
Food Security and Adaptation to Climate Change

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International research programs

- Global Environmental Change and Food Systems (GECAFS)
 - 2001 to 2011
 - Earth Systems Science Partnership of ICSU: WCRP, IHDP, IGBP, Diversitas
- Climate Change and Food Security (CCAFS)
 - Challenge program of CGIAR (Consortium Group on International Agricultural Research) in partnership with ESSP
 - Launched in 2010



Food security...

... exists when all people, at all times, have **physical and economic access** to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

(UN-FAO World Food Summit 1996)



... is more than agricultural yields or food production
... is underpinned by food systems

Food Systems

Food System ACTIVITIES

Producing food: *natural resources, inputs, markets, ...*

Processing & packaging food: *raw materials, standards, storage requirement, ...*

Distributing & retailing food: *transport, marketing, advertising, ...*

Consuming food: *acquisition, preparation, customs, ...*



Food System OUTCOMES Contributing to:

Social Welfare

- Income
- Employment
- Wealth
- Social capital
- Political capital
- Human capital



Food Security, i.e. stability over time for:

FOOD UTILISATION

- Nutritional Value
- Social Value
- Food Safety

FOOD ACCESS

- Affordability
- Allocation
- Preference

FOOD AVAILABILITY

- Production
- Distribution
- Exchange

Environmental Welfare

- Ecosystem stocks & flows
- Ecosystem services
- Access to natural capital



1. Vulnerability of food systems to GEC

Classic view

**GLOBAL ENVIRONMENTAL
CHANGE (GEC)**

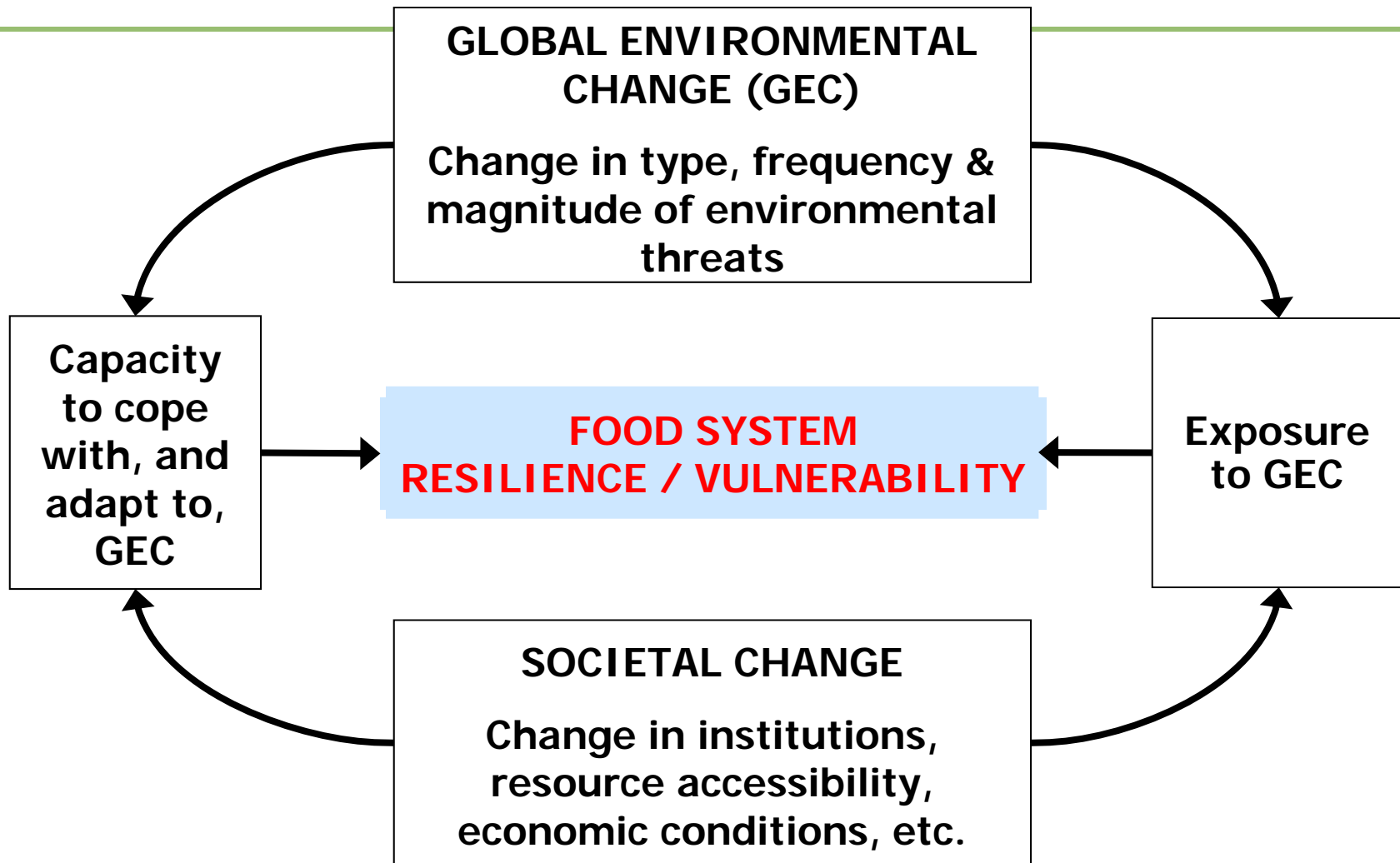
Change in type, frequency &
magnitude of environmental
threats



