Caribbean Climate and Health Responders Course

Health System Resilience in a Changing Climate – May 25, 2022

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Promoting Health of People and Planet Together

Columbia Mailman School of Public Health
Global Consortium on Climate and Health Education

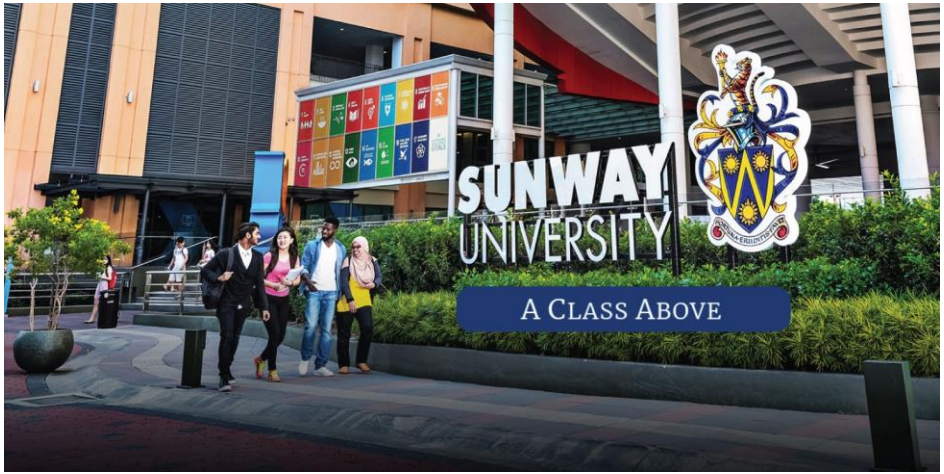
Caribbean Institute for Meteorology and Hydrology
CIMH

Planetary Health – Our Patients: People & Planet

Who am I?

SUNWAY
CENTRE FOR PLANETARY HEALTH

Recasting the partnership between people and planet so that both can thrive



Tan Sri Dr. Jemilah Mahmood
Executive Director

Dr. Renzo Guinto
Chief Planetary Health Scientist

Who am I?

St. Luke's Medical Center
College of Medicine
William H. Quasha Memorial

Planetary & Global Health Program

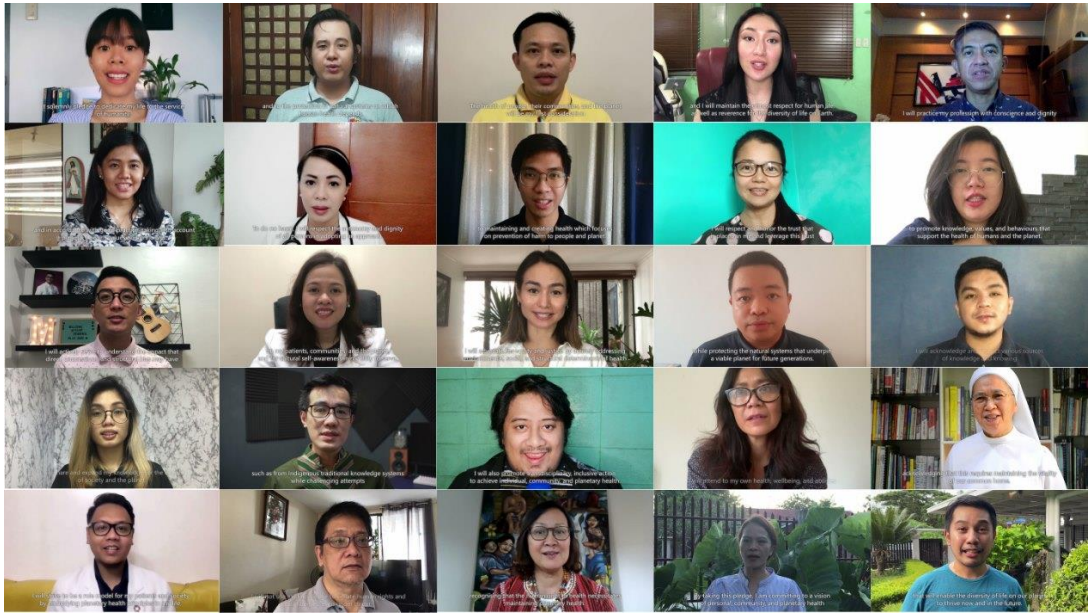
Connected to the world
Caring for people & planet
Committed to the future

Who am I?

Who am I?

PLANETARY HEALTH PHILIPPINES

Establishing a community for planetary health in the Philippines



Learning Objectives

- Explain how **vulnerability assessments** are used to understand individual, community and health system impacts and vulnerabilities
- Apply principles outlined in **WHO guidance documents** to measure the resilience of health systems
- Describe how **stress testing of health systems** facilitates preparedness for climate change
- Use knowledge of **vulnerability and adaptive capacity** to explore challenges faced by small and remote health systems

Open-Ended Question 1

Do you know any similarity between the Philippines and the Caribbean?

Short Film: Del Carmen, Philippines


Escape


CHRIS
Alleluia

HELP
FOOD
WATER

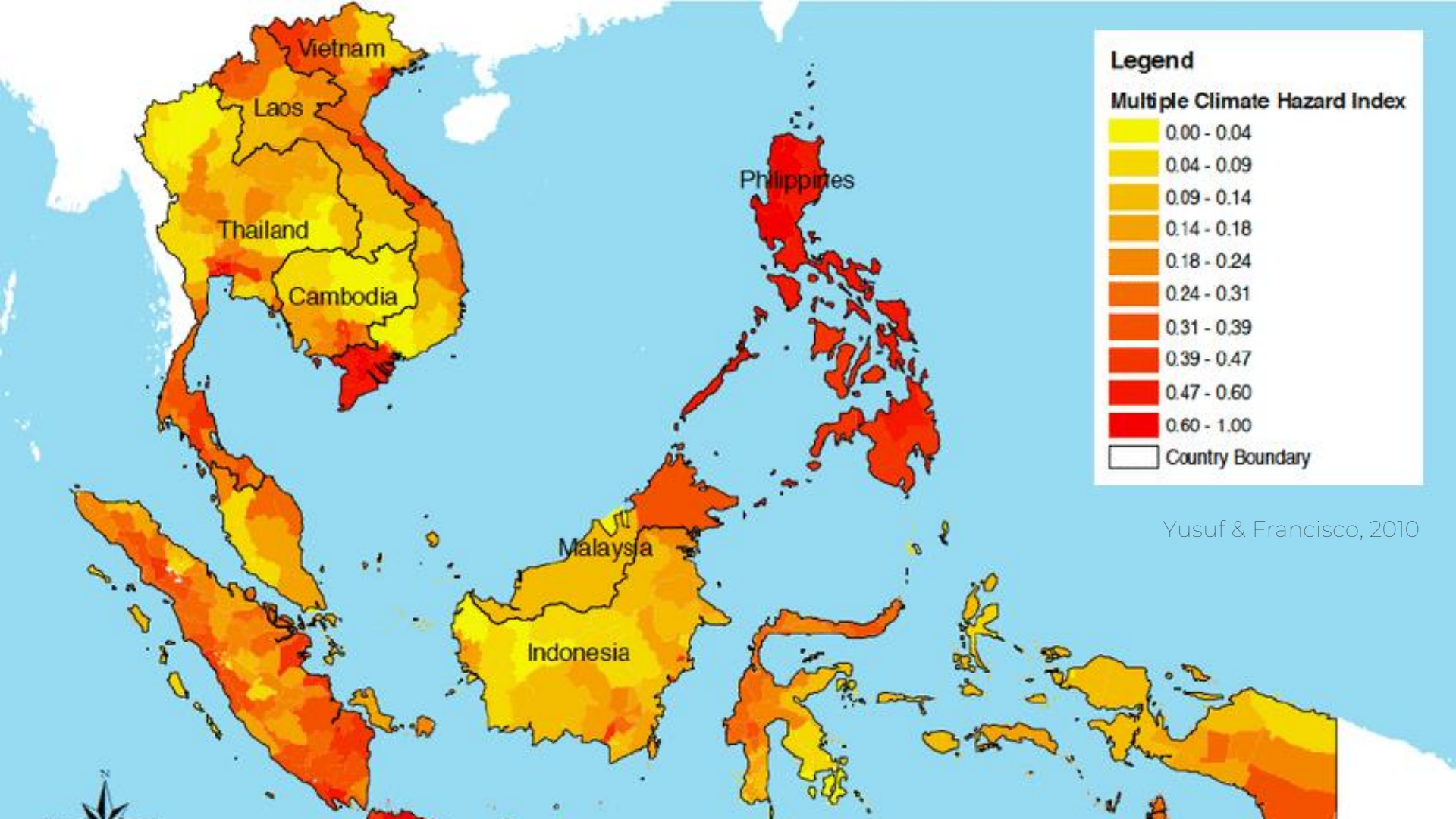
UN News
Global perspective
Human stories

Philippines typhoon recovery, complicated by coronavirus concerns

SCIENTIFIC METHOD —

Ocean levels in the Philippines rising at 5 times the global average

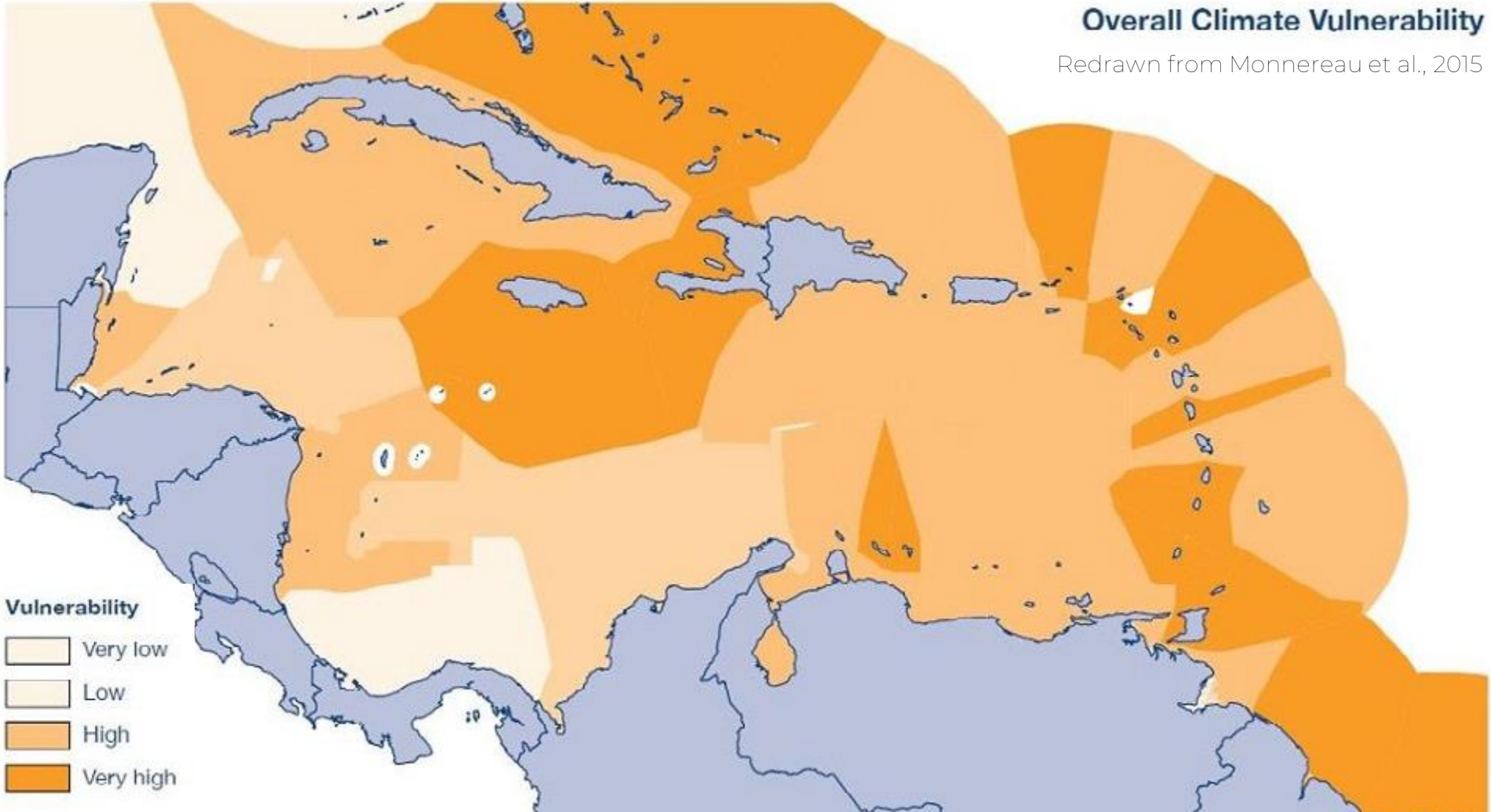
Globally, sea levels are going up, but there are big regional differences.

