that is ultimately productive

- Scenarios inform global agricultural **economic models** (IMPACT, GLOBIOM) linked to climate models

Regional socio-economic scenarios for West Africa

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What will be done?

- **Policy workshops** with national and regional policy makers and other sectors that use the scenarios to test current policies and develop new collaborative plans

- Continual engagement to help sectors develop **partnership links** and to **embed** foresight in the region (e.g. training young professionals); **national** -and **local**-level strategic planning through the scenarios

- Wide **media engagement** to alert wider public to future challenges and uncertainties and to new collaborative actions of process partners

Based on East Africa experience where decision-makers found the process "*useful and enriching*" and key for "*identifying challenges and designing strategies to address these challenges*"

Farm of the Future Approach

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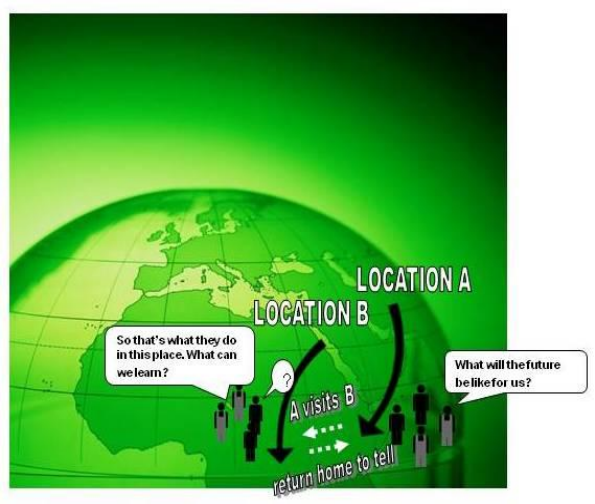
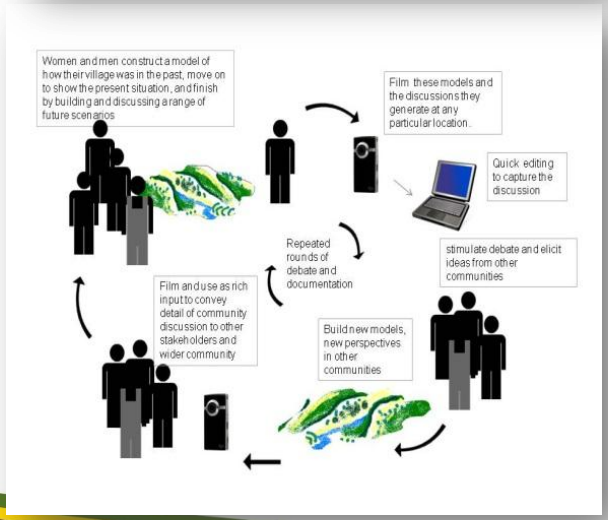
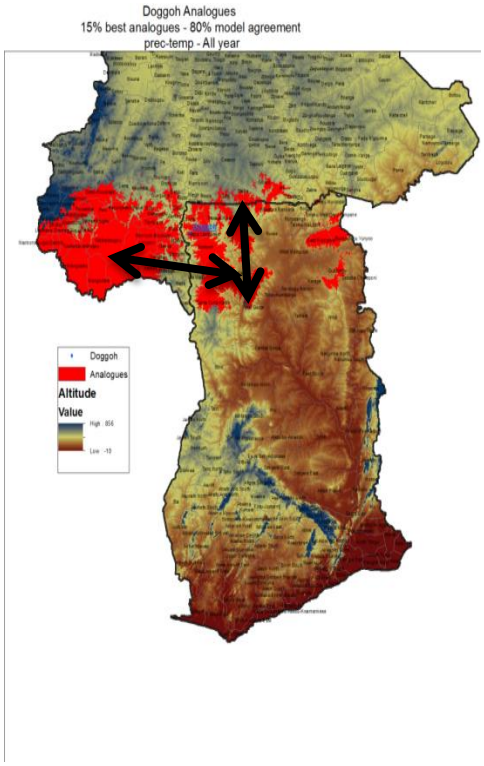
Strengthen the adaptive capacity of farmers and AIS to climate change using climate analogue tools and adaptation practices (learning opportunities)







