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# CLIMATE CHANGE AND ITS POTENTIAL IMPACTS ON AGRICULTURAL PRODUCTION

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## OUTLINE

1. Country background
2. Overview of climate change
3. Climate and non-climate stressors
4. USAID climate change policy
5. Impacts of specific climate stresses on agricultural production and potential adaptation responses
6. Challenges and opportunities



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# 1. COUNTRY BACKGROUND

- Population: 10M with annual growth rate of 2.5% and density of >300 inhabitants per km<sup>2</sup>
- Rapid urban expansion
- Acute poverty: Over 75% of the population earn less than \$2 a day
- Less than 2% forest cover
- More than 70% of watersheds are degraded
- Steeply sloped land with approximately 63% of the country with slopes > 20% and only 29% with slopes < 10%



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## 1. COUNTRY BACKGROUND (cont.)

- Approximately 36M tons of soil loss annually
  - Hillside agriculture has surpassed the carrying capacity of the country
- Primary pathway of tropical storms that originate from Atlantic ocean
  - Severe flashfloods affect poor coastal floodplain communities
- All environmental & socio-economic conditions, Haiti is a Small Island Developing State (SIDS) – LDC
  - Haiti is one of the nations most at risk from climate change



## 2. OVERVIEW OF CLIMATE CHANGE: Greenhouse Effect



- Human activities are producing greenhouse gases (GHGs), which enhance Earth's natural greenhouse effect, thereby contributing to global warming





## 2. OVERVIEW OF CLIMATE CHANGE (cont.)

### Sources of GHG Emissions

- Burning of fossil fuels for transportation, electricity
- Land use change (land clearing, deforestation)