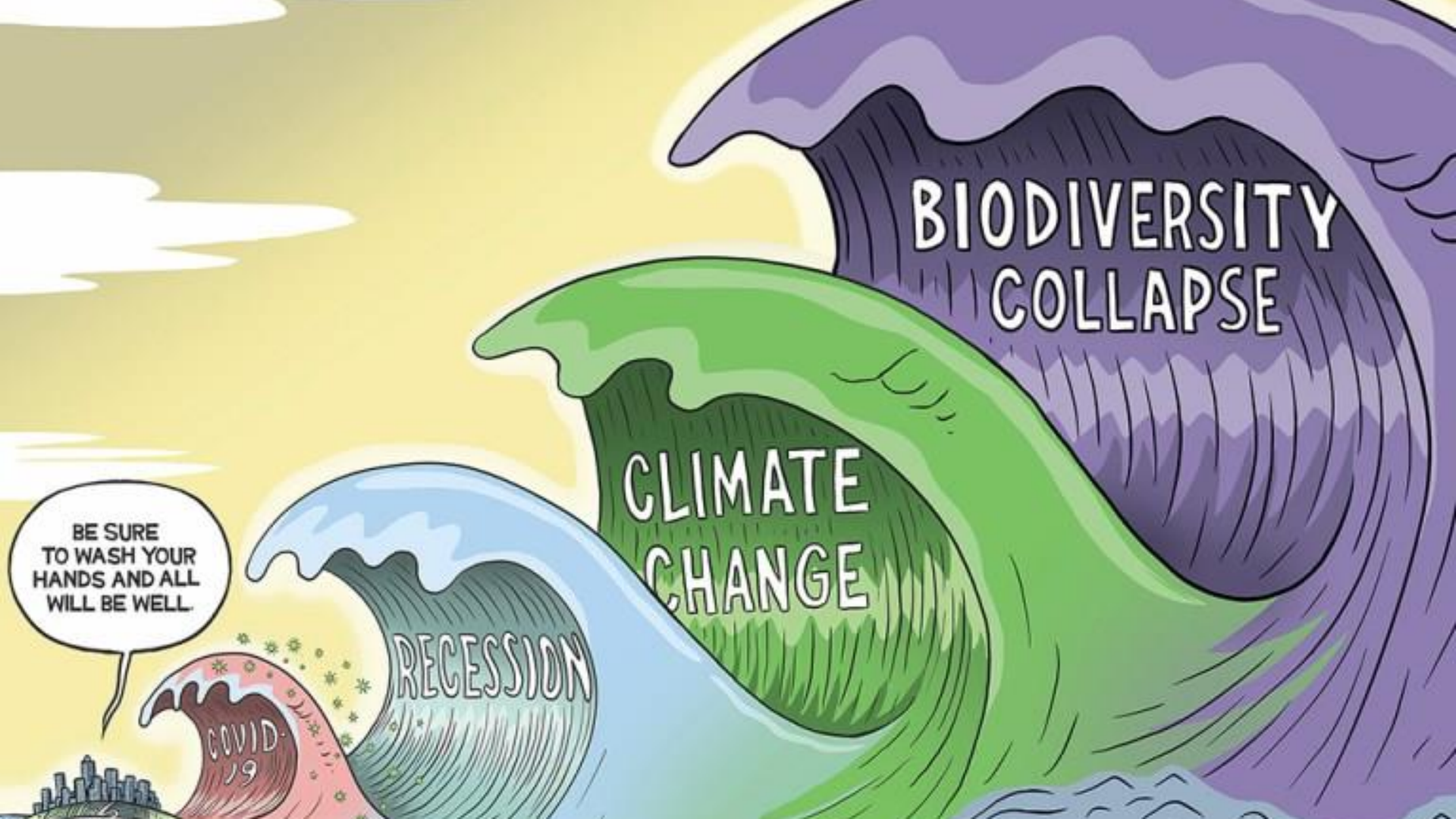


Yusuf & Francisco, 2010

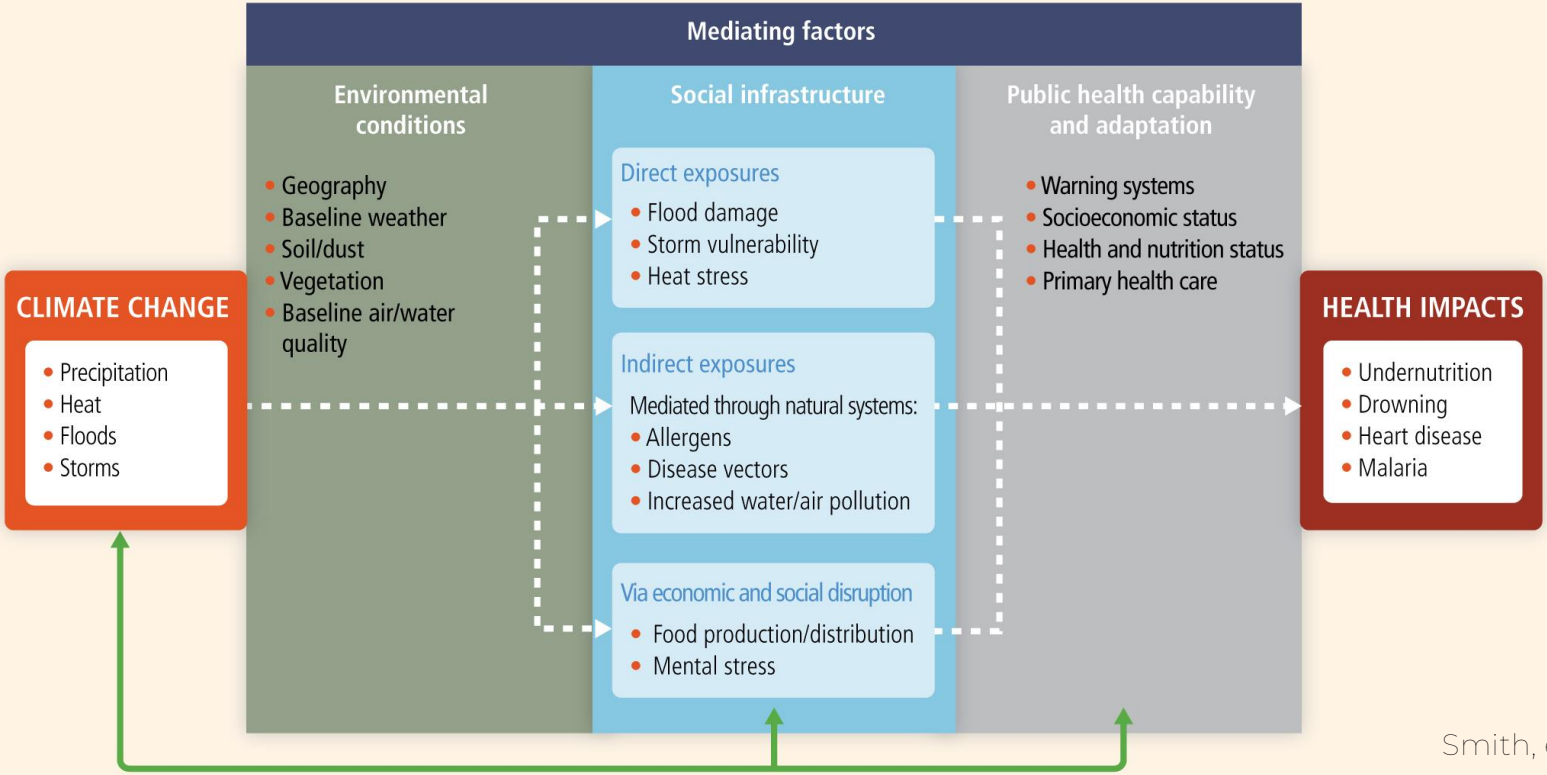
Overall Climate Vulnerability

Redrawn from Monnereau et al., 2015



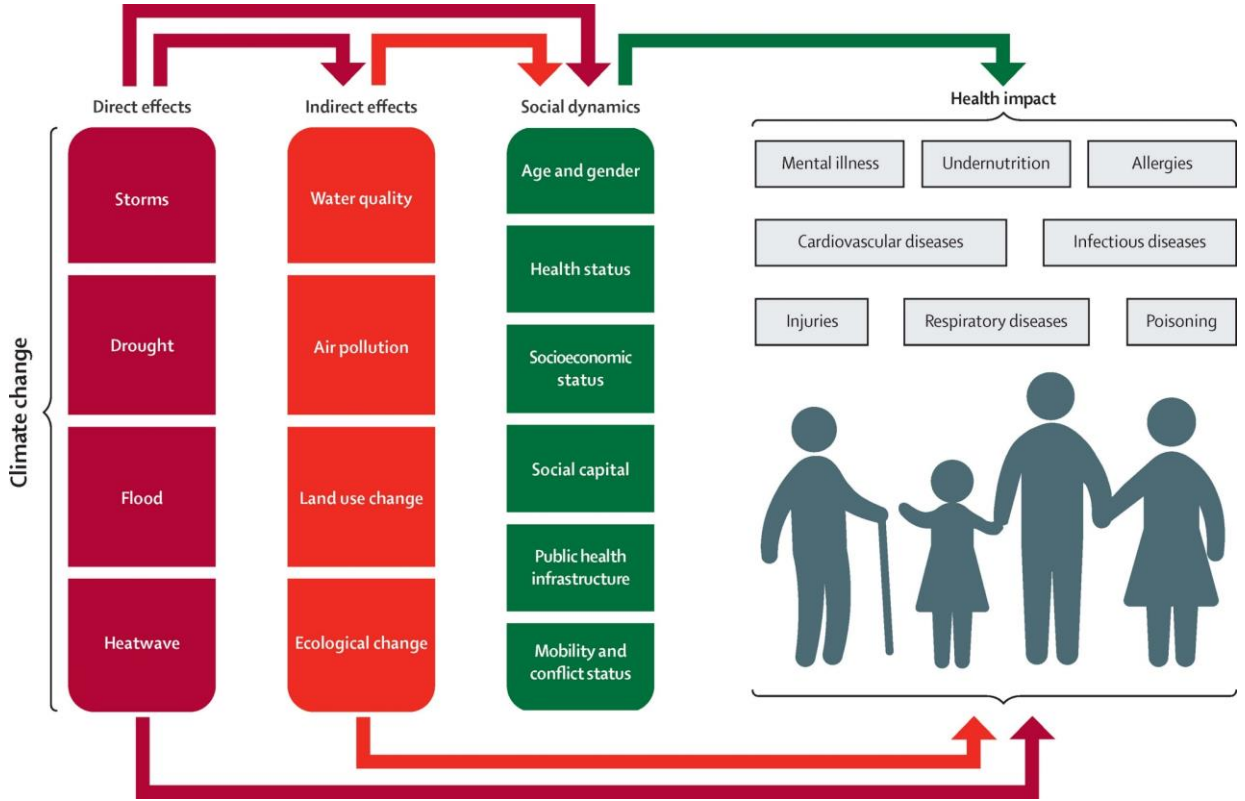

BIODIVERSITY COLLAPSE
CLIMATE CHANGE
RECESSION
COVID-19
BE SURE TO WASH YOUR HANDS AND ALL WILL BE WELL.