5. Scaling up climate information & services

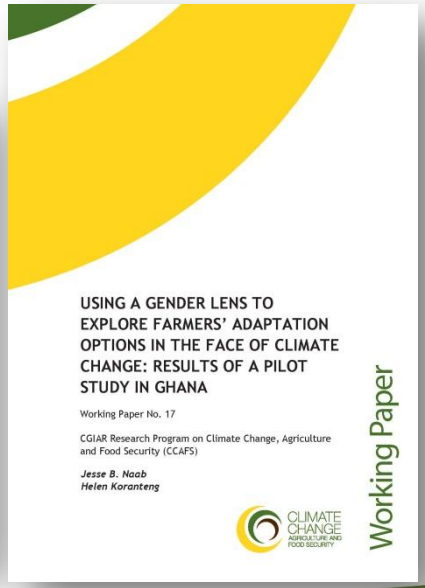
- **Strengthen the capacity of NHMS in forecasting**
- **Tailor climate information to the needs of farmers**

- 42 participants (NHMS) staff trained to produce seasonal forecasts (ECOWAS countries, Agrhymet, ACMAD)
- Forecast bulletin produced disseminated
- 140 participants (**33 women**) (farmers, extension, NGOs staff) trained (Ségou, Yatenga, Kaffrine) to understanding seasonal forecast information & make management decisions.
- Evaluation of the seasonal forecast results with the farmers

- Learning lessons from Mali agri-met services
- South-South learning
- Scaling up across the Sahel

6.Strengthening the capacity of stakeholders

- **Documenting indigenous practices for climate change adaptation & mitigation**
- **Videos on best practices for climate change adaptation and mitigation (e.g video on gender and adaptation to CC)**
- **Identifying social and cultural barriers to adoption**



7. Securing finance to make it happen

- Adaptation finance
- Mitigation finance

  - Why mitigation finance?
    - Agricultural development can and usually does increase productivity
    - This inevitably reduces GHG emissions per unit of food produced.
    - Thus can secure mitigation finance to drive agricultural development