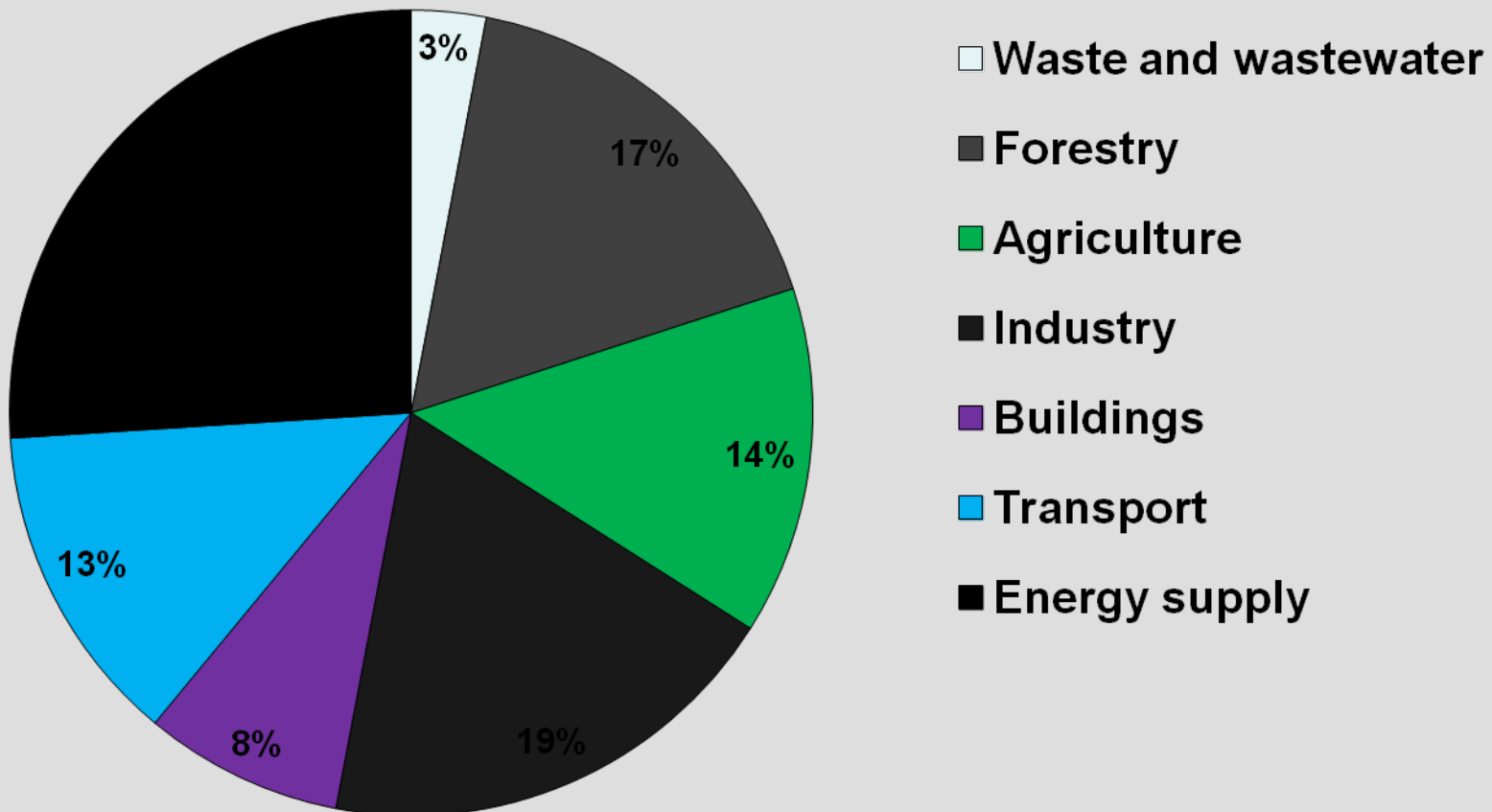
### Main GHGs

- Carbon Dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous Oxide (N<sub>2</sub>O)



## 2. OVERVIEW OF CLIMATE CHANGE (cont.)

Global GHG Emissions By Sector





## 2. OVERVIEW OF CLIMATE CHANGE (cont.)

Variabilité dans la qualité, la disponibilité et la distribution de l'eau. Augmentation de la compétition et des conflits frontaliers sur les ressources en eau

Perte des habitats, espèces et des écosystèmes protecteurs, changements migratoires, acidification des océans

Augmentation de l'incidence des maladies infectieuses d'origine hydrique et vectorielle, du stress et de la mortalité due à la chaleur, des coûts de santé supplémentaires causés par la pollution de l'air

**AGRICULTURE**

**RESSOURCES  
EN EAU**

**FORESTERIE**

**ECOSYSTEMES**

**SYSTEMES  
COTIERS**

**SANTE  
PUBLIQUE**



Baisse de la prévisibilité dans les rendements des récoltes, modification de la demande pour l'irrigation, risque grandissant des infestations par les pestes

Changement au niveau de la composition, de la santé et de la productivité des forêts

Erosion, inondation, salinisation, pression sur les forêts, marais, et zones humides côtières





### 3. CLIMATE CHANGE STRESSORS

- Increasing average temperatures: 1.4 à 3.2°C during the 21<sup>st</sup> century for the Caribbean region (IPCC's Fourth Assessment)
- More extreme weather events, including stronger storms
- More erratic precipitation patterns (droughts and floods more common)
- Rising sea levels: 0.18 to 0.59 m during the 21<sup>st</sup> century (IPCC's Fourth Assessment)
- Glacial melting
- Ocean acidification



### 3. NON-CLIMATIC STRESSORS

- Poverty
- Pollution
- Demographic pressure
- Over-exploitation of natural resources



## 4. USAID CLIMATE CHANGE POLICY

- 22 CFR 216.1(b), Environmental Policy: USAID policy is to:
  - (4) Define environmental limiting factors that constrain development and identify and carry out activities that assist in restoring the renewable resource base on which sustained development depends.
- Climate change represents a potential obstacle and therefore needs to be considered in project design and implementation.



## 4. USAID CLIMATE CHANGE POLICY (cont.)

- USAID began addressing CC early in the 1990s and drafted a climate change strategy in 1994
- \$1 billion Climate Change Initiative over 5 years in 1997 and “**fast start funding**” from Copenhagen Accord
- One of USAID’s top three priorities along with Feed the Future and Global Health
- Executive order on climate resilient international development on September 23, 2014 “*requires the integration of climate-resilience considerations into all United States international development work to the extent permitted by law*”.



