Presentation prepared for the July 28, 2015 event:

Climate Change Adaptation and Population Dynamics in Latin America and Caribbean: Key Issues for Policy Dynamics

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Climate Change Adaptation and Population Dynamics in Latin America and the Caribbean: Key Issues for Policy Makers
28 July 2015

Water, Climate Change, Health and Adaptation

Sally J Edwards
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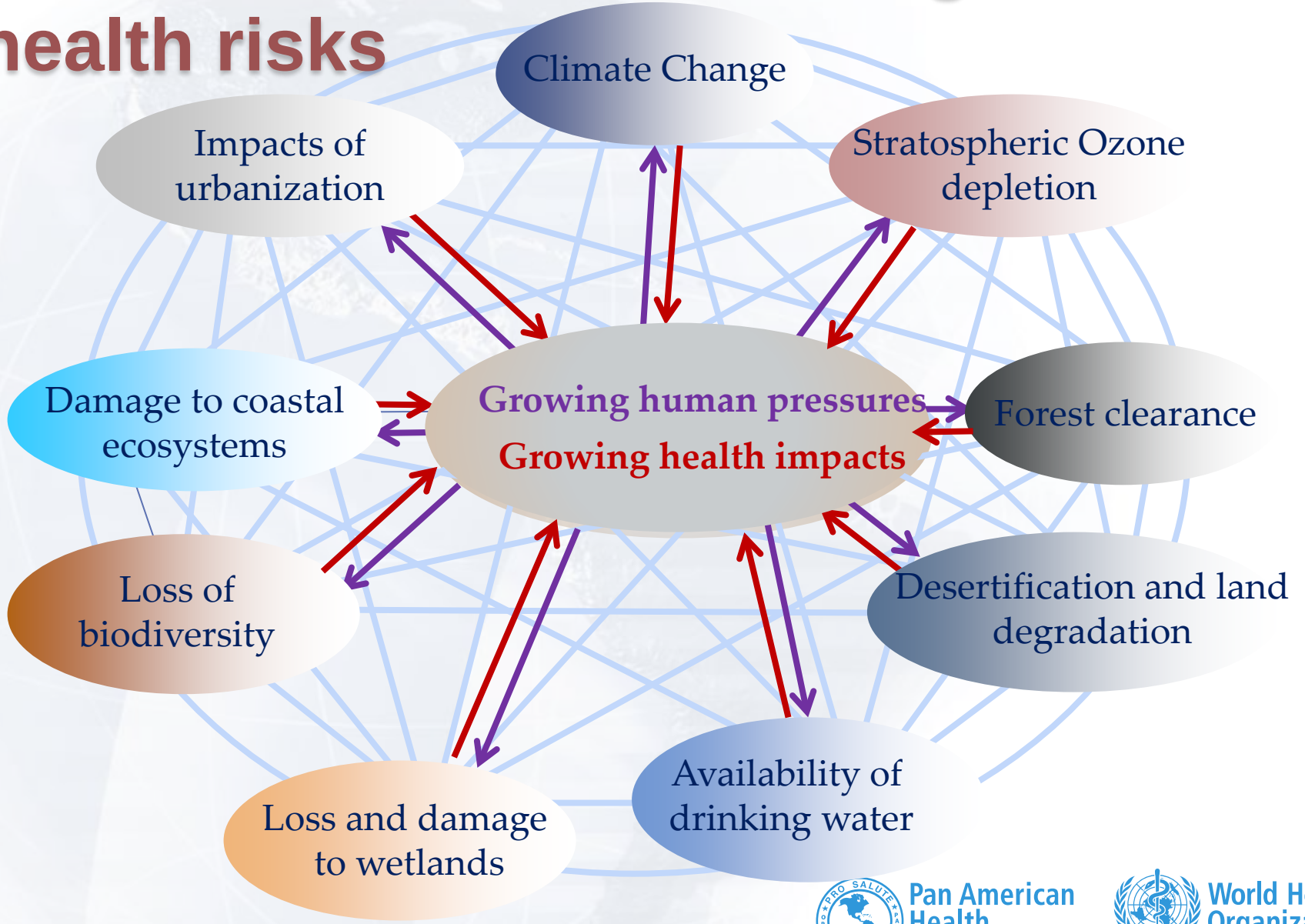
- What do we know about the relationship between Human Health & Climate Change
- Health sector response
- Dominica experience
- Final thoughts