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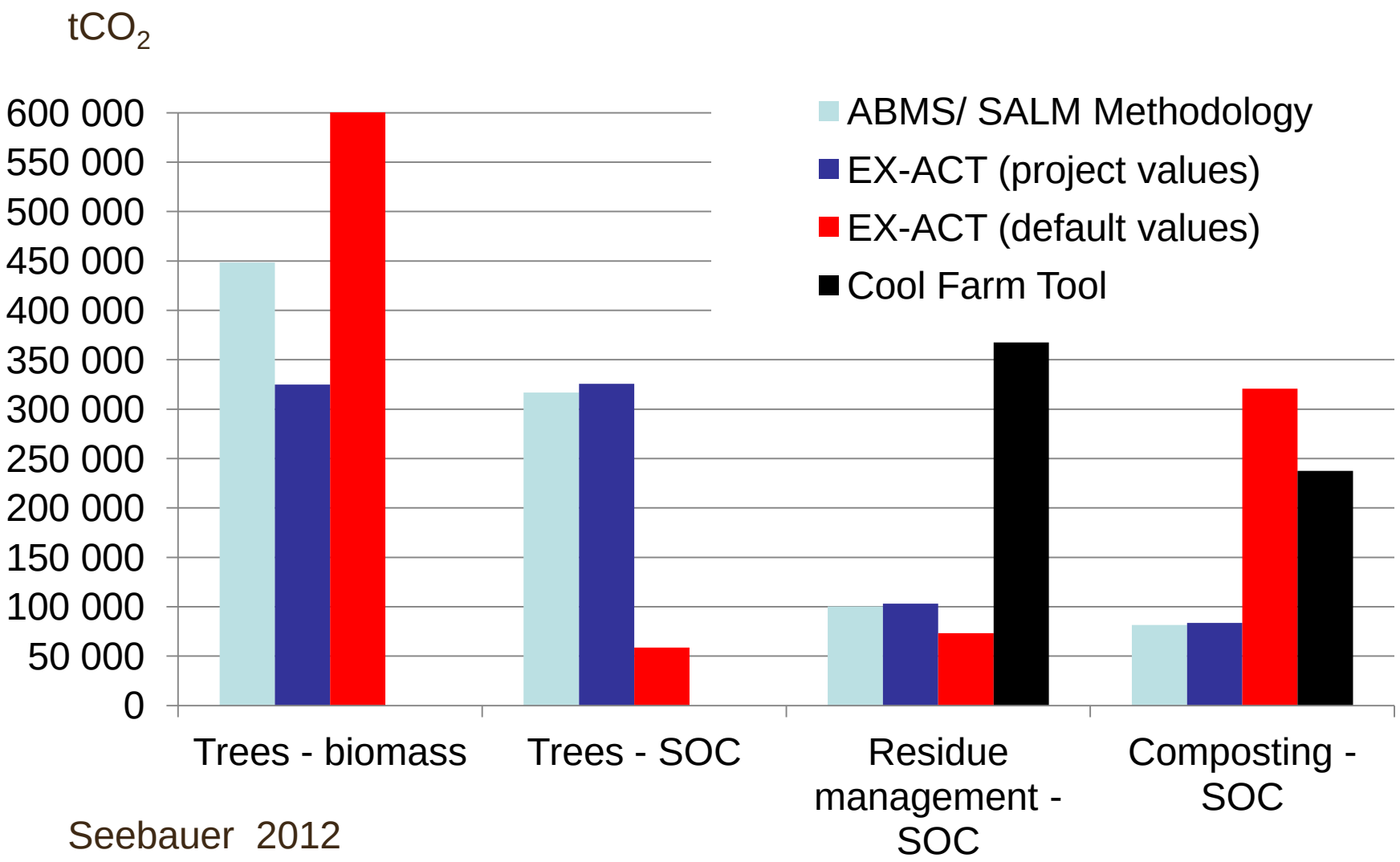
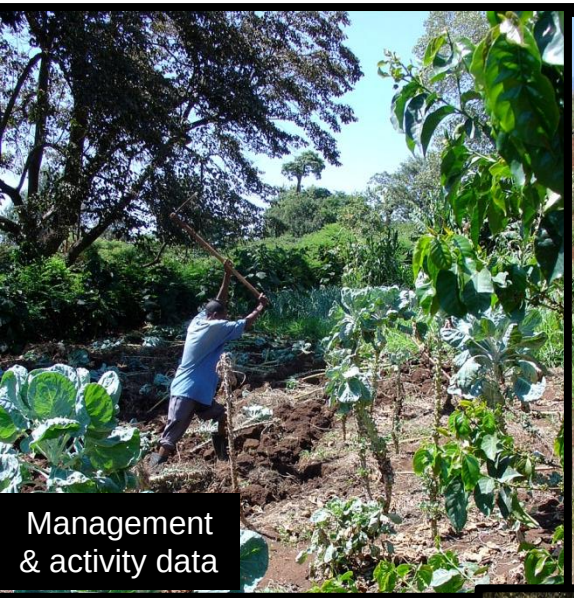
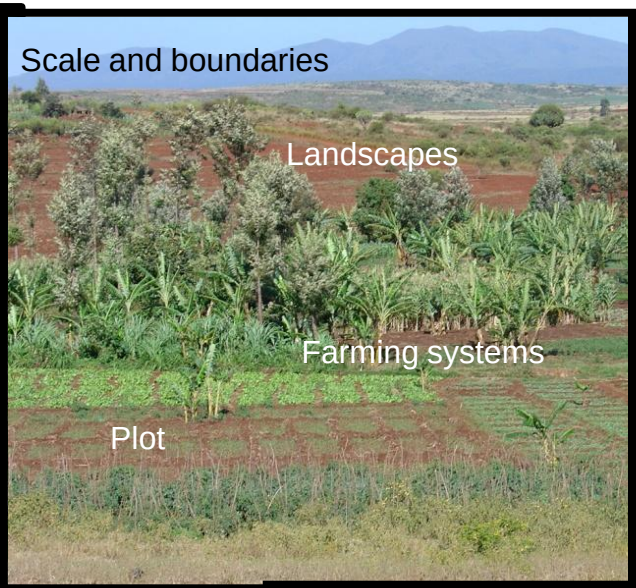
8. Improve knowledge on GHGs in smallholder systems