**FOOD PRODUCTION
IMPACTS**

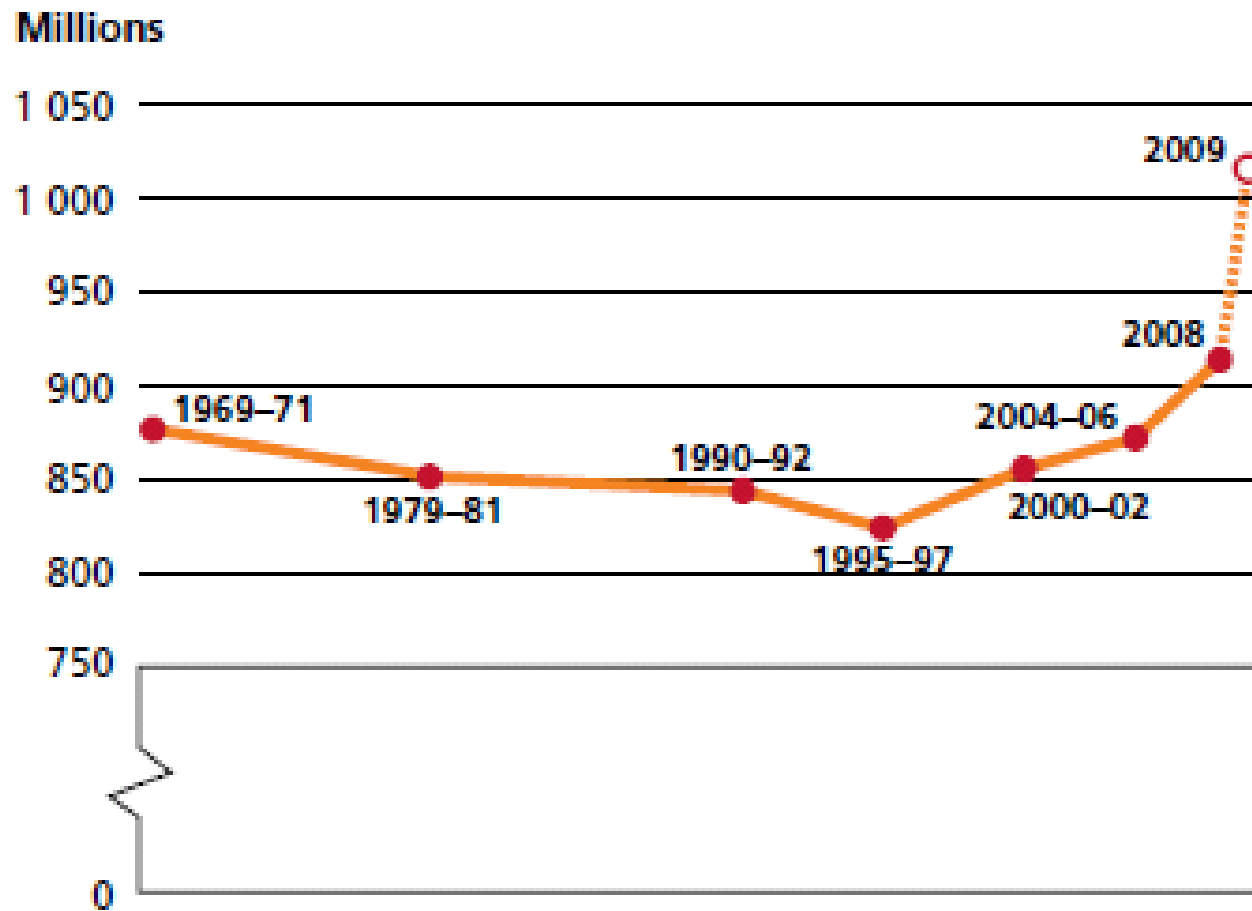
Vulnerability of Food Systems to GEC