Global environmental changes and health risks



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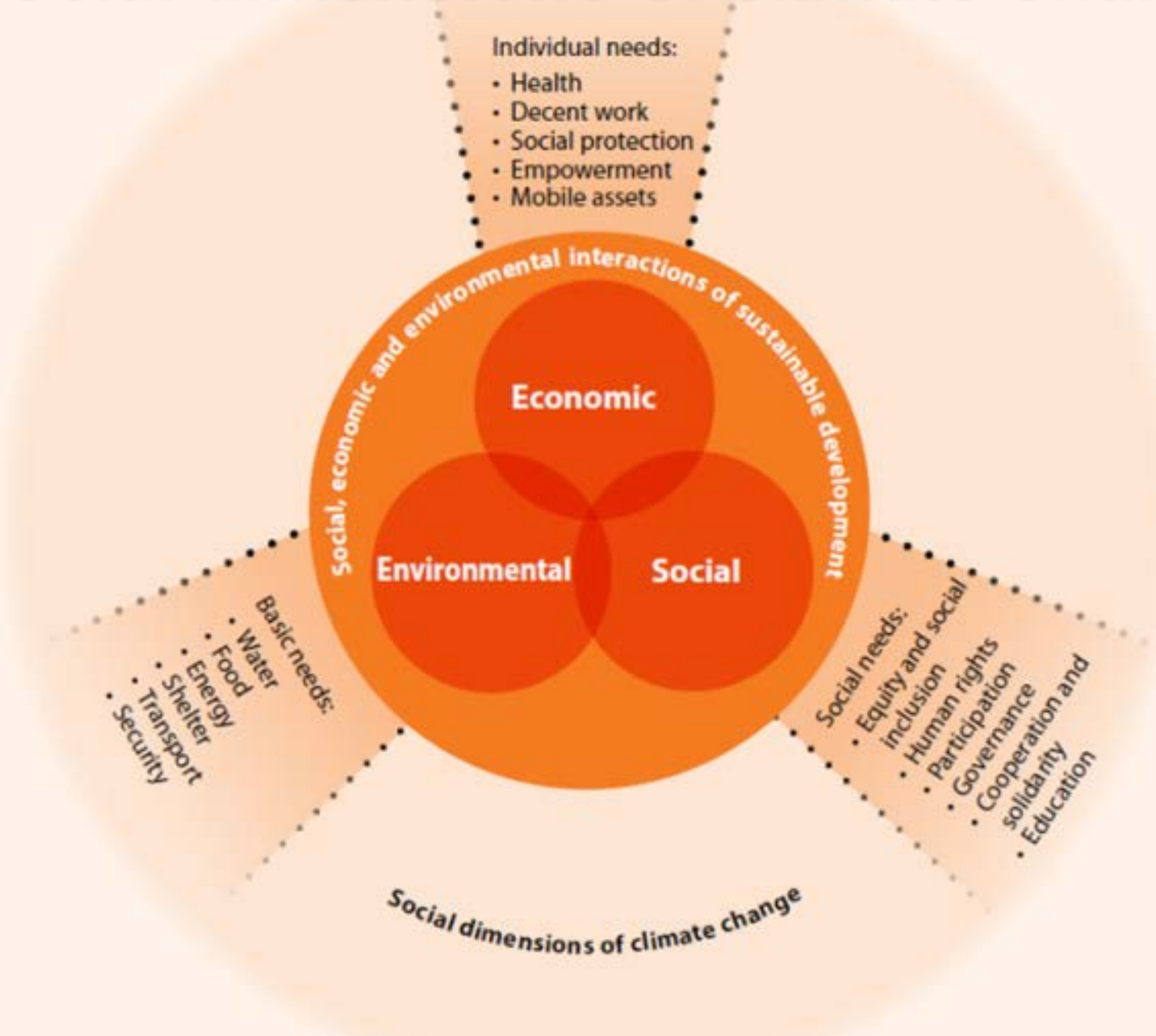
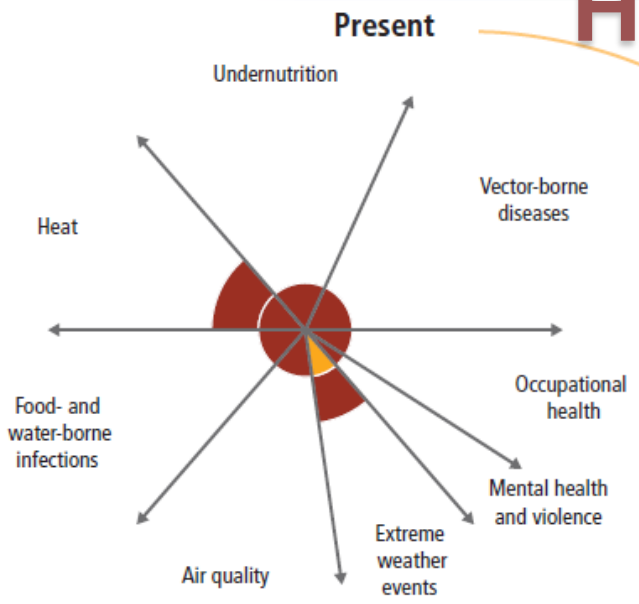
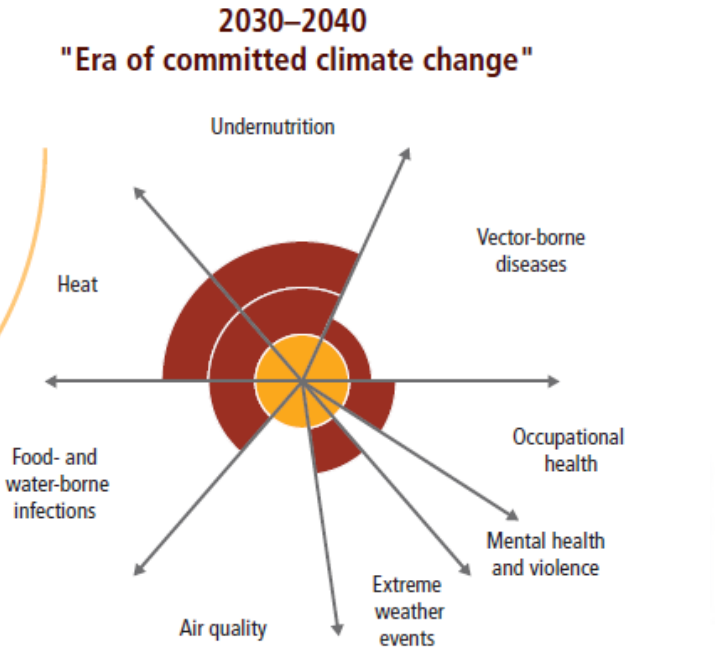
Social dimensions of climate change