Climate Change and Human Health



Smith, et al, 2014

Climate Change and Human Health



Watts, et al., 2015

Health Systems – not ready for pandemics or climate change

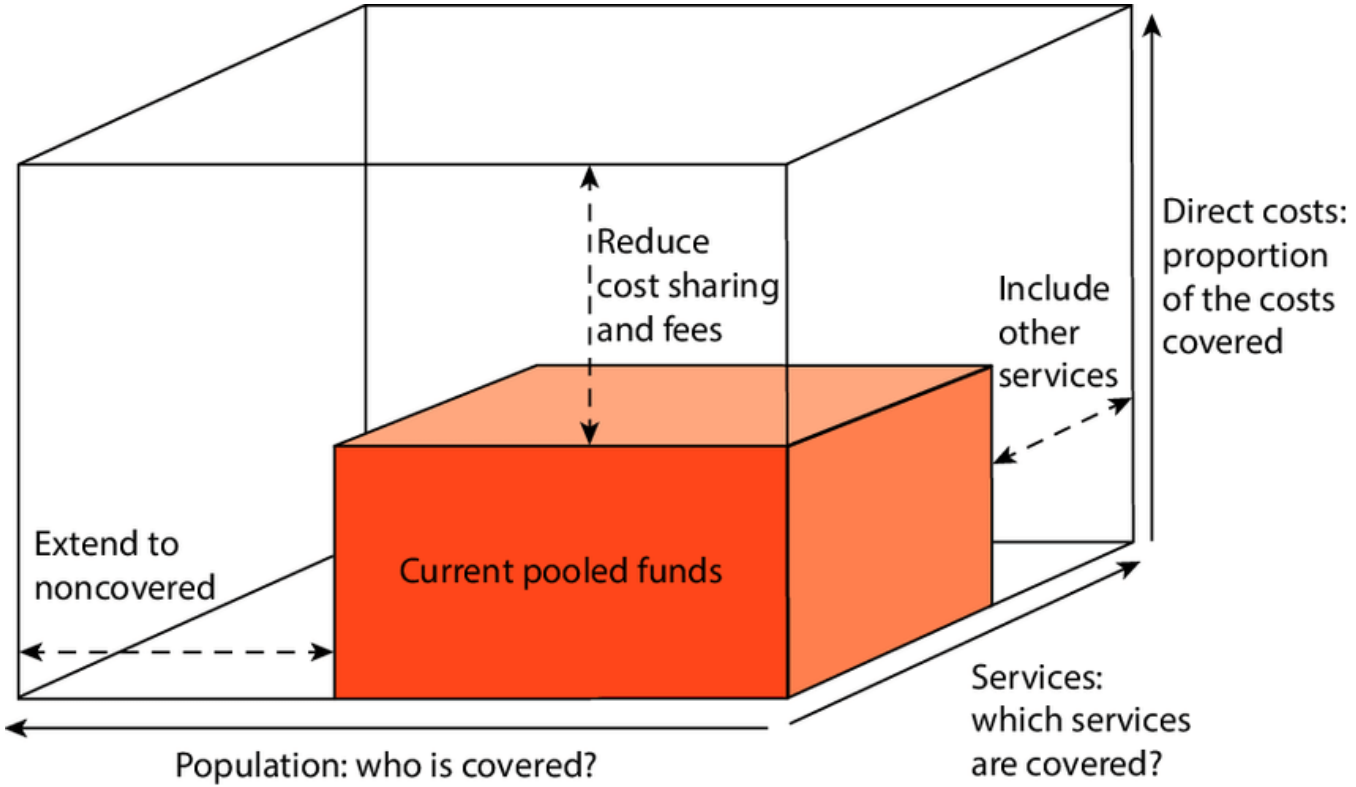
Besa enters the covid-19 ward, where he'll be stationed from 6 a.m. to 2 p.m.

MARTIN SAN DIEGO/FOR THE WASHINGTON POST

Open-Ended Question 2

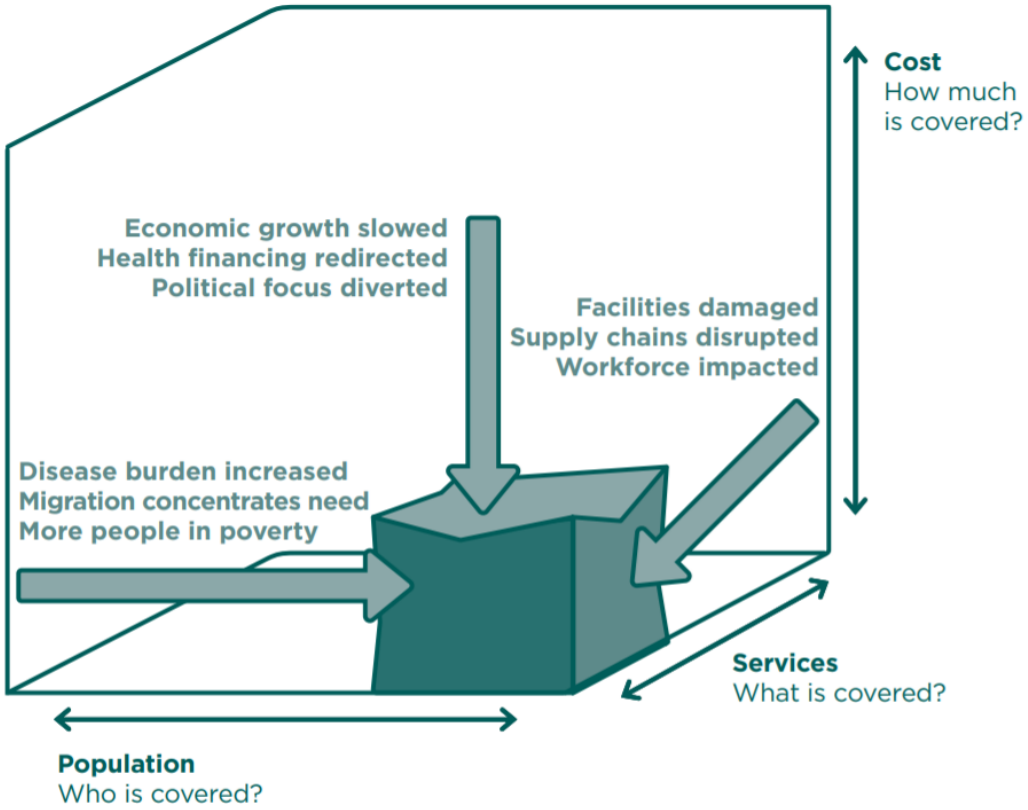
How does climate change impact health systems?

Universal Health Coverage (UHC) Cube



WHO, 2010

Climate Change Compresses the UHC Cube



WISH, 2020

Global Progress in Climate & Health Mainstreaming

50%

- Have a national health and climate change plan

> 50%

- Moderate or low levels of implementation, primarily due to financing barriers

< 50%

- Conducted a health vulnerability and adaptation assessment

70%

- NDCs that included health considerations, mostly from adaptation perspective

WHO, 2018; WHO, 2020

Climate and Health Financing Gap

- While financing has increased in recent years, not catching up with the annual adaptation costs – in developing countries alone, estimated at USD 70 billion, rising to USD 280 - 500 billion by 2050
- COVID-19 is straining public and private budgets
- None of the 203 UNFCCC-funded adaptation projects since 2015 were dedicated to health

Are we ready to build health systems

that consider the climate?

Mayhew, et al., 2013

Open-Ended Question 3

When you hear the word ‘resilience’, what word/phrase/image first comes to mind?

What is RESILIENCE?

The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation.

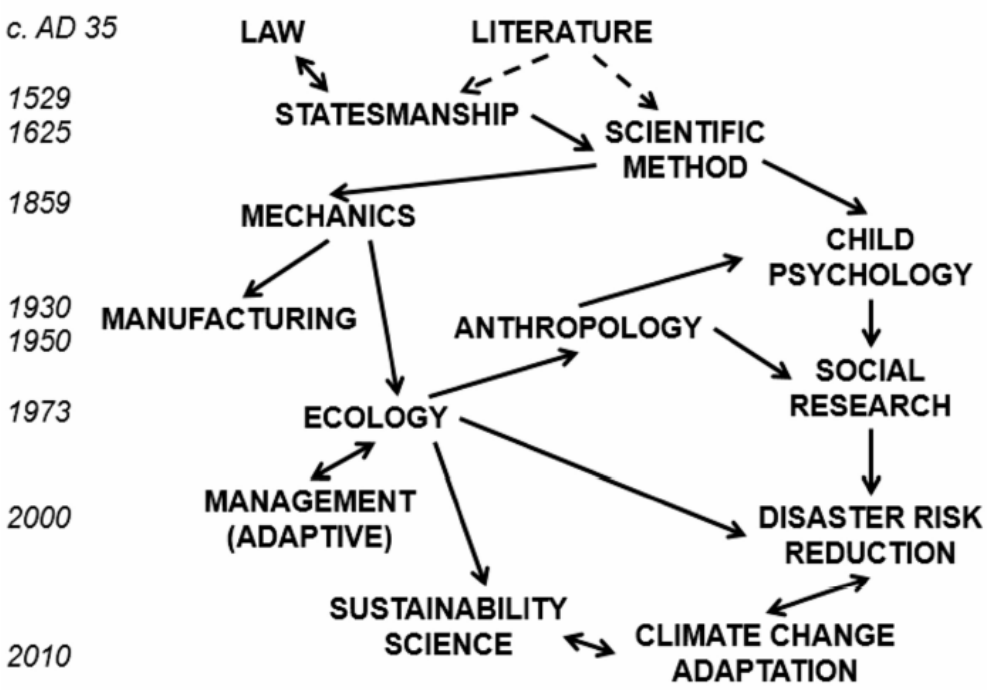
IPCC, 2014

What is RESILIENCE?