More holistic view



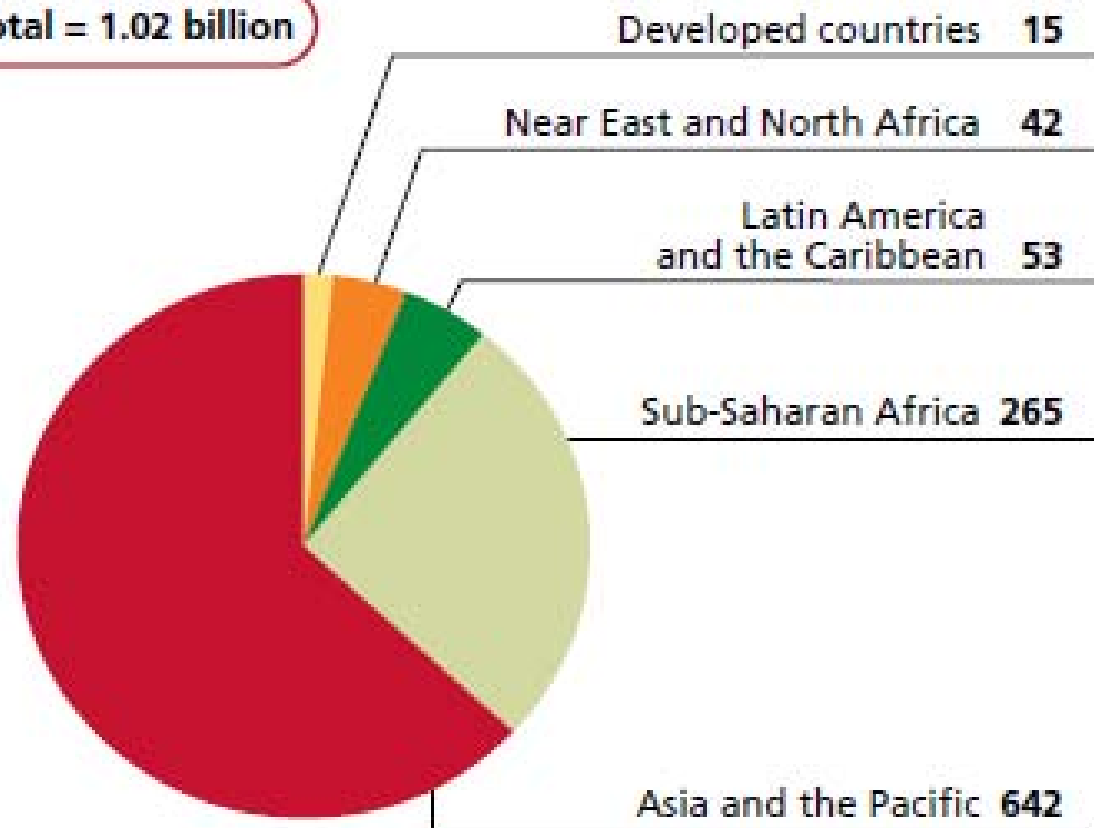
A billion people are hungry...