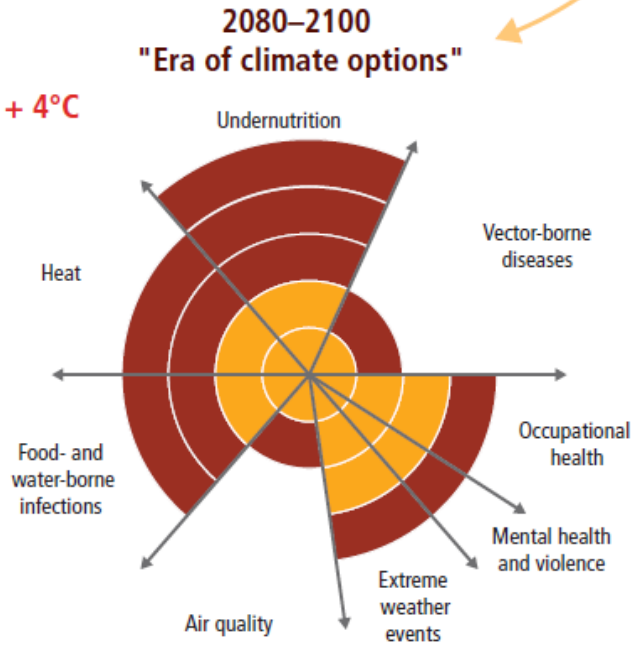


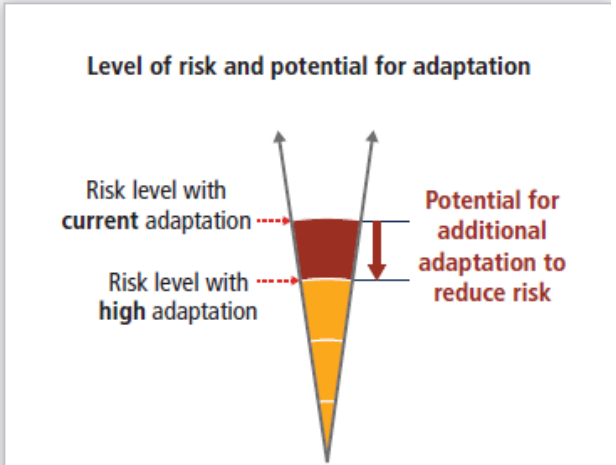
The Social Dimensions of Climate Change. UN Agencies, 2011