The capacity of social, economic, and environmental systems to ***cope*** *with a hazardous event or trend or disturbance,* ***responding or reorganizing*** *in ways that* ***maintain their essential function****, identity, and structure, while also maintaining the capacity for* ***adaptation, learning, and transformation****.*

IPCC, 2014

Evolution of the term ‘resilience’



Adapted from Alexander 2013

Resilience vis-à-vis ADAPTATION

*The process of **adjustment** to actual or expected climate and its effects. In human systems, adaptation seeks to **moderate or avoid harm or exploit beneficial opportunities***

Intergovernmental Panel on Climate Change

Other Related Terms

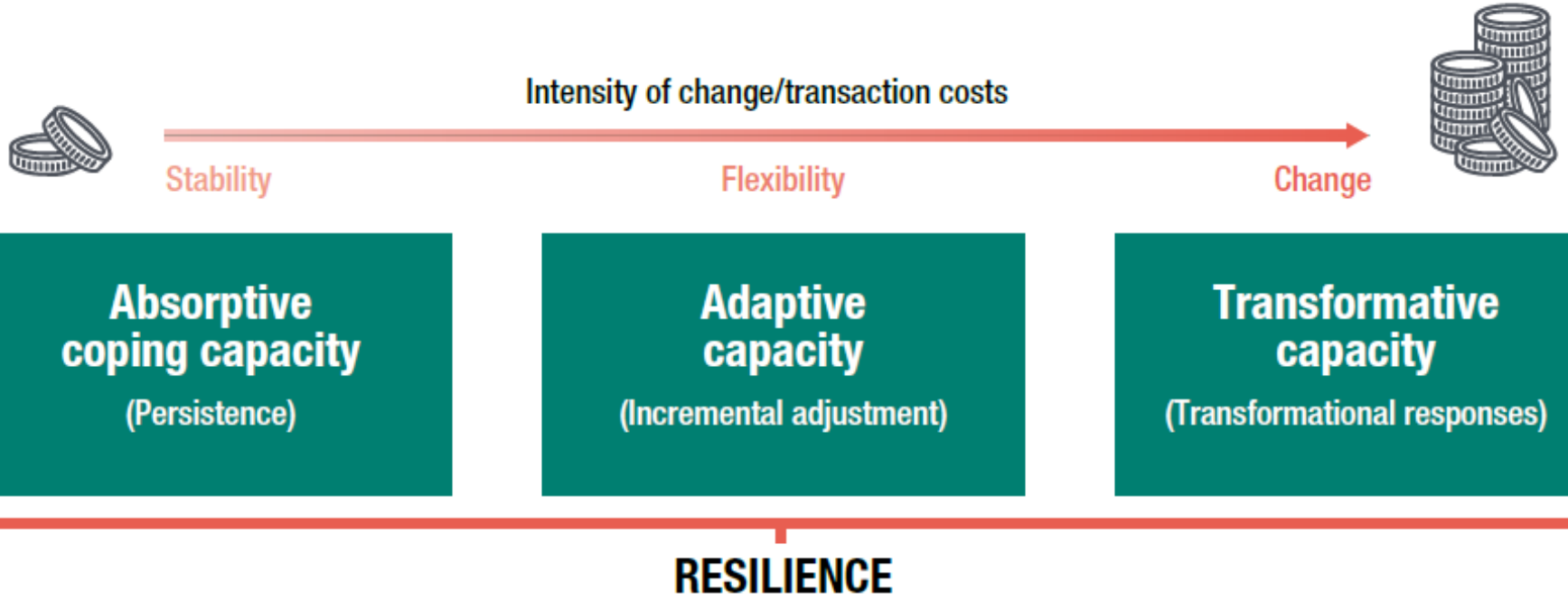
Adaptive capacity: **“**The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences**”** (IPCC, 2014)

Adaptive capacity manifests as adaptations (Smit & Wandel, 2005) and is a resource for maintaining resilience (Engle, 2011; Nelson, 2011)

Vulnerability: **“**The degree to which a system is susceptible to, or unable to cope with, adverse effects of. climate change, including climate variability and extremes**”** (IPCC, 2014)

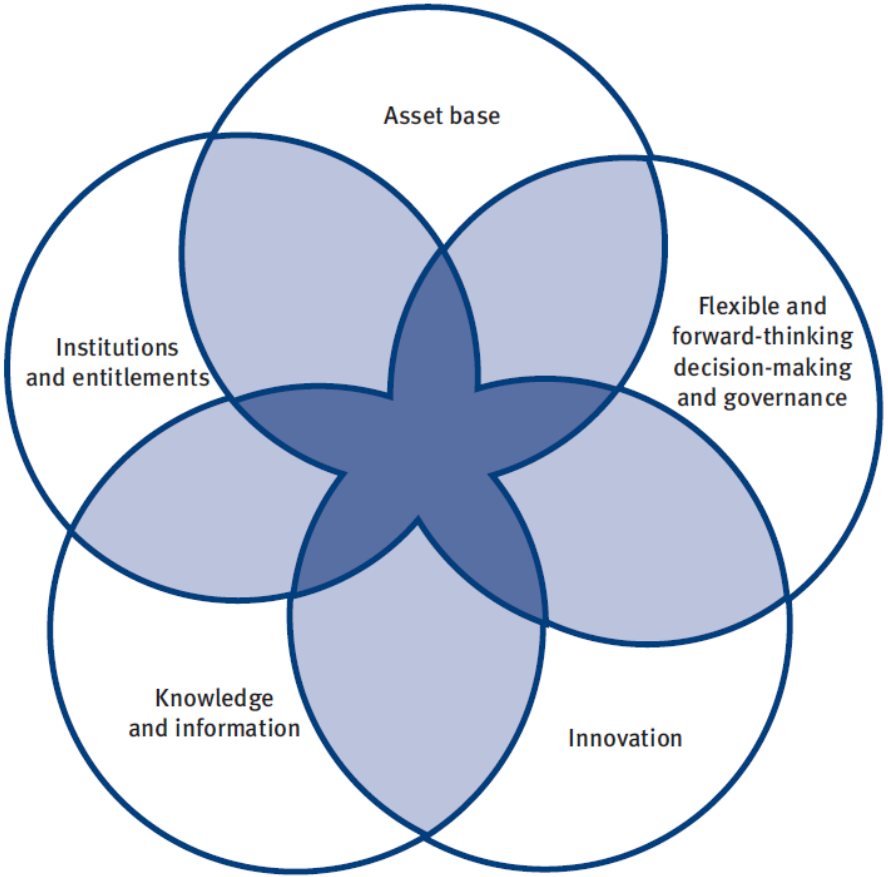
Vulnerability = exposure to hazard + sensitivity + adaptive capacity (Smit & Wandel, 2006)

Capacities for Resilience



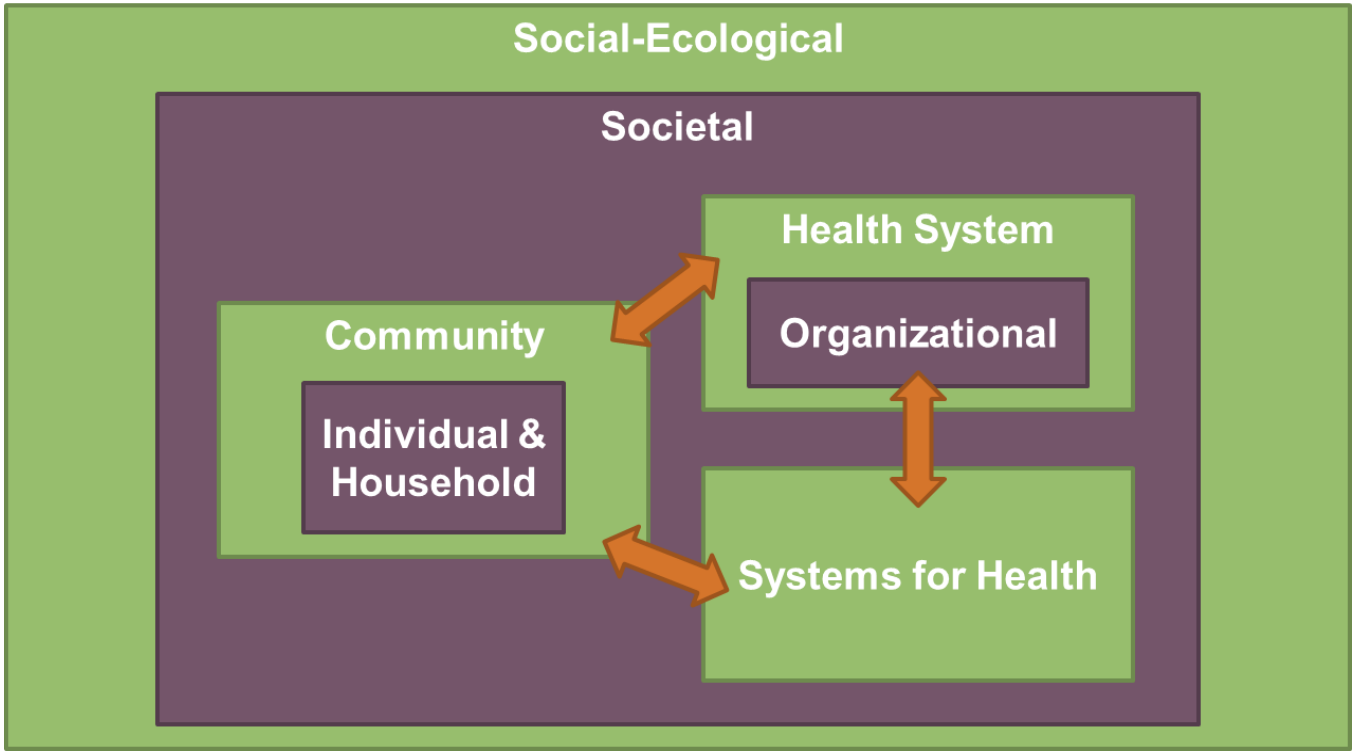
Bene, et al, 2012

Figure 1: The relationships between characteristics of adaptive capacity at the local level