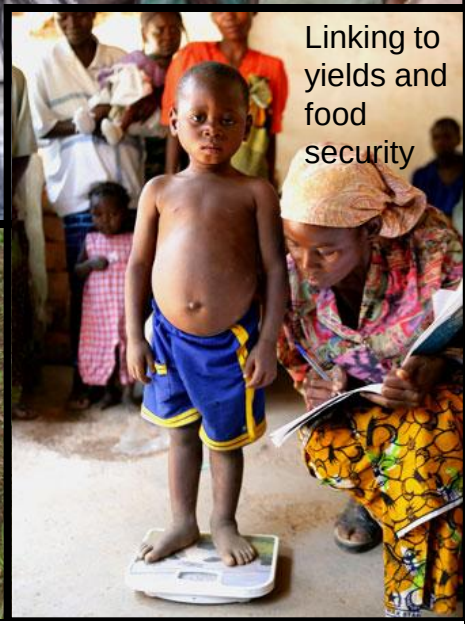


Seebauer 2012

6. Need to developing a shared protocol for GHG emissions



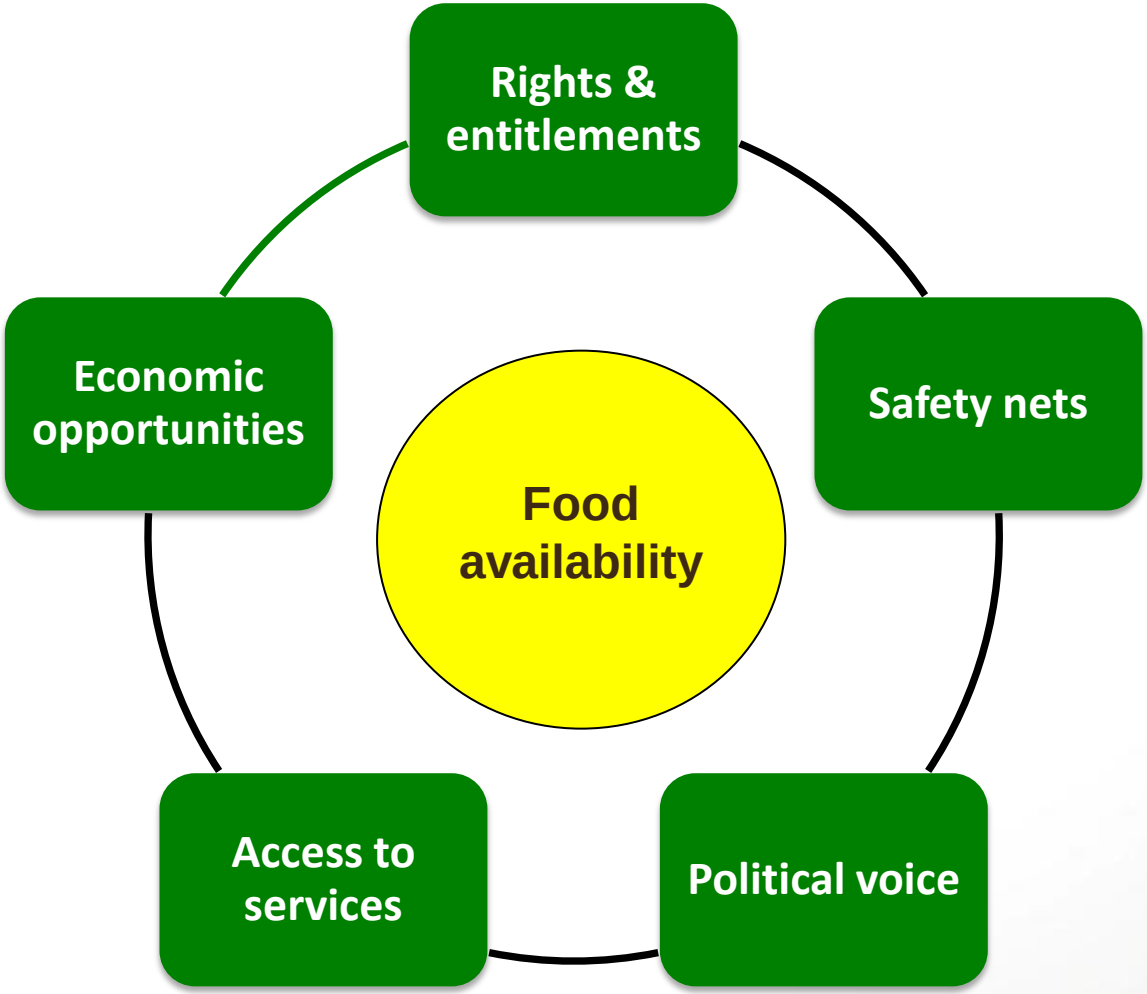




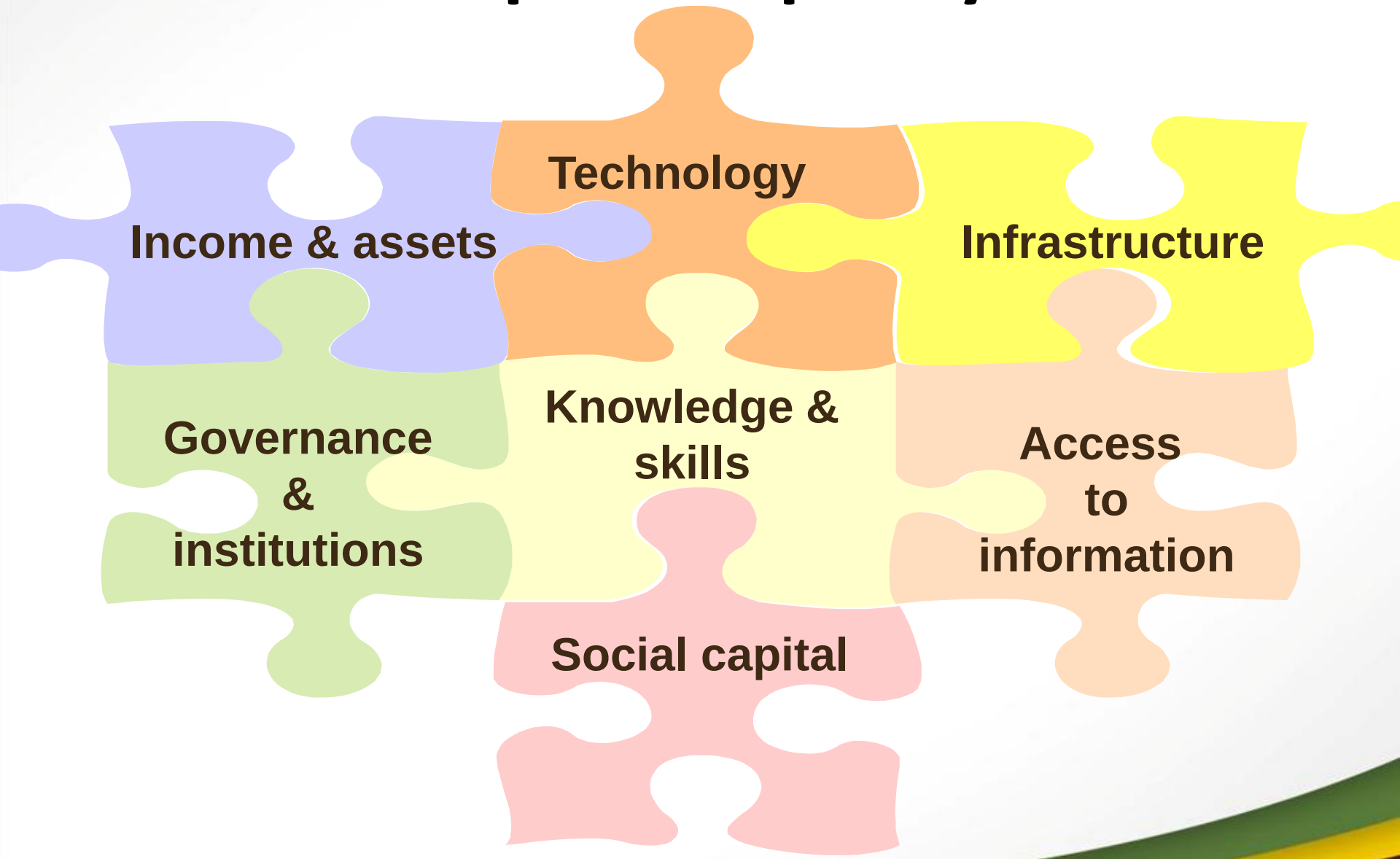
ICRAF, ILRI, IRRI, ICRISAT, FAO, University of Hohenheim, Global Research Alliance for Agricultural Greenhouse Gases

3) Conclusions

For food insecure people, need actions on



Adaptive capacity



1. We should expect a major transformation of the world's food systems
2. Moving towards a "sustainable food system" means going well beyond production
3. Towards a climate smart agriculture

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