Health risks & risk reduction through adaptation





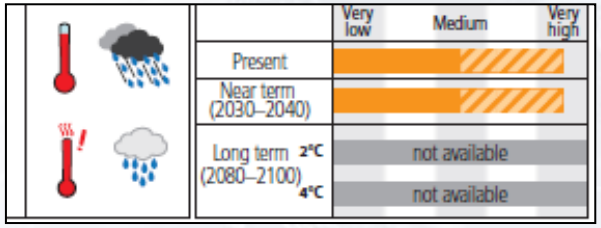


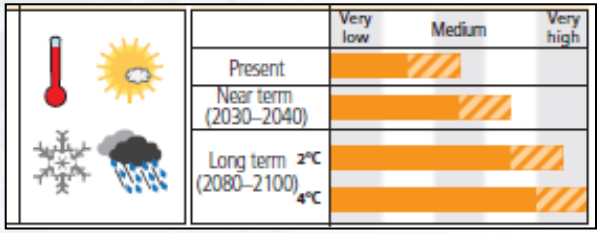


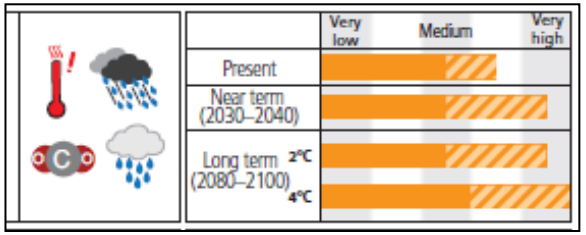
IPCC, 2014

Central & South America

IPCC, 2014



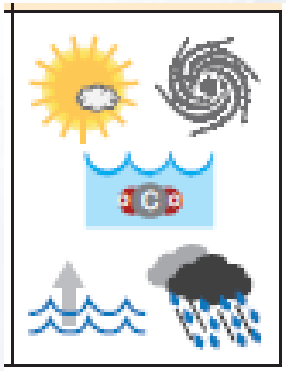


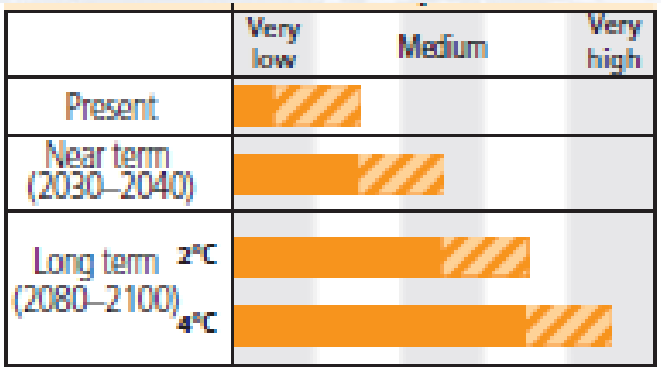


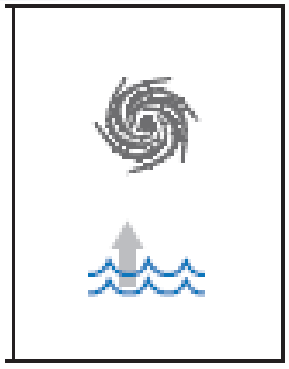
Key Risk	Adaptation Issues & Prospects
Water availability in semi-arid and glacier-melt-dependent regions and Central America; flooding and landslides in urban and rural areas due to extreme precipitation (high confidence)	Integrated water resource management Urban and rural flood management (including infrastructure), early warning systems, better weather and runoff forecasts, and infectious disease control
Decreased food production and food quality (medium confidence)	Development of new crop varieties more adapted to climate change (temperature and drought) Offsetting of human and animal health impacts of reduced food quality Offsetting of economic impacts of land-use change Strengthening traditional indigenous knowledge systems and practices
Spread of vector-borne diseases in altitude and latitude (high confidence)	Development of early warning systems for disease control and mitigation based on climatic and other relevant inputs. Many factors augment vulnerability. Establishing programs to extend basic public health services

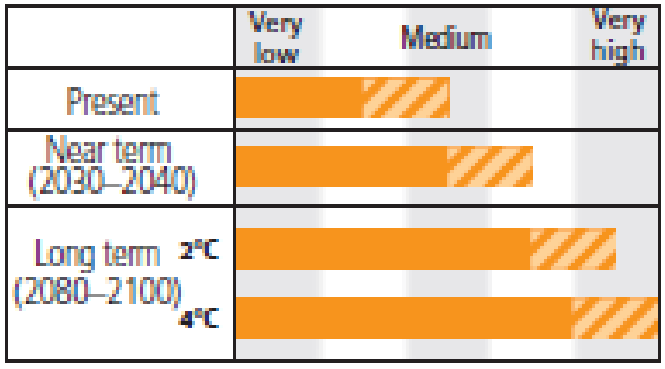
IPCC, 2014

Small Islands









Key Risk	Adaptation issues & prospects
Loss of Livelihoods, coastal settlements, infrastructure, ecosystem services, and economic stability (high confidence)	Significant potential exists for adaptation in islands, but additional external resources and technologies will enhance response.
	Maintenance and enhancement of ecosystem functions and services and of water and food security
	Efficacy of traditional community coping strategies is expected to be substantially reduces in the future.
The interaction of rising global mean sea level in the 21st century with high-water-level events will threaten low-lying coastal areas (high confidence)	High ratio of coastal area to land mass will make adaptation a significant financial and resource challenge for islands.
	Adaptation options include maintenance and restoration of coastal landforms and ecosystems, improved management of soils and freshwater resources, and appropriate building codes and settlement patters.

Health Outcomes of Climate Change

- Asthma, Respiratory Allergies and Airway Diseases
- Cancer
- Cardiovascular Diseases and Stroke
- Food-borne diseases
- Water borne diseases
- Vector borne diseases
- Infectious diseases
- Heat related morbidity and mortality
- Human development effects
- Weather related morbidity and mortality

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Water: the right amount

- Cat Island, Bahamas – Hurricane Irene 2011

- Tacloban Hospital desalinization plant, Philippines, Typhoon Yolanda 2013
- Gonaives, Haiti – post flooding 2009

o Port-au-Prince, Haiti – Earthquake 2010

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Water: the right quality

- Port-au-Prince, Haiti – Earthquake 2010

- Gonaives, Haiti – post flooding 2009

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Foodborne Diseases and Nutrition

- WHO estimate over 70,000 deaths from malnutrition and 47,000 deaths from diarrhoea due to climate change in 2000
- Global changes in ocean currents, water mass distribution, changes in arctic ice cover, length of melt season, hydrology, and precipitation patterns will alter contaminant and pathogen pathways
- Strong association between sea surface temperature and proliferation of many Vibrio bacteria species (cholera post Haiti outbreak)
- Increased temperatures and ocean acidification may lead to more virulent strains of existing pathogens and changes in their distribution
- Drought can encourage the spread the mold Aspergillus flavus that produces aflotoxin poisoning

Waterborne Diseases

- Waterborne outbreaks highly correlated with extreme precipitation events
- Increases in water temperature, precipitation frequency and intensity, and changes in coastal ecosystem health (pH, salinity, nutrient and contamination runoff) could increase the incidence of water contamination. The effects are pathogen and pollutant specific.
- Urbanization of coastal regions may lead to additional nutrient, chemical and pathogen loading
- Waterborne pathogens are implicated in other illnesses with immunologic, neurologic, hematologic, metabolic, pulmonary, ocular, renal and nutritional complications
- Waterborne microorganisms include: Protozoa [cryptosporidiosis], Parasites [shistosomiasis], Bacteria [Cholera and legionella], Viruses [gastroenteritis], Amoebas [meningoencephalitis], Algae [neurotoxicity]

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Vectorborne and Zoonotic Diseases

- Domestic animals and wildlife, incl. marine mammals, sea turtles, seabirds and fish may serve as reservoirs for human pathogens
- WHO estimate malaria responsible for 2.9% worlds DALY's
- Emerging zoonotic disease outbreaks are increasing (SARS, Nipha virus, HIV/AIDS, H1N1, MERS Cov …)
- Changes in precipitation and temperature patterns affect VBZDs. Influences transmission cycles, extrinsic incubation periods, distribution of vector and therefore likelihood of transmission
- Population migration also important factor – susceptibility
- Biodiversity change leads to altered dynamics of predator-prey relationships as well as vector and pathogen reservoir populations