(FAO-SOFI, 2009)



Undernourishment in 2009, by region (millions)

Total = 1.02 billion



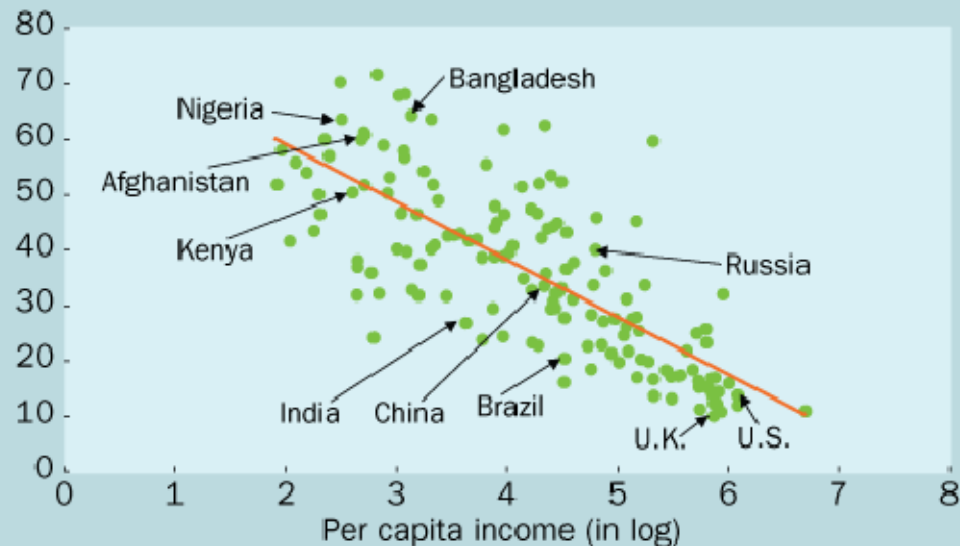
The poor were most vulnerable because they spend most of their income on food

Chart 2

Paying more

Poor people tend to spend relatively more of their income on food, and therefore suffer more when food prices go up.

(food weighting within consumer price index, percent)