ODI, 2010

Spaces for Health Resilience and Adaptation



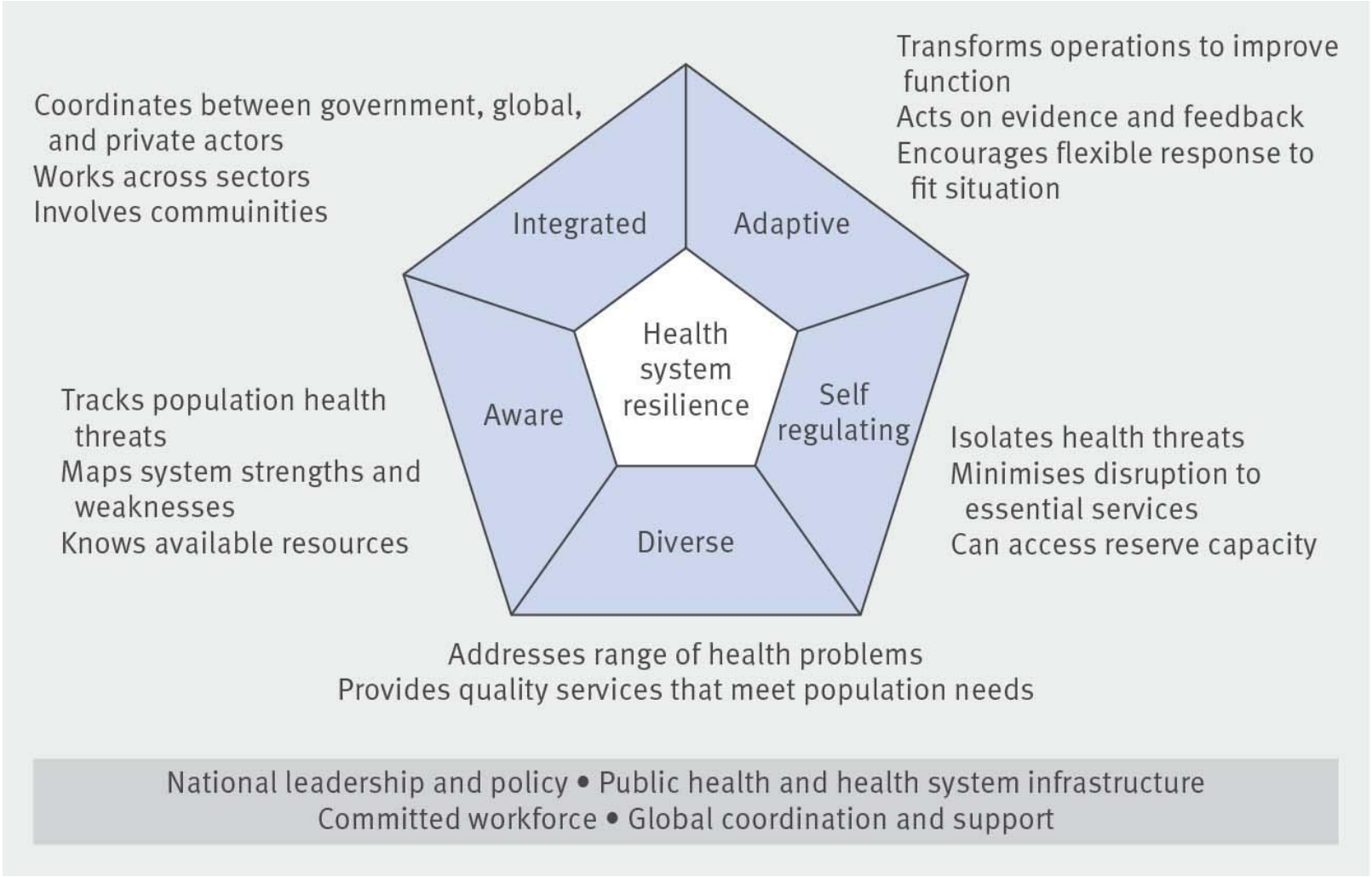
Guinto, 2019

What is a RESILIENT HEALTH SYSTEM?

The capacity of health actors, institutions, and populations to prepare for and effectively respond to crises; maintain core functions when a crisis hits; and, informed by lessons learned during the crisis, reorganise if conditions require it

Kruk, et al, 2015


NO
U-TURN
ALONG
ORTIGAS
AVENUE



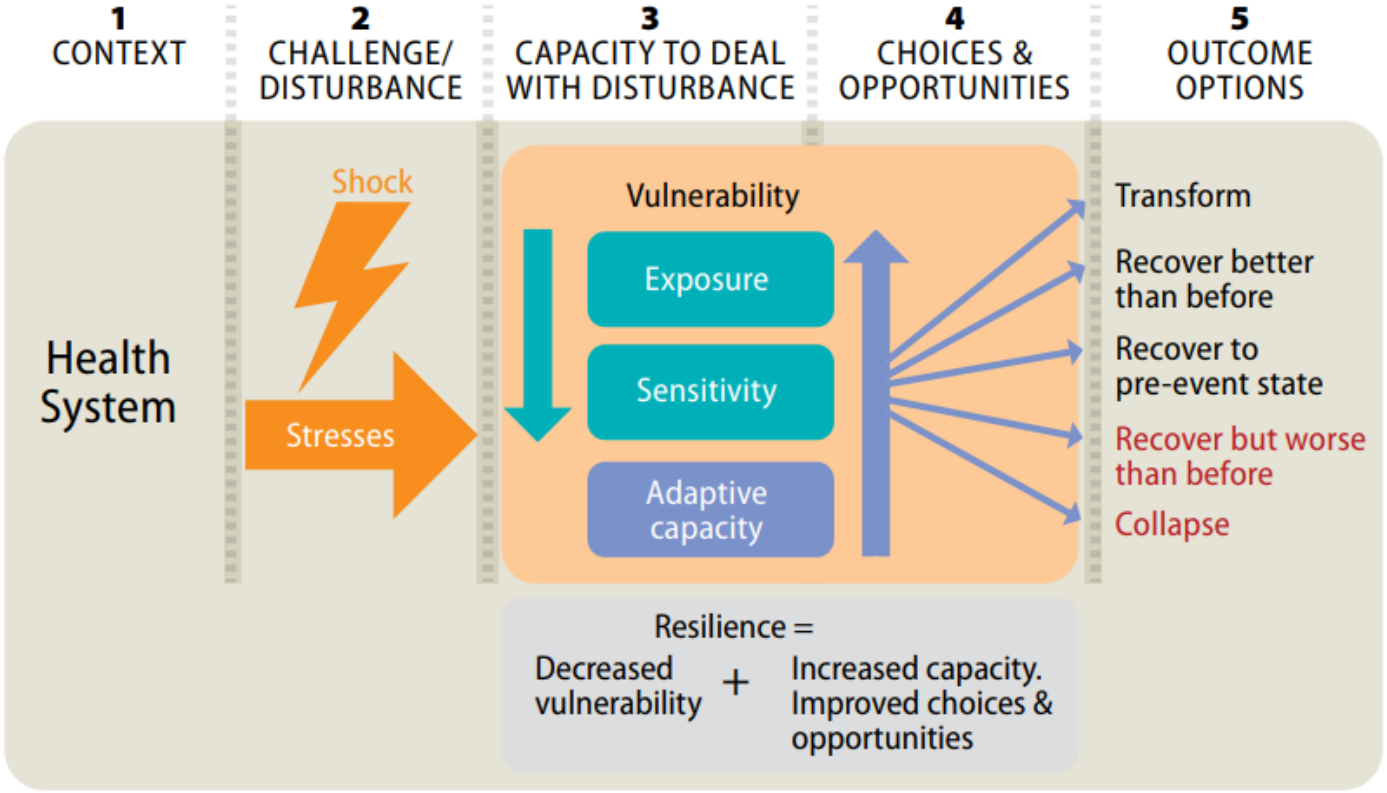
Kruk, et al. 2017

What is a CLIMATE-RESILIENT HEALTH SYSTEM?

*A climate resilient health system is one that is capable to **anticipate, respond to, cope with, recover from and adapt to** climate-related shocks and stress, so as to bring sustained improvements in population health, despite an unstable climate.*