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Weather-Related Morbidity and Mortality

- Increases in the incidence and intensity of extreme weather events such as hurricanes, floods, droughts, and wildfires may adversely affect health during the event or later
- Sea-level rise associated with climate change will amplify the threats from storm surge associated with extreme weather events in coastal areas
- health alert warning systems for extreme heat events and air pollution that especially affects people with existing conditions such as cardiovascular disease need to be implemented
- Current evidence insufficient to determine if frequency of tropical cyclones will change
- More intense hurricanes, increases in flooding and wildfires may exacerbate:
    - Release of toxic chemicals from landfills
    - Contamination of drinking water with raw sewage
    - Increased concentration of air pollutants
    - Contamination of stored food stocks with toxic substances or sewage

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Health Effects of Sea-Level Rise

- Inundation of living areas; expansion of flood plains, inability to get insurance
- Erosion and loss of coastal land
  - Worsening protection against future storm surge
- Contamination of fresh water
  - Coastal wells tend to be shallow
- Population displacement
- Mental health effects
- Loss of critical infrastructure
  - Hurricane Katrina as example

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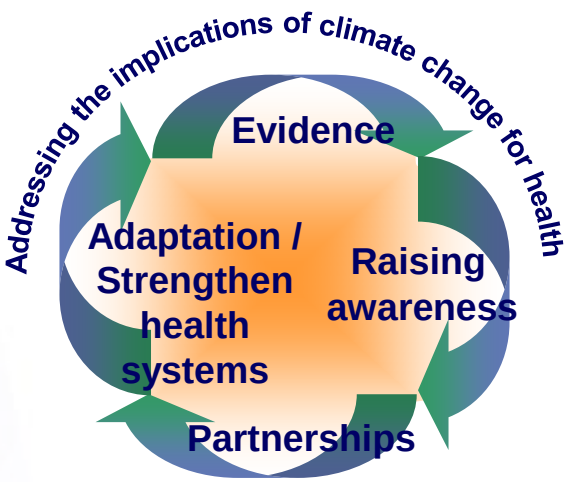
Strategic areas

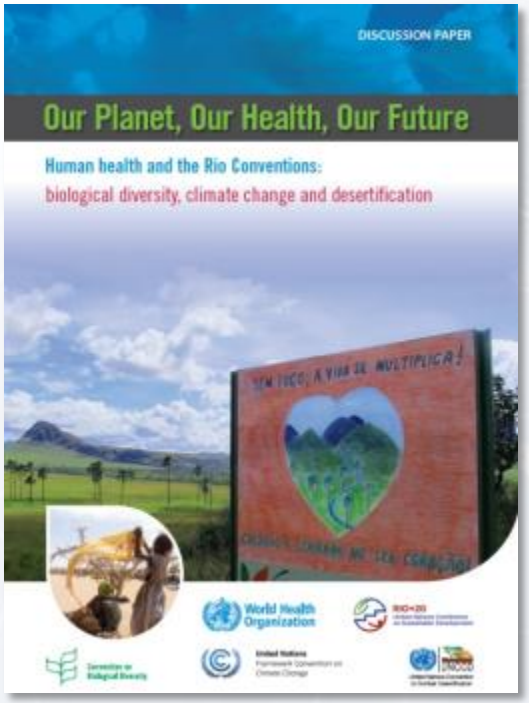


- **Evidence**: Strengthening the generation and dissemination of knowledge regarding health risks associated with climate change and about the appropriate public health response to this phenomenon.

- **Awareness raising** and education: Creating awareness and increasing knowledge about the health effects of climate change among the general public and in other sectors, including health personnel, by promoting training and by communicating and disseminating information through a multidisciplinary approach.

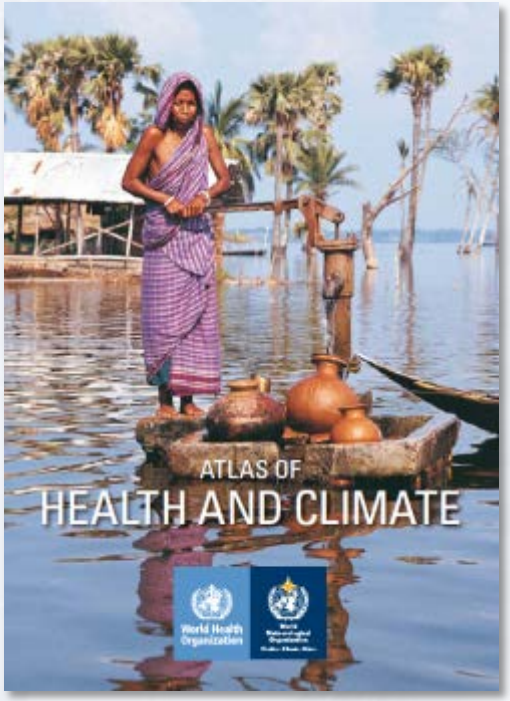
- **Partnerships**: Promoting, articulating, and establishing cross-disciplinary, interagency, and intersectoral partnerships to ensure that health protection and promotion is central to climate change policies.