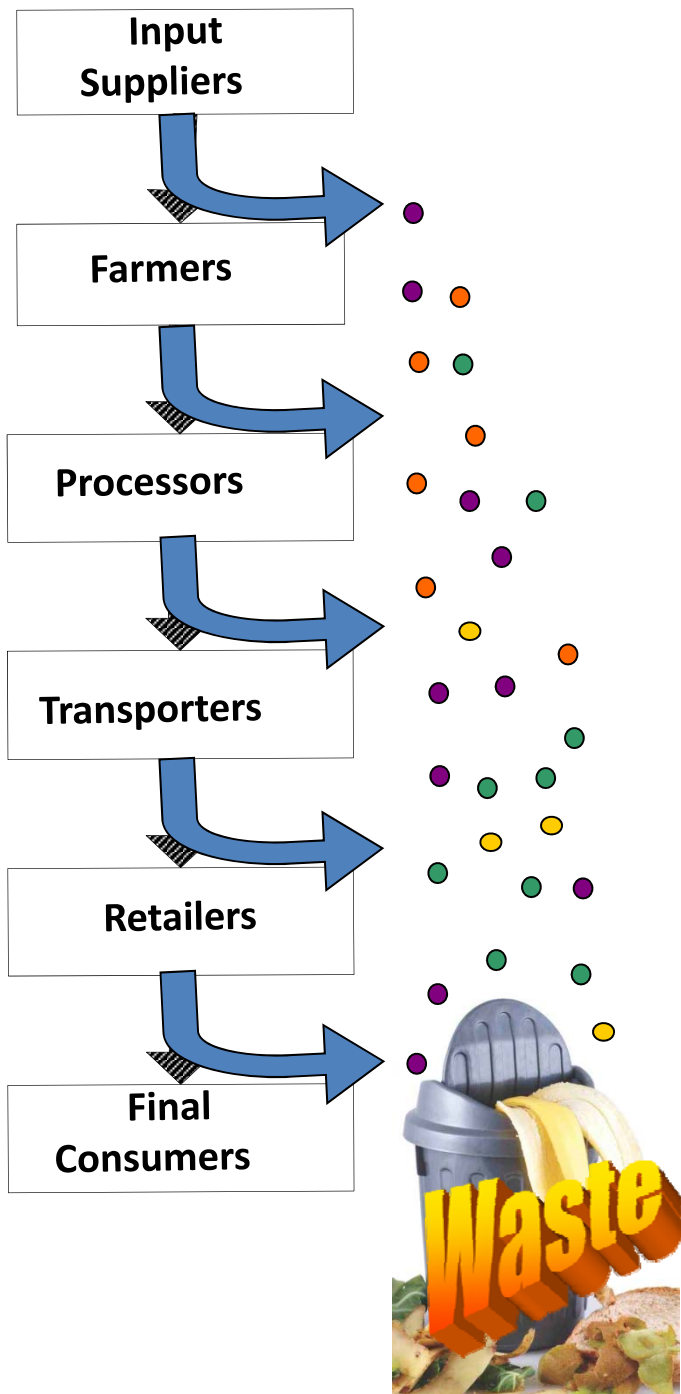


Source: IMF staff calculations.



Adaptation in food systems

- Technology
e.g. Crop improvement, irrigation, precision agriculture, food safety and storage, better transport links, warning systems
- Institutions
e.g. Regional trade, land tenure security, insurance, subsidies, certification, aid
- Society
e.g. Dietary preferences, household traditions, waste reduction



Reducing food loss

- May occur anywhere along the supply chain, from farm to final consumer
- Difficult to measure
- Globally, 15-50% of food is lost post-harvest
- Often unnoticed until too late

Food Security, Climate Change and Tradeoffs



Agriculture and Rural Development Discussion Paper 42

Climate Change Response
Strategies for Agriculture:
Challenges and Opportunities
for the 21st Century



Francesco Tubiello
Josef Schmidhuber
Mark Howden
Peter G. Neofotis
Sarah Park
Erick Fernandes
Dipti Thapa

Agriculture also a solution to mitigation (if forest loss reduce, carbon sequestered, and emissions reduced in the supply chain) but...

“The tradeoffs between land use for food, bio-energy and carbon sequestration, as well as the social, environmental, and economic implications of adaptation responses, increasingly need to be considered within such analyses.” (WB, 2008)



**FOOD
SECURITY
AND
GLOBAL
ENVIRONMENTAL
CHANGE**

Edited by
John Ingram, Polly Ericksen
and Diana Liverman

GECAFS Synthesis Project

- Synthesis of knowledge
- Lessons learnt
 - Vulnerability
 - Scenarios
 - Regional approaches
 - Engaging stakeholders
 - Focus on food not agriculture
- Future agendas
- Earthscan; late 2010