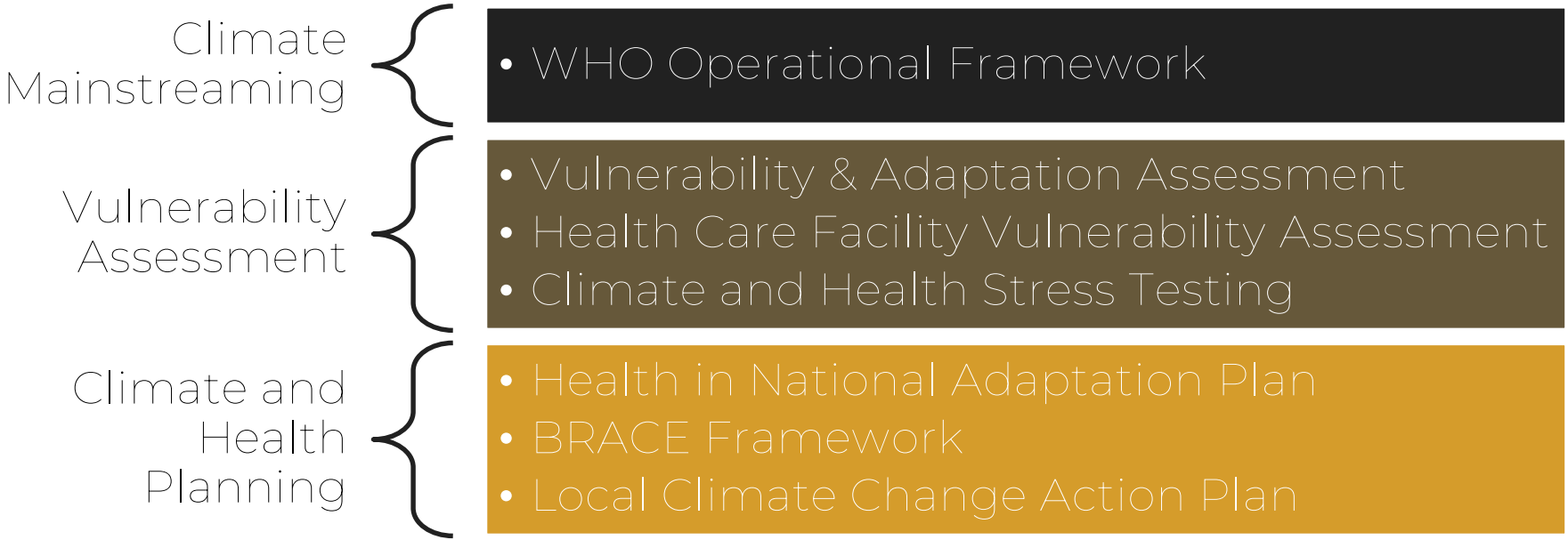
WHO, 2015

Conceptual Framework for Resilience



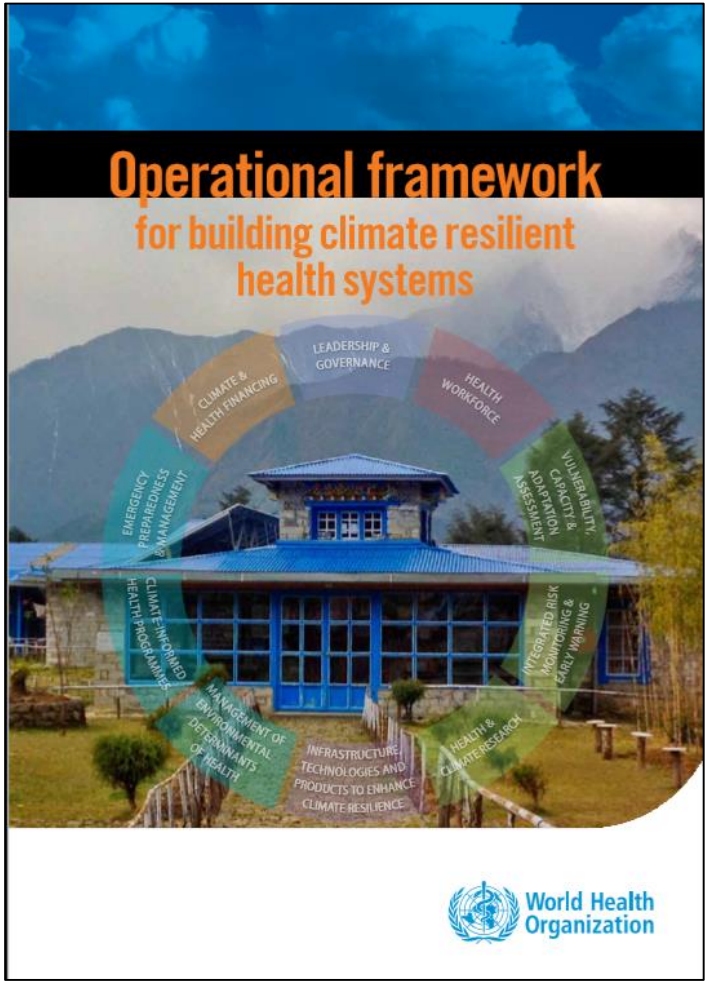
WHO, 2015

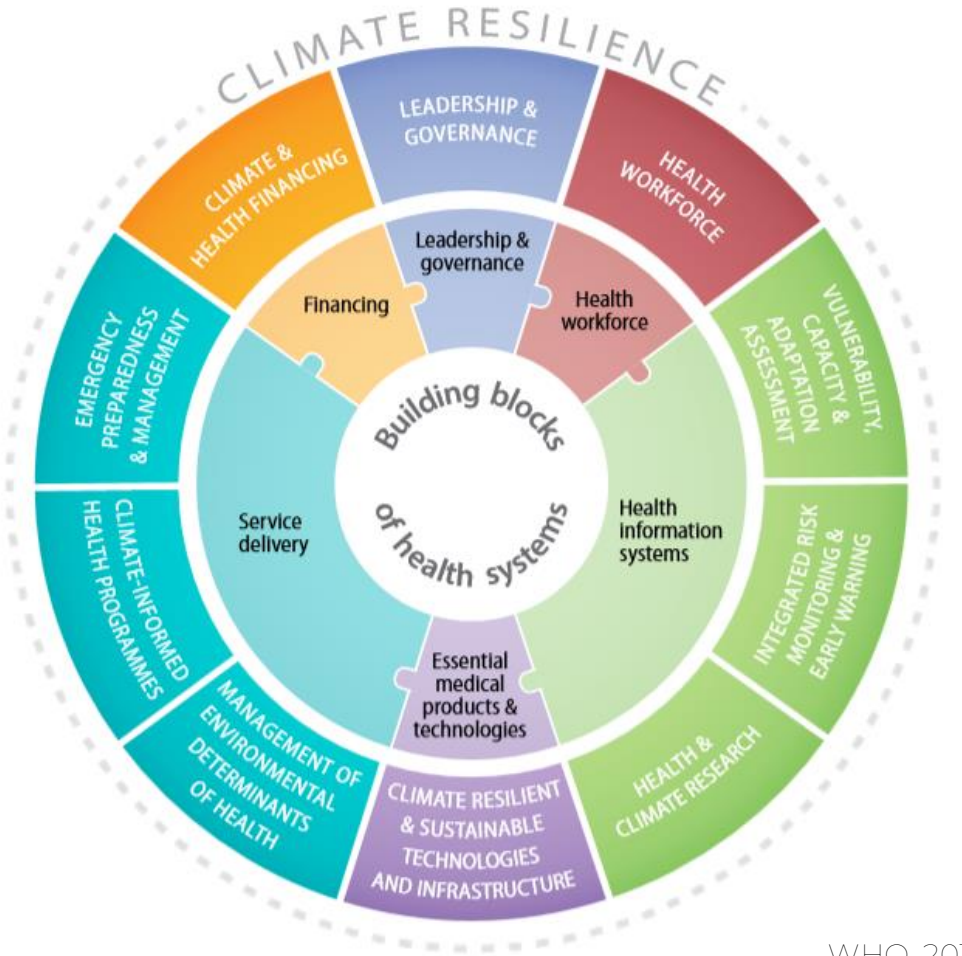
Tools for Building Health System Resilience



Open-Ended Question 4

Name a ‘building block’ of the health system


Operational framework
for building climate resilient health systems
LEADERSHIP & GOVERNANCE
CLIMATE & HEALTH FINANCING
HEALTH WORKFORCE
VULNERABILITY, CAPACITY & ADAPTATION ASSESSMENT
EMERGENCY PREPAREDNESS & MANAGEMENT
CLIMATE-INFORMED HEALTH PROGRAMMES
INTEGRATED RISK MONITORING & EARLY WARNING
MANAGEMENT OF ENVIRONMENTAL DETERMINANTS OF HEALTH
INFRASTRUCTURE, TECHNOLOGIES AND PRODUCTS TO ENHANCE CLIMATE RESILIENCE
HEALTH & CLIMATE RESEARCH
World Health Organization

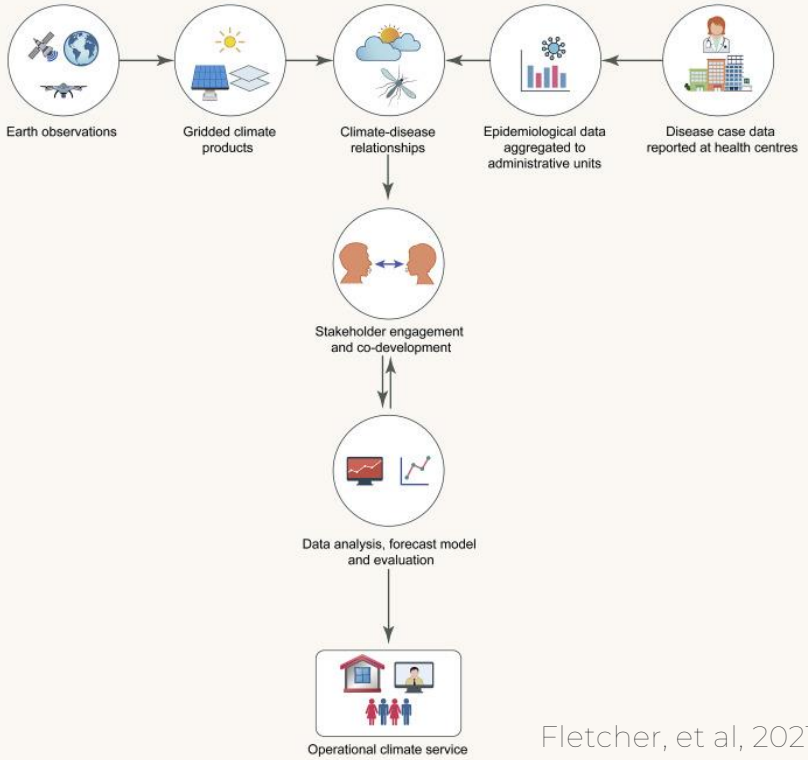

CLIMATE RESILIENCE
LEADERSHIP & GOVERNANCE
HEALTH WORKFORCE
VULNERABILITY, CAPACITY & ADAPTATION ASSESSMENT
INTEGRATED RISK MONITORING & EARLY WARNING
HEALTH & CLIMATE RESEARCH
CLIMATE RESILIENT & SUSTAINABLE TECHNOLOGIES AND INFRASTRUCTURE
MANAGEMENT OF ENVIRONMENTAL DETERMINANTS OF HEALTH
CLIMATE-INFORMED HEALTH PROGRAMMES
EMERGENCY PREPAREDNESS & MANAGEMENT
CLIMATE & HEALTH FINANCING
Leadership & governance
Health workforce
Health information systems
Essential medical products & technologies
Service delivery
Financing
Building blocks of health systems

WHO, 2015

Building Block: Service Delivery

Building Block: Health Workforce

Building Block: Health Information Systems

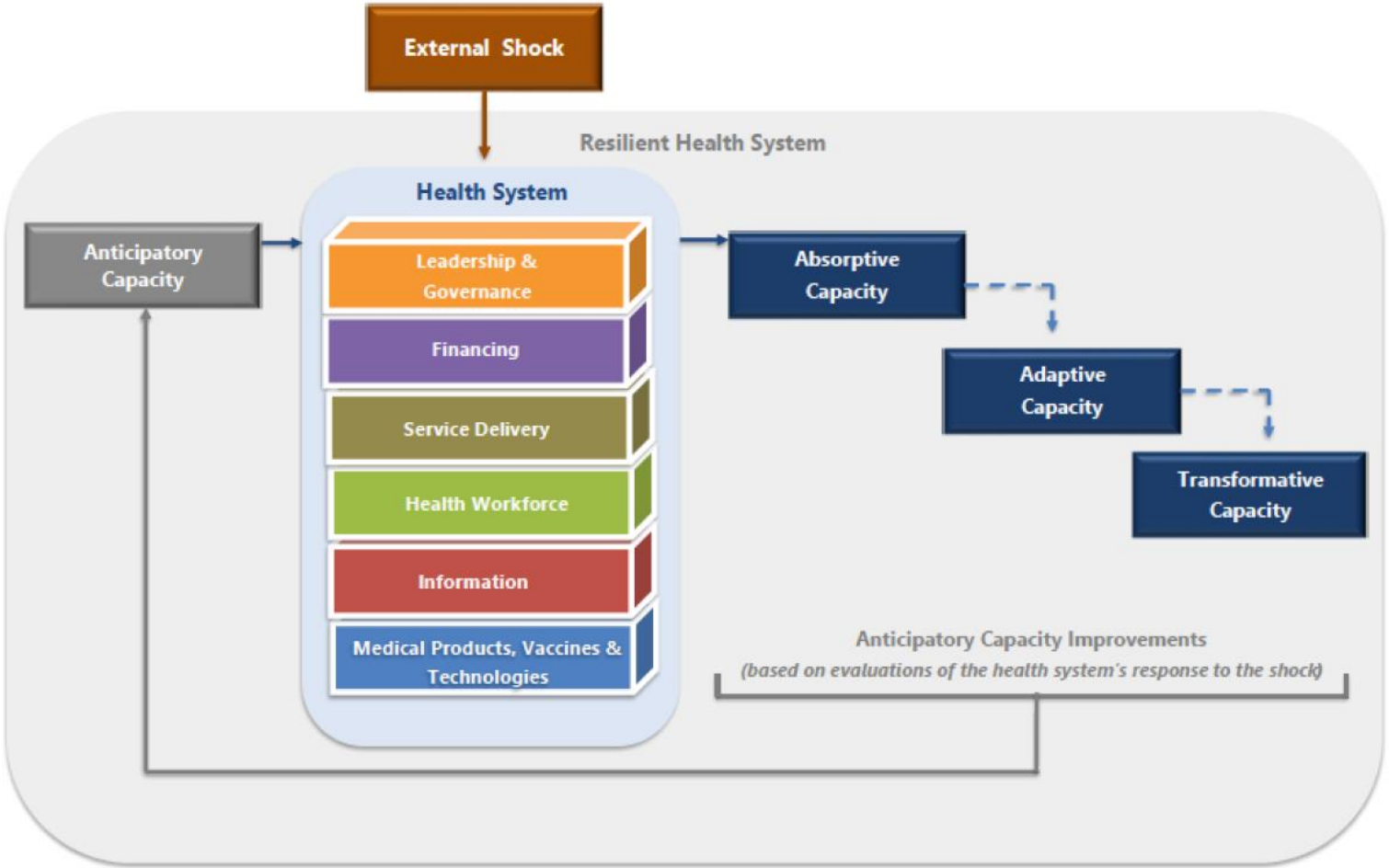


Fletcher, et al, 2021

Table 2. High-level Effects of a Shock on the Building Blocks of a Health System

HEALTH SYSTEM	POTENTIAL EFFECTS OF SHOCK
Leadership & Governance	Existing leadership capacity exceeded (due to increased demands across health systems)
	Increased need for collaboration
Financing	Decline in available financing due to economic impact of shock
	Increased demand for financing to support emergency needs across health system
Service Delivery	Reduced capacity for service delivery (due to damage to infrastructure/equipment and/or reduced workforce)
	Increased demand for specific services (due to disease outbreak, injuries from disaster or subsequent increase in health issues)
	Reduced access to services due to inability to reach facility, damaged facility or financial constraints of patients
Health Workforce	Reduced workforce (due to illness/injury/deaths from diseases or hazards)
Information	Increased demand for timely information
	Reduced capacity to deliver information (due to damages to infrastructure)
Medical Products, Vaccines & Technologies	Increased demand for specific medical products, vaccines and technologies
	Reduced supply chain capacity