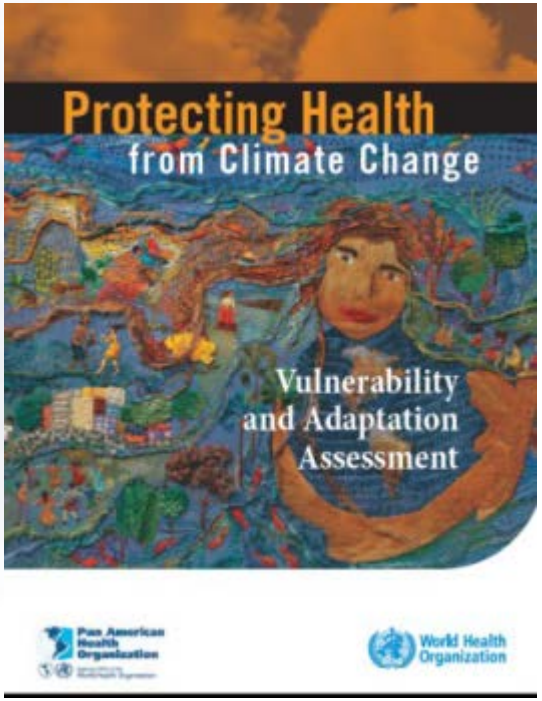
- **Adaptation**: Strengthening and developing the capacity of health systems to design, implement, monitor, and evaluate adaptation measures designed to improve response capacity to the risks posed by climate change.



Evidence

Assessments: from the health sector for intersectorial actions





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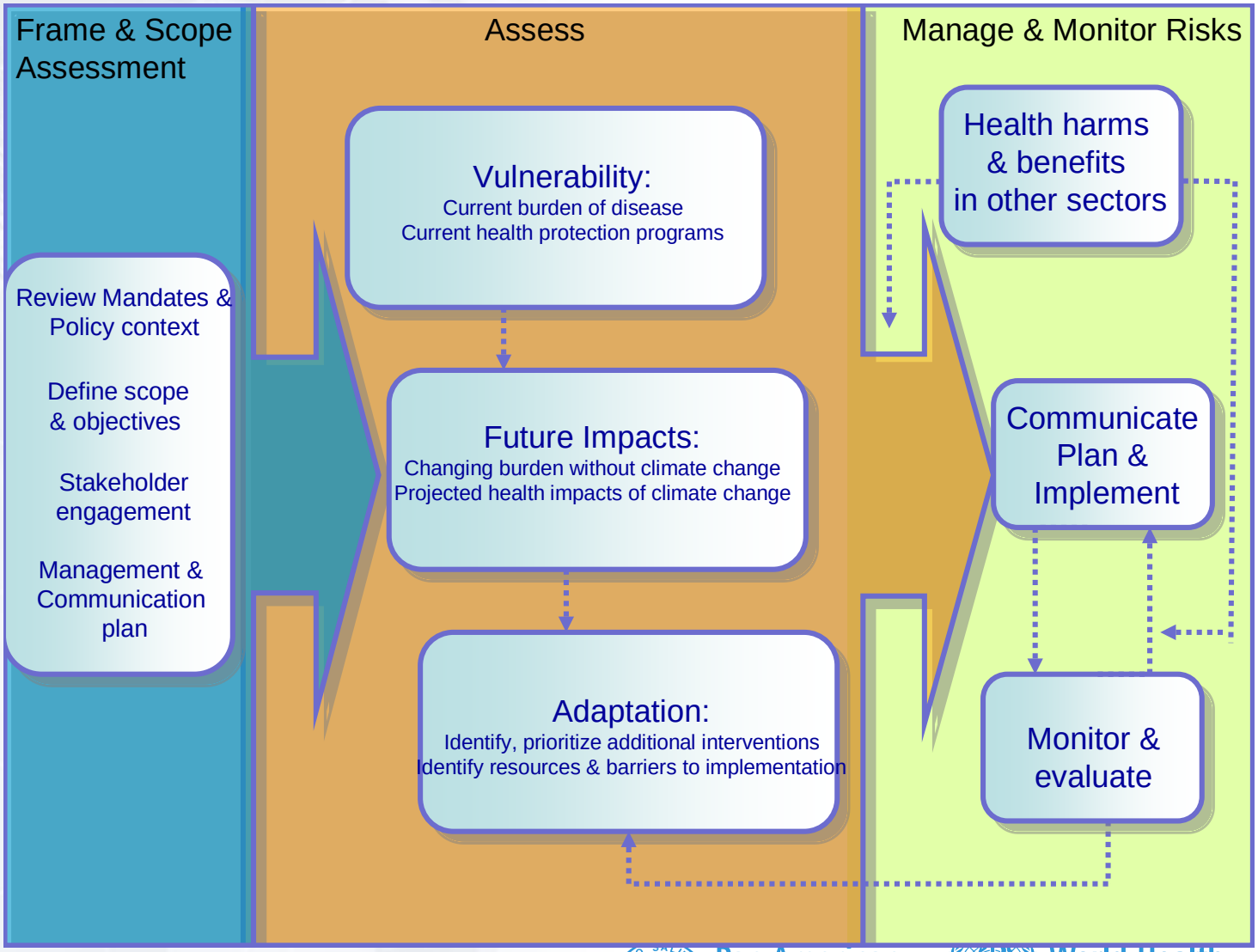
Adaptation

Vulnerability and Adaptation Assessment process



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Dominica

- Goal : to assess the vulnerability of the health of the population of Dominica to the possible impacts of climate variability and change.
- Specific objectives:
  - To determine the association between climate variability and change and three priority areas
    - vector borne diseases,
    - food safety and security
    - water quality).
  - To generate evidence of the risk presented by climate variability on health and develop adaptation plans to reduce the impact.
  - To establish baseline data on the three priority areas and identify priorities in program planning to reduce the transmission of diseases through the various pathways.
  - To inform the development of a climate change strategy for health
  - To identify information and data gaps and inform future research