GECAFS food systems concepts adopted by other organisations



Food Security and UNFCCC

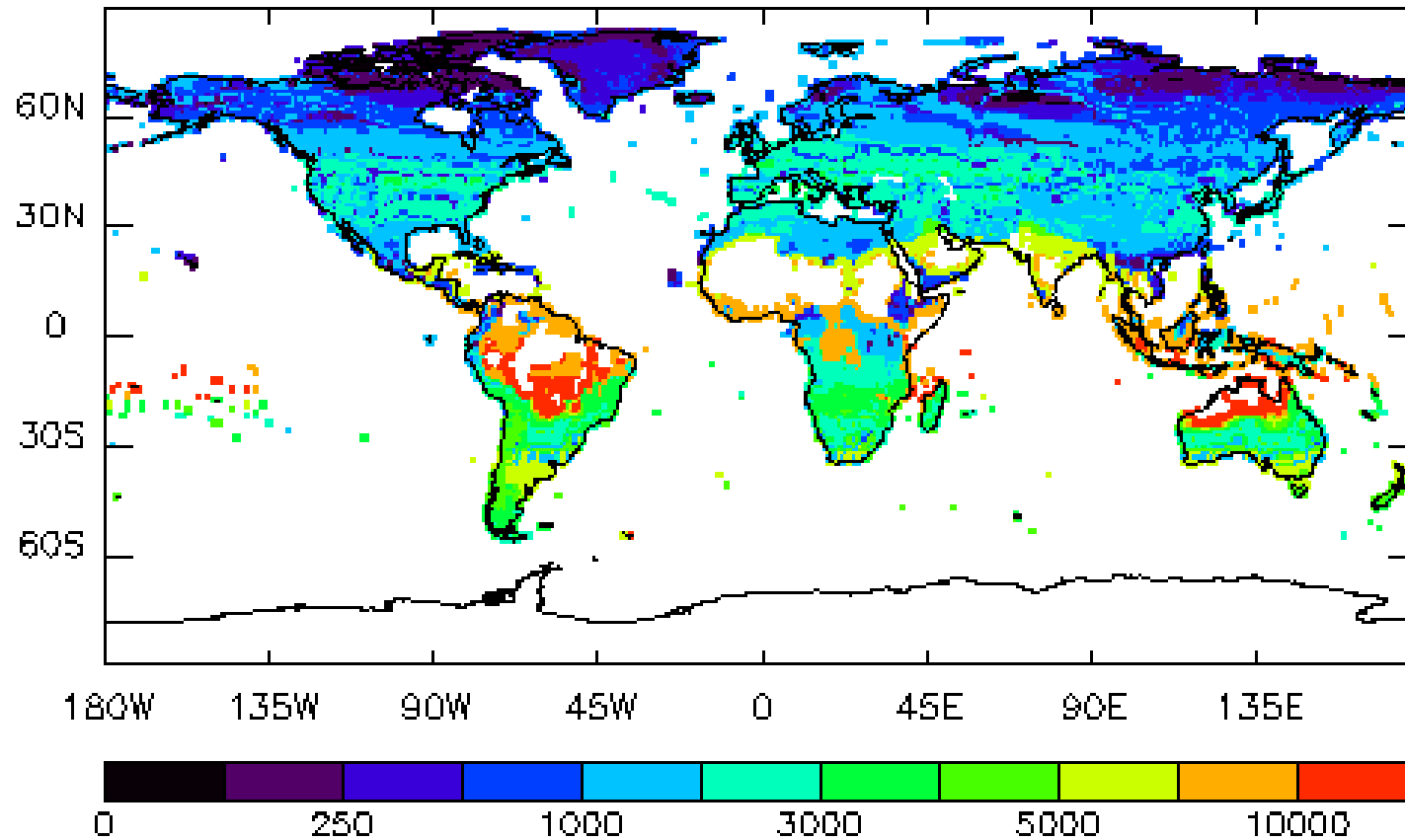
- 'Agriculture and Rural Development Day'
- Funds for adaptation (but are they additional?)
- Side events
- Land use and mitigation (CDM, REDD...)

New CGIAR programs

Challenge program on Climate Change and Food Security (with ESSP)

- To provide diagnosis and analysis to ensure the inclusion of agriculture, livestock and fisheries in climate change policies
- To identify and develop pro-poor adaptation and mitigation practices, technologies and policies for food systems and rural livelihoods

**Crop suitability could shift 1000s of kilometers in a +4C world.
White land areas have no present day climate analogue (what would grow there?).**



Climate Variability and Change: CCAFS agenda

*Technologies, practices
and policies for:*

- 1. Adaptation for current climate risk*
- 2. Adaptation for progressive climate change*
- 3. Mitigation for reducing GHG emissions, enhancing carbon-storage and reducing poverty*
- 4. Diagnosis and vulnerability assessment for making strategic choices*