Figure 1. Health System Resilience Conceptual Framework



6.2.1 Jamaica

Table 8. Application of Proposed Traffic Light System to Jamaica

Health System Building Block	National HSR Measure	Traffic Light Status
Leadership & Governance	Legislation	
	Health Sector Emergency Response Plan	
	Emergency Operations Center or Unit for health sector	
	Multisectoral Emergency Response Plan	
	Decentralized decision-making	
	Membership in relevant organizations	
	Signatory to agreements	
	Plan for emergency preparedness activities	
Financing	Contingent domestic financing	
	Costed and funded HSS plans	
	Emergency funding arrangements with external bodies	
Service Delivery	HSI Scores	
	UHC Service Coverage Index	
	Critical Infrastructure	***
Health Workforce	Emergency Education & Trainings	***
	Ratio of doctors, nurses and midwives per 1000 population	
	CR-FELTP trained workers	
Information	IHR Core Capacity for Risk Communication	
	Health Information System	
	Information sharing mechanisms	***
	Research capacity	
	Health sector surveillance system	
Medical Products, Vaccines & Technologies	MOH emergency procurement plan	
	Stockpile of medical supplies, medicines, and lab supplies.	
	Mobilization protocols	***

*** Information not found

Table 3: Example of colour-coded responses regarding level of resilience

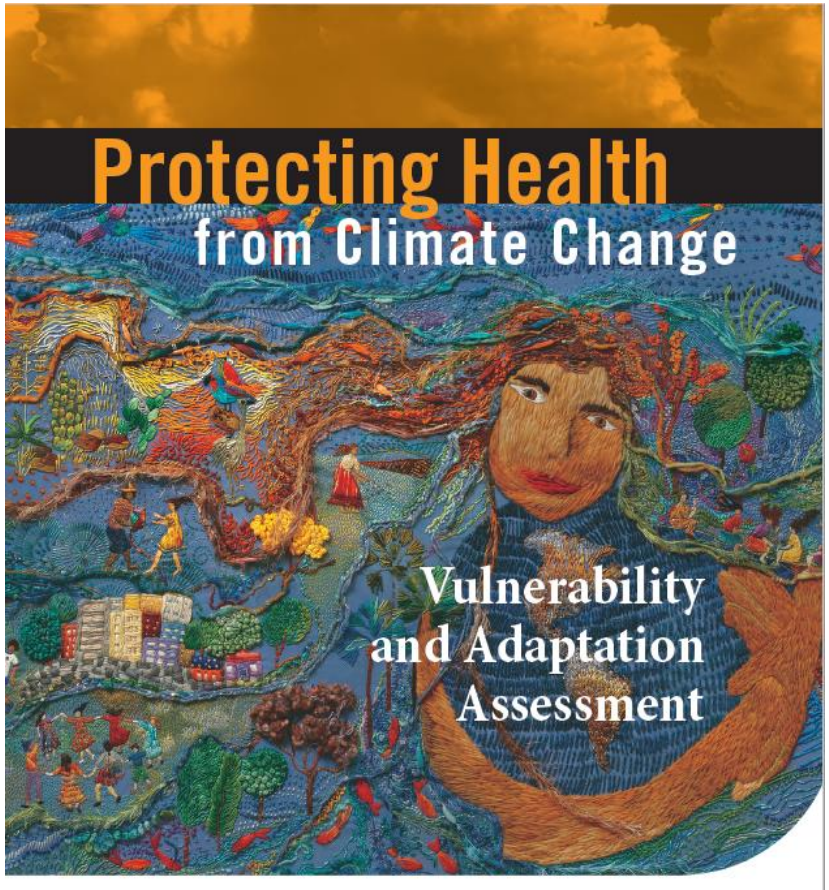
Level of resilience:

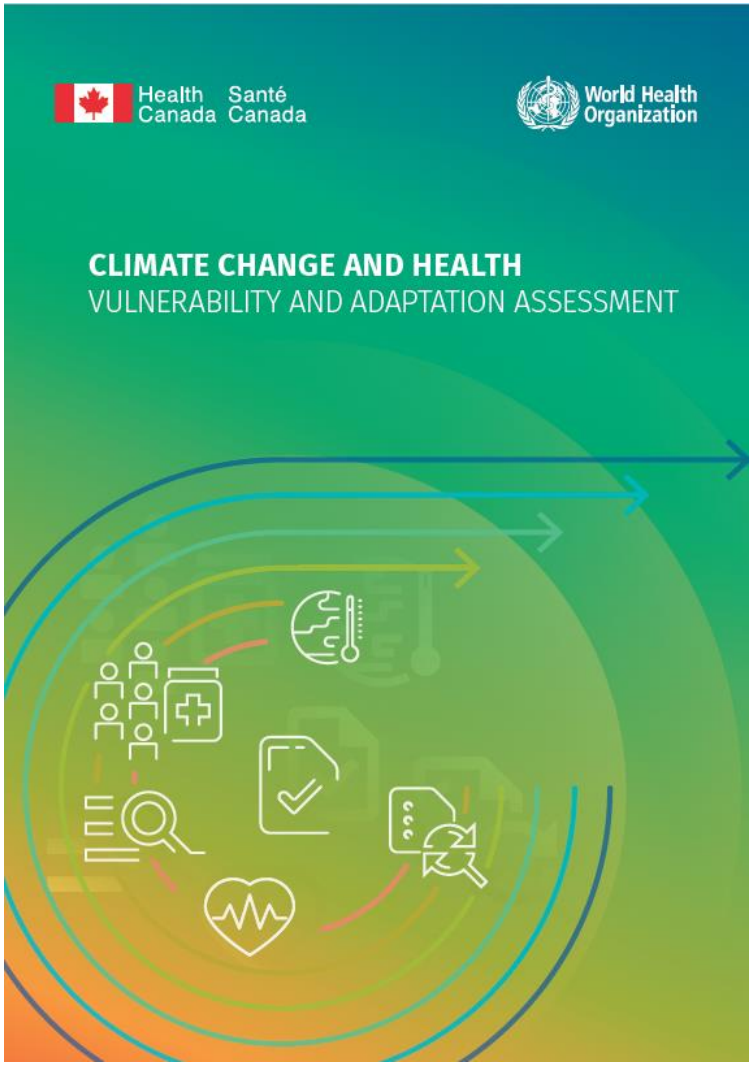
Low (unavailable, unable, unprepared)

Medium (in progress, incomplete, basic)

High (completed, achieved, prepared)

Resilience to short-term risks (<= 10 years)				Additional resilience to long-term climate change risks (>10 years)			
Leadership and governance							
The Ministry of Health has a designated focal point responsible for health and climate change				Adequate and sustained human and financial resources in place to implement the HNAP			
A national health and climate change plan (Health component of the National Adaptation Plan or HNAP) developed				Long-term risks inform the implementation and adaptation measures of key priorities integrated in the HNAP			
Institutional mechanisms between the Ministry of Health and key health-determining sectors support the implementation of the HNAP				HNAP includes actions to strengthen the resilience of health systems to long-term risks			
HNAP includes actions to protect the health of populations and health systems operations from extreme weather events and current climate change				HNAP iteratively updated based on emerging evidence on climate change and health			
Main adaptation and mitigation strategies and policies in health-determining sectors that maximize health co-benefits identified and implemented				Routine assessment and implementation of adaptation and mitigation strategies and policies in health-determining sectors based upon climate change projections that maximize health co-benefits			


Protecting Health
from Climate Change
Vulnerability
and Adaptation
Assessment
World Health
Organization


Health Canada
Santé Canada
World Health Organization
CLIMATE CHANGE AND HEALTH
VULNERABILITY AND ADAPTATION ASSESSMENT

Vulnerability & Adaptation Assessment

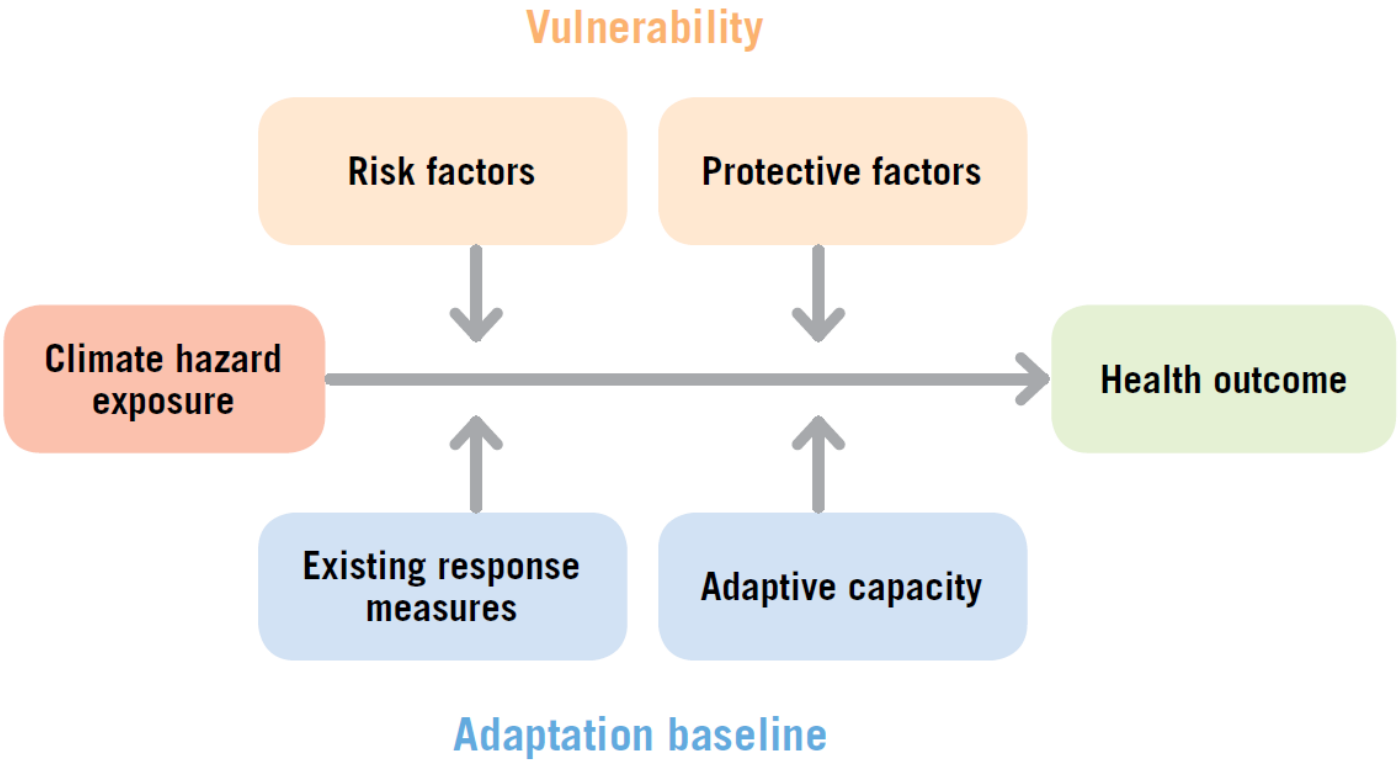


Figure 3. Conducting a climate change and health vulnerability and adaptation assessment