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Vector-borne Diseases

- **Surveillance**: abundance of vectors; prevalence of disease-causing pathogens; disease rates within the human population associated with climate risks
- **Exposure**: effects of changing climate conditions (e.g., rising temperatures, humidity, increased precipitation and flooding events) on the abundance and distribution of vectors and intermediate hosts; effects of changing climate conditions on biotic factors (vegetation, host species, predators, competitors, parasites and human interventions); projected impacts of climate change on disease rates
- **Sensitivity**: mosquito-borne illnesses (e.g., Dengue Fever, Chikungunya); rodent-borne disease (e.g., Leptospirosis); resilience behaviour and immune status of the human population
- **Adaptations**: actions to reduce the abundance of vectors and risks from vector-borne diseases; adaptation options such as effective water storage methods and waste-water management systems

Water-borne Diseases

- **Surveillance**: prevalence of disease-causing pathogens; disease rates within the human population associated with climate risks
- **Exposure**: effects of changing climate conditions (e.g., rising temperatures, increased precipitation and flooding events) on the distribution, availability and quality of drinking water; projected impacts of climate change on disease rates (especially extreme events in influencing water-borne outbreaks)
- **Sensitivity**: water-borne illnesses (e.g., gastroenteritis); microbiological or chemical contamination of water sources associated with effects of temperature variability and pesticide/sediment run-off; resilience behaviour and immune status of the human population
- **Adaptations**: preventative measures to reduce risks from contamination of drinking water; adaptation options — e.g.
  - i) development of a comprehensive water resource management plan to regulate harvesting, conservation and export of water,
  - ii) agro-forestry for soil and watershed protection

Food Safety and Security

- **Surveillance**: prevalence of disease-causing pathogens causing food contamination; disease rates within the human population associated with climate risks
- **Exposure**: contamination of food; effects of changing climate conditions on the availability of nutritious and safe food production and crop diversity; limited access to safe and available food sources; variability/stability of food prices and supply; projected impacts of climate change and environmental conditions on agricultural and fishing harvests and disease rates
- **Sensitivity**: food-borne illnesses and food insecurity; socially and economically disadvantaged populations who lack reliable access to safe and available food sources
- **Adaptations**: preventative measures to reduce risks from food contamination; actions to reduce risks from food insecurity; actions to improve the degree of access to services associated with food safety (water, health and sanitation); adaptation options consistent with the promotion of food security and safety through climate resilient agricultural and fisheries development; effective waste management systems

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“BAD” News about Adaptation

- We cant see future clearly: evidence/data limitations & complex pathways
- Its not only about doing better development
- New information and new skills are required to be “smarter” about what we have always done
- New partnerships are essential
- Not all climate risks will be avoidable or “fixable”

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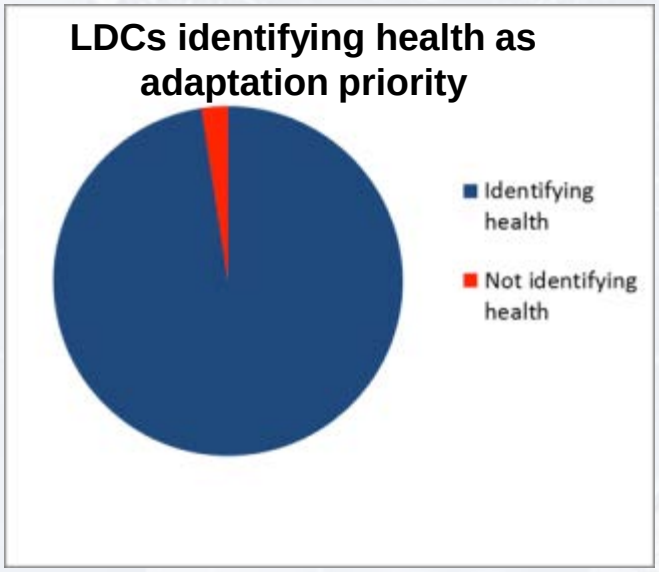
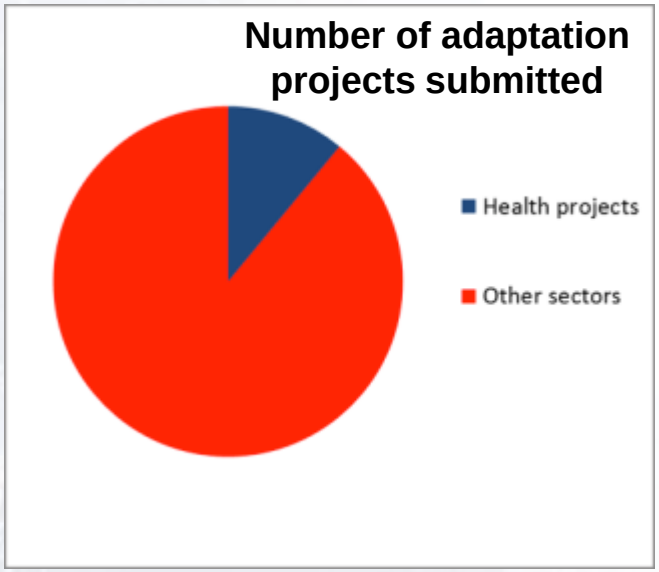
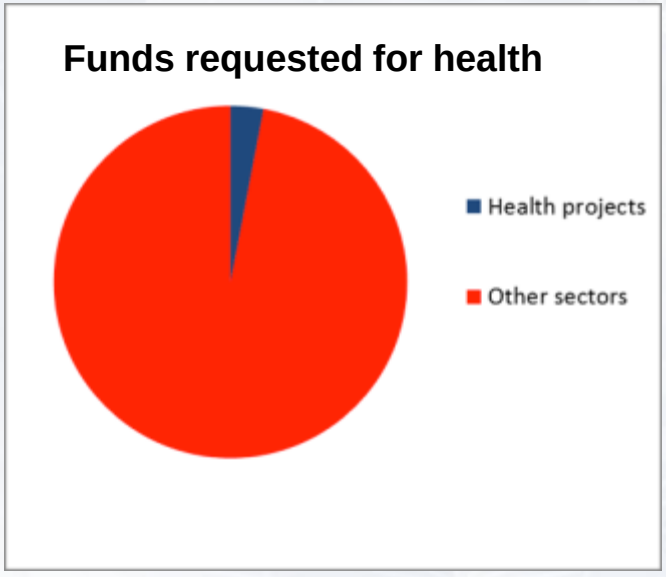
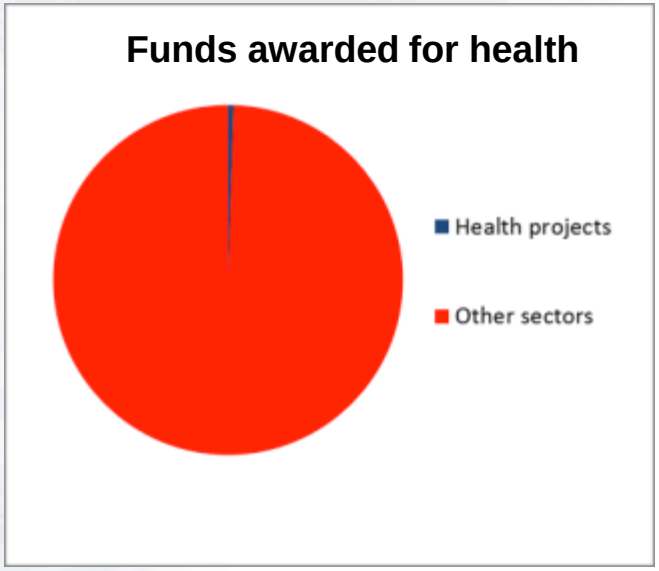
Health continues to be neglected in climate change support mechanisms