## 4. USAID CLIMATE CHANGE POLICY (cont.)

- ❖ **Overall Goal:** Assist countries to develop in ways that reduce emissions while building resilience to climate change impacts
- ❖ **Adaptation**
  - ❖ Reduce the vulnerability of people, places and livelihoods to negative impacts of climate change by integrating effective adaptive strategies into key development sectors
- ❖ **Clean Energy**
  - ❖ Help developing countries reduce long-term emission trends in energy, industry, transportation, and buildings by accelerating their transition to low-emission energy systems
- ❖ **Sustainable Landscapes**
  - ❖ Slow, halt and reverse deforestation as outlined in the U.S. Reducing Emissions from Deforestation and Degradation of Forests (REDD+) strategy





## 5. IMPACTS OF SPEC. CLIMATE STRESSES ON AG PROD. AND POTENTIAL ADAPTATION RESPONSES

### Example of climate stresses

- More variable rainfall (heavier, less frequent precipitation events), more severe drought

### Impacts

- Water scarcity / flooding can cause significant decrease in yields

### Potential Adaptation

- Shade netting
- Switch from growing maize to growing millet
- Install rainwater harvesting tanks
- Use drip irrigation





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## System of Rice Intensification (SRI)



SRI



Traditional system





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# Agroforestry





## 5. IMPACTS OF SPEC. CLIMATE STRESSES ON AG PROD. AND POTENTIAL ADAPTATION RESPONSES

### Example of climate stresses

- Stronger storms

### Impacts

- Loss of crops and livestock

### Potential Adaptation

- Risk reduction, re-zoning
- Early warning systems
- Build back better







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## Rehabilitation of irrigation systems



## Ravine treatment and soil conservation







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## Mangrove protection



- buffering role during storm surges
- fish/other aquatic species habitat protection





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## Flood control works





## 5. IMPACTS OF SPEC. CLIMATE STRESSES ON AG PROD. AND POTENTIAL ADAPTATION RESPONSES

### Example of climate stresses

- Warmer coastal waters which can threaten coral and fish

### Impacts

- Loss of habitats for marine species that can generate decreased livelihood for fishermen

### Potential Adaptation

- Reducing stresses on corals
- Community-managed or protected areas





## 6. CHALLENGES AND OPPORTUNITIES

- Lack of alternative livelihoods for upstream farmers trapped in unsustainable intensive hillside agriculture; requires large investments for soil, water conservation
- Land tenure
- Difficulty of changing people's attitudes / behaviors
- Lack of holistic approach to watershed management (ridge to reef)
- Need to update the legal and institutional framework



## 6. CHALLENGES AND OPPORTUNITIES (cont.)

- CIAT (InterMinisterial Land Use Committee) coordinating will all sectoral ministries Haiti's Intended Nationally Determined Contribution (INDC) for COP 21
- Haiti has its National Adaptation Program of Action (NAPA)
- *“Deuxième Communication Nationale sur les Changements Climatiques”*
- Donors coordination for adaptation activities
  - UNEP & GEF: supporting GOH in implementing all international conventions including CC





## 6. CHALLENGES AND OPPORTUNITIES (cont.)

### *Climate-smart agriculture*

“Climate-smart agriculture promotes production systems that sustainably increase productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals”.

<http://www.fao.org/climate-smart-agriculture/72610/en/>

➤ Climate Smart Agriculture Framework and Action Plan provide both BFS and FTF Missions with a framing for enhancing climate smart approaches across our agriculture and food security programs.



*Statement by U.S. Agriculture Secretary Tom Vilsack on Final  
Communiqué by G-20 Agriculture Ministers on May 8, 2015*

“... as the U.S. Department of Agriculture underscored with the release of USDA's Building Blocks for **Climate Smart Agriculture and Forestry** in April, the world must wake up to the fact that no challenge poses a greater threat to future generations than climate change. With that in mind, global leaders should encourage development of a range of technologies, including agricultural biotechnology, and practices that are integral to food production and management of natural resources that help to reduce greenhouse gas emissions, increase carbon storage, and generate clean and renewable energy“.



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*Thank you!*