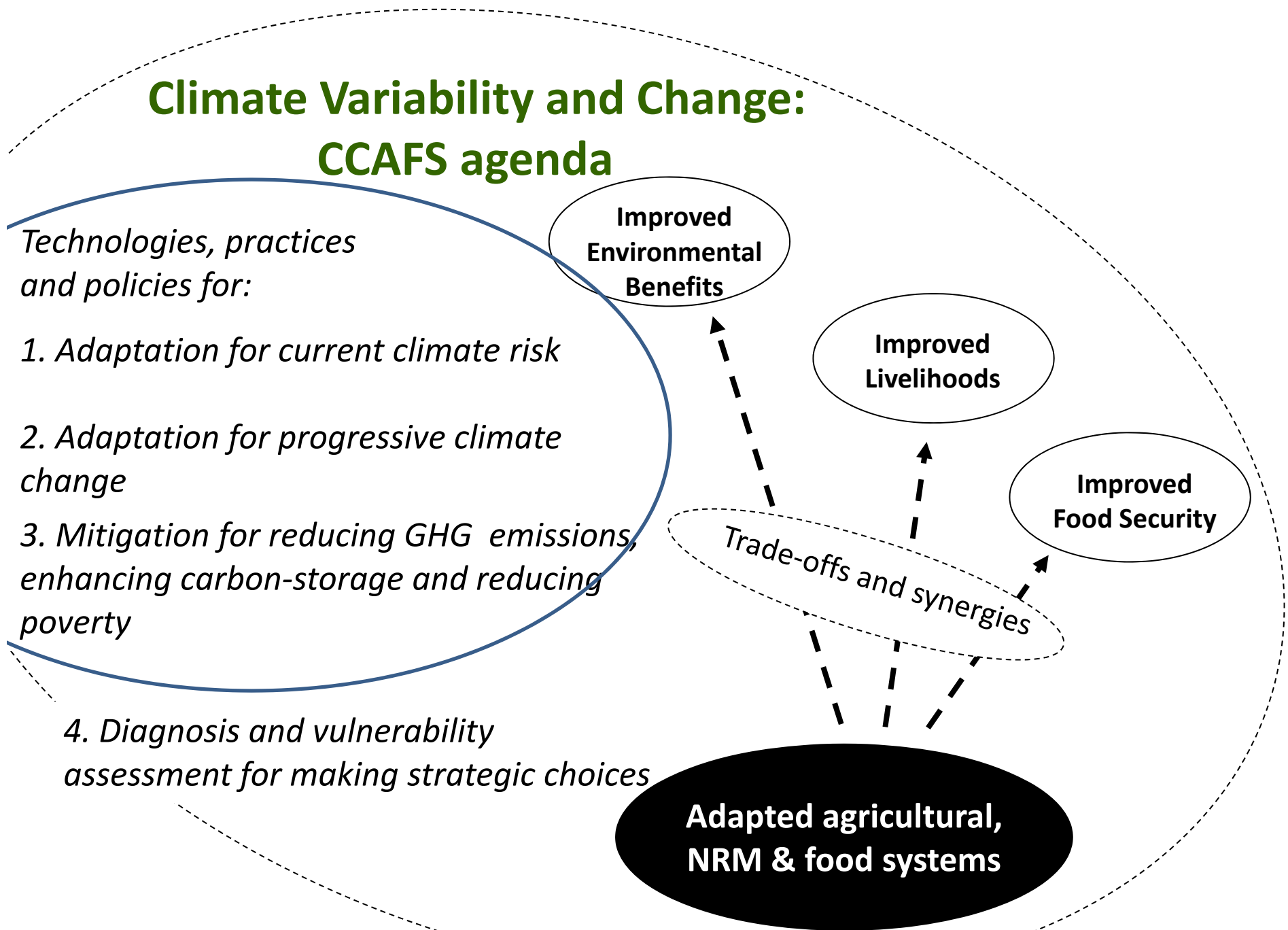
**Improved
Environmental
Benefits**

**Improved
Livelihoods**

**Improved
Food Security**

Trade-offs and synergies

**Adapted agricultural,
NRM & food systems**



Gracias!