What is the status of health in the UNFCCC ?

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Potential explanations for lack of support to protect health:

- Overall lack of funding for adaptation in general
- Health community largely absent from the NAPA process
- Health sector not submitting proposals
- Not enough technical guidance
- Continued low awareness and capacity

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Water Solutions

- ↑ irrigation efficiency
- ↑ harvests from rainfall-watered lands
- ↑ water storage capacity
- ↑ forest cover, restore coastal ecosystems
- Reuse water
- ↓ energy use; both fossil fuel & hydro
- ↓ amount of meat in diets (75 gal/# vs. 800 gal/#)
    - animal agriculture worldwide contributes ~20% GHG
    - ↓ meat consumption from 100g/day/person to 90g/day/p
        - Rich countries eat less, poor countries eat more
        - <1/2 coming from red meat

Postel, S. 2005. Liquid Assets: The Critical Need to Safeguard Freshwater Ecosystems. Worldwatch Paper 170, p. 39 and McMichael et al. Lancet online 9-13-07

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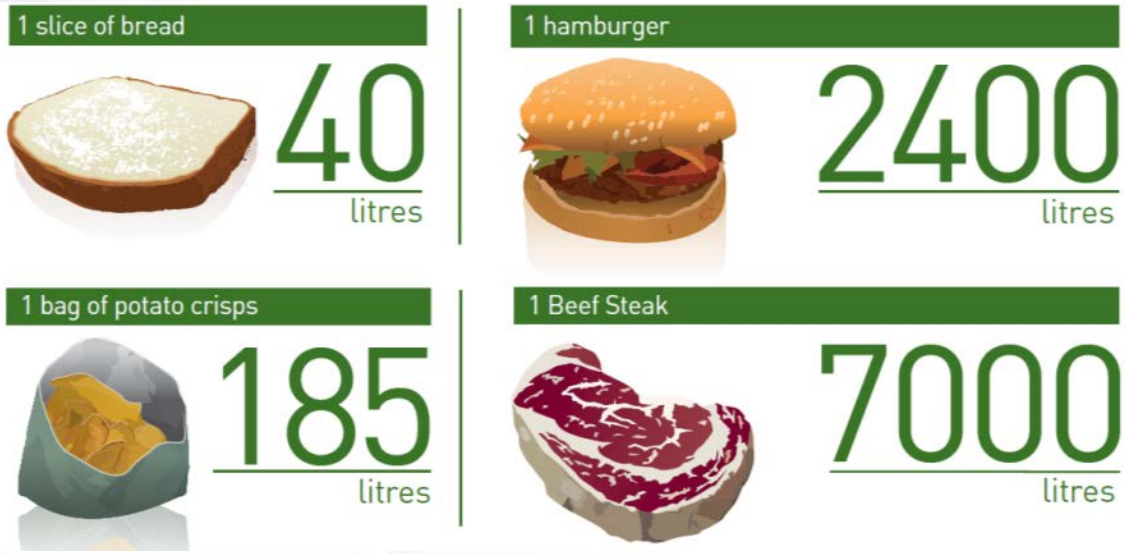
How much water does it take to produce?



FAO, 2012

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