



# Food security and climate change

A report by the  
High Level Panel of Experts  
on Food Security and Nutrition (HLPE)

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# Request from CFS

- Review existing assessments and initiatives on the effects of climate change on food security and nutrition
- Focus on
  - the most affected and vulnerable regions and populations
  - the interface between climate change and agricultural productivity,
  - the challenges and opportunities of adaptation and mitigation policies and actions for food security and nutrition.

# Report organization: five chapters

1. Assessing vulnerability to climate change *today*
2. Assessing vulnerability *tomorrow*
  - Plausible scenarios of the future
3. Adaptation
  - Options to address food security challenges from climate change
4. Mitigation
  - Options to reduce GHG concentrations while supporting sustainable food security and poverty reduction
5. The need for coordination and coherence of food security and climate change policies and actions

# Dimensions of vulnerability to climate change

- Vulnerability depends on risk...
  - Exposure
  - Magnitude
  - Sensitivity
  - Ability to respond and adapt
- Vulnerability components
  - Biophysical *and* social
- Vulnerability affects individuals, household, communities, and agricultural systems
- The poor are especially vulnerable

# Examples of vulnerable livelihoods

- Sensitive cropping systems
  - Potato-based systems are sensitive to high nighttime temperature
  - Rice-based systems are sensitive to high daytime temperature
- Women who haul water are sensitive to increased variability in precipitation
- Key staples and sources of diet diversity susceptible in some regions (e.g., wild foods, fruits and vegetables)
- Low-income, rural communities

# Most vulnerable regions?

- Arid and semi arid regions of the tropics
  - Sahel of sub-Saharan Africa, South and West Asia, North Africa, India and parts of the dry Andes in Latin America.
- Coastal areas, at risk from flooding and sea level rise.
  - Countries with agriculture in river deltas
  - Small Island States.

# Most vulnerable systems?

- Pastoralists and smallholder farmers in dry areas, particularly in South Asia and Africa
- Marine fishery production among tropical nations
- Small farms with limited access to input and output markets and off-farm opportunities
- Regions where conflicts for land and water are already pending

# Integrating biophysical and socioeconomic futures essential for understanding vulnerability

- With high population growth and low income growth average kilocalorie availability declines in all regions by 2050.
- Climate change increases the number of malnourished children substantially.
- Trade flows adjust if trade policies don't constrain

# Adaptation to increase the general resilience of food systems

- Adaptation to climate change is embedded in the broader need to
  - Produce more food
  - Build more resilient food systems
  - Consider the needs and rights of farmers
  - Support vulnerable groups and communities
  - Address sustainability

# GHG emissions linked to agriculture

- Sources of agricultural GHGs
  - 13% of **total** GHG emissions result directly from agricultural activities
  - 2% indirect (energy and other inputs used in ag)
  - 11% to 17 % from land use change, most associated with agricultural practices
- Total: 26 to 32% (2005)

# Assess mitigation and food security jointly

- Reduce emissions at the lowest food security cost and Improve food security at the lowest emissions cost
- Undertake full-cost assessment of mitigation options
  - upfront, transaction, transition, opportunity
- Need appropriate metrics to assess emissions reductions in a food security perspective

# Mitigation options that also enhance food security: examples

- Direct
  - Farming practices that increase soil carbon in degraded soils
  - Fertilizer management that reduces fertilizer application by increasing plant uptake
  - Livestock and manure management that reduce GHG emissions and lower farmer cost per unit of output
  - Water management that saves water and reduces GHG emissions
  - Crop residue management that increases soil health and reduces GHG emissions
- Indirect
  - Manage food consumption for lower emissions and more efficient food systems
  - Reduce emissions from land use change for agriculture by increasing agricultural productivity

# RECOMMENDATIONS FOR COORDINATION AND COHERENCE OF FOOD SECURITY AND CLIMATE CHANGE POLICIES AND ACTIONS

# Four principles for policies and action

- Integrate food security and climate change actions
- Increase the base of evidence for policy-making
- Involve all stakeholders in decision-making
- Focus on the needs and contributions of the disadvantaged

# Five sets of recommendations for national governments and international organizations

- Pursue synergies in food security and climate change actions
- Increase resilience of food systems to climate change
- Develop low-emissions agricultural strategies that contribute to food security
- Collect information locally and share knowledge globally
- Facilitate participation of all stakeholders in decision making and implementation

# Integrate food security and climate change concerns

- Increase immediately investments for food security and resilience to climate change
- Refocus agricultural research to address a more complex set of objectives, including adaptation and mitigation
- Modernize extension services
- Build human, physical, and institutional capacity

# Increase resilience of food systems to climate change

- Facilitate
  - Exchange of information on farmer practices
  - Improved farmer access to weather information
  - Greater diversity in the field and broader access to genetic resources
- Promote an international trading regime that supports food security and contributes to the resilience of food systems
- Invest to increase resilience to climate-change driven water availability risk
- Support special management challenges of coastal areas

# Develop low-emissions agricultural strategies that contribute to food security 1/2

- Adopt policies and develop programs that discourage land use change for agriculture
- Promote crop, livestock, manure, and water management practices that
  - Prevent loss of soil carbon
  - Build carbon soil carbon banks
  - Prevent land degradation
  - Reduce greenhouse gas emissions

# Develop low-emissions agricultural strategies that contribute to food security 2/2

- Manage food consumption for lower emissions in food systems
- Assess the contribution of various types of biofuels to mitigation and food security

# Collect information locally and share knowledge globally

- Collect more spatially explicit biophysical data
- Monitor and share information on existing practices and performance
- Improve information about vulnerable communities/populations and regions
- Improve models that facilitate understanding of climate change effects on agriculture
- Organize regional sharing of experience and knowledge

# Facilitate participation of all stakeholders in decision making and implementation

- Promote debate on the roles of the public and private sectors in safeguarding food security in the context of climate change
- Encourage public-public information- and technology-sharing partnerships to share the value of public goods developed and knowledge gained locally
- Increase transparency and civil society participation to improve efficiency and equity

# Recommendations for the CFS

- Include climate change recommendations in the Global Strategic Framework (GSF) for Food Security and Nutrition
- Encourage more explicit recognition of food security in negotiations on
  - Climate change
  - International trade
- Enhance the role of civil society
- Support efforts to improve data collection and a collection sharing mechanism on international data gathering for climate change and food security

# To download the report

[www.fao.org/cfs/cfs-hlpe](http://www.fao.org/cfs/cfs-hlpe)