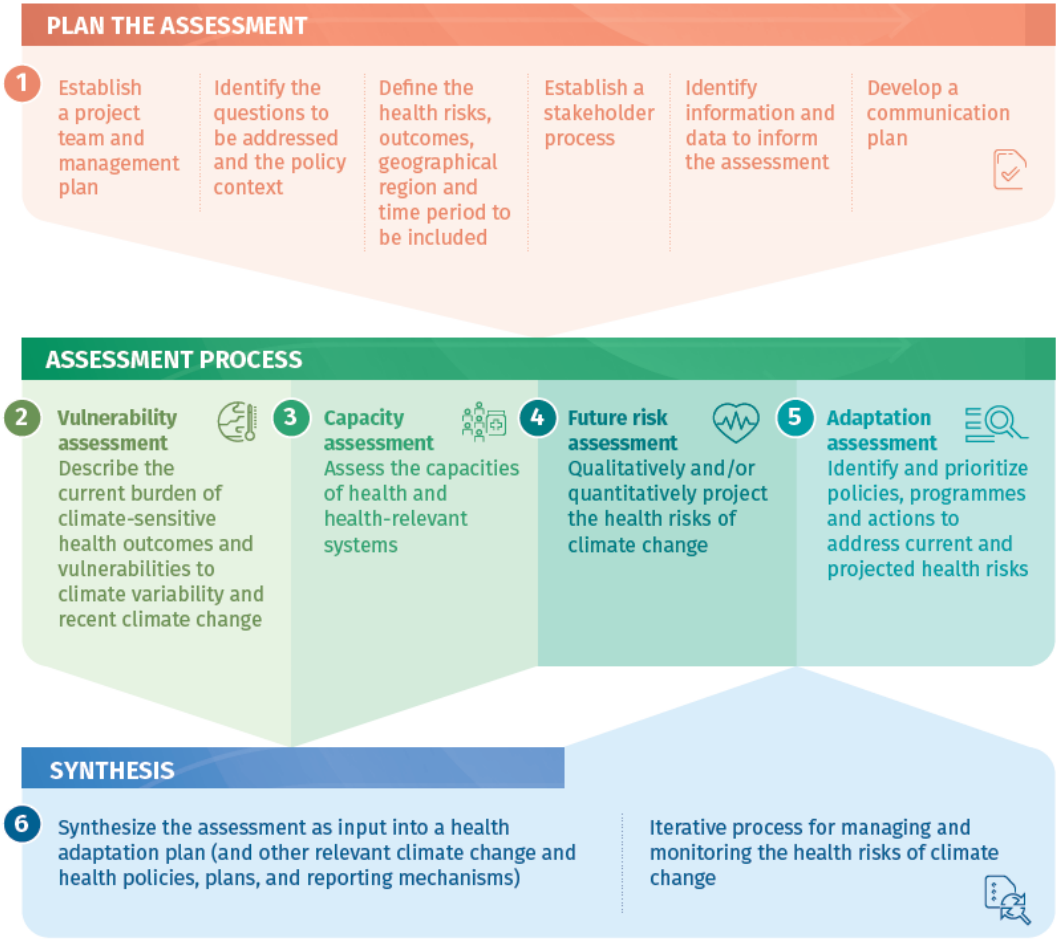
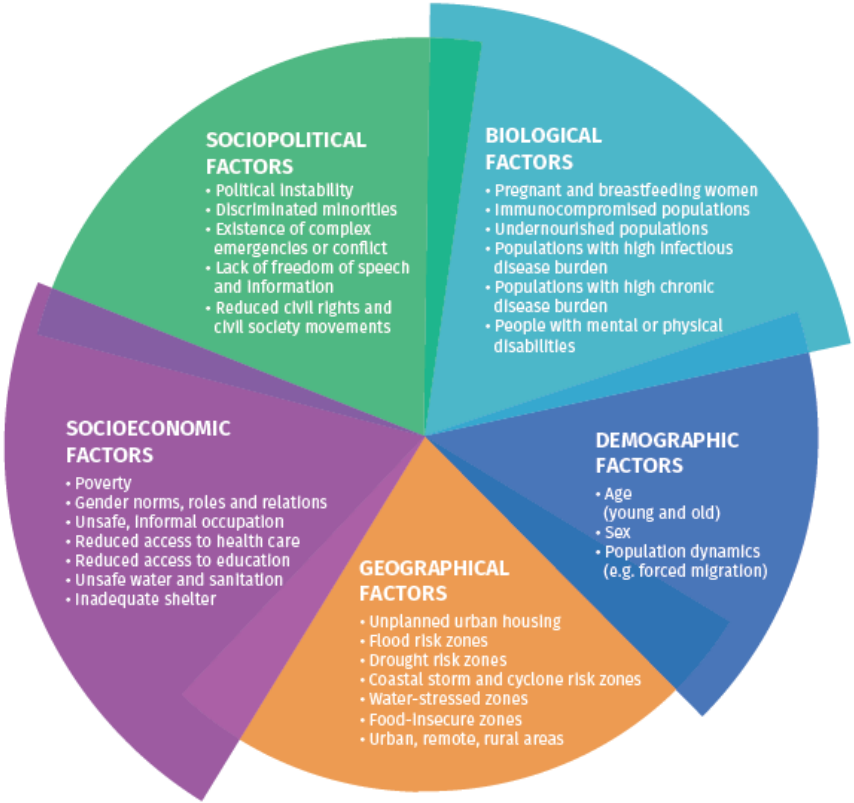


Table 2 Vulnerability to climate-sensitive health outcomes by subpopulation

Groups with increased vulnerability	Climate-related vulnerabilities
Infants and children	Heat stress, air pollution, waterborne/foodborne diseases, vector-borne diseases, malnutrition
Pregnant women	Heat stress, extreme weather events, waterborne/foodborne diseases, vector-borne diseases
Elderly people and people with chronic medical conditions	Heat stress, air pollution, extreme weather events, waterborne/foodborne diseases, vector-borne diseases
Impoverished/low socioeconomic status	Heat stress, air pollution, extreme weather events, waterborne/foodborne diseases, vector-borne diseases
Outdoor workers	Heat stress, air pollution, vector-borne diseases, ultraviolet light (UV) exposure

Figure 4. Multiple vulnerability factors for health impacts of climate change

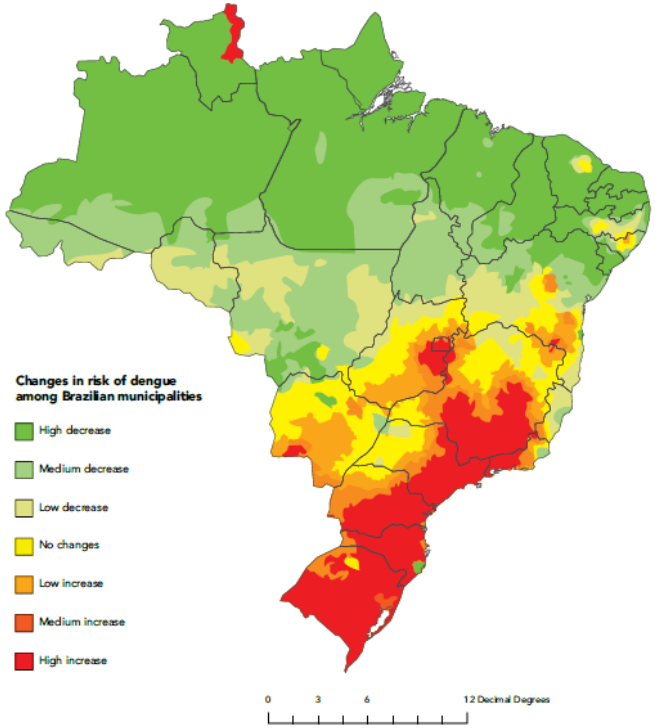


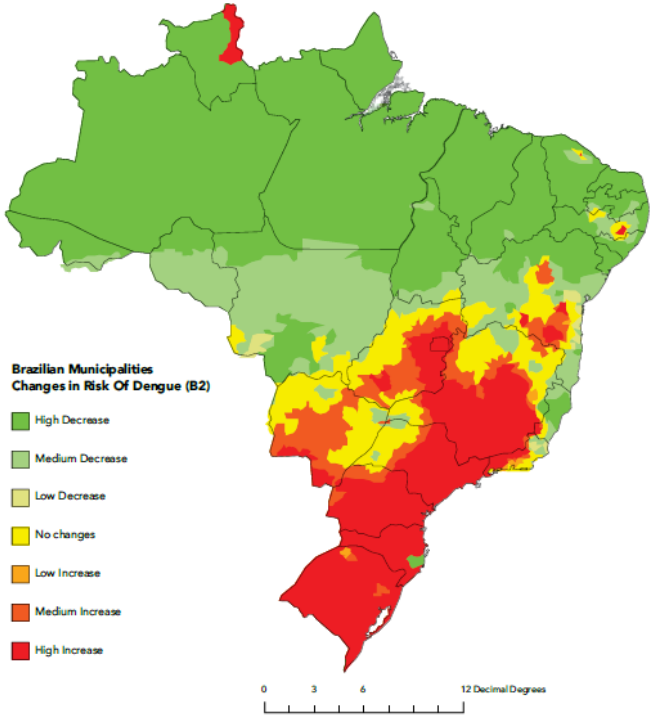
Source: Based on Gamble JL, Balbus J, Berger M, et al. Populations of concern. In: The impacts of climate change on human health in the United States: a scientific assessment. Washington, DC: U.S. Global Change Research Program; 2016; and Quality criteria for health national adaptation plans. Geneva: World Health Organization; 2021.

Table 4 Summary of the main findings of the risk assessment for climate change impacts on health in Oceania, for the year 2050

Exposure	Health impact estimated	Baseline health impact	Future health impact
Temperature extremes (cold and heat)	Attributable mortality in >65 year old age group	1100 deaths per year (across 10 cities); temperate cities have higher rates of heat deaths than tropical cities	Annual mortality range from 1400 to 2000, depending on scenario: increase in heat deaths will significantly outweigh decrease in cold deaths
Rainfall (inland)	Annual incidence of deaths and injuries	Average annual death rate in Australia (1970–2001) was 0.41/million (state rates varied from 0.05 to 3.1): the injury rate was 1.9/million (range 0.1–8.7)	Predicted annual death rate of 0.53–0.61/million (state rates vary from 0.06 to 4.8); the injury rate was 1.99/million (range 0.22–13.77)
Temperature and rainfall	Population living in a potential malaria transmission zone	Imported cases only	Substantial south-eastern expansion of the malaria zone
Vapour pressure	Population living in a potential dengue transmission zone	Dengue not established, but local outbreaks from infected travelers occur in far north-east Australia in most years	Substantial south-eastern and westward expansion of the dengue zone
Temperature	Annual incidence of diarrhoeal disease	Aboriginal people living in remote arid communities have high level of diarrhoeal disease	A 10% (5–18%) increase in the annual number of diarrhoeal hospital admissions among Aboriginal children

Figure 4.11 Projected changes in dengue risk due to climate change, 2040–69 (left) and 2070–99 (right), Brazil, Scenario B2. High reduction: < -80%; Medium reduction: from -80% to -40%; Low reduction: -40% to -2%; No change: -2% to 2%; Low increase: 2% to 40%; Medium increase: 40% to 80%; High increase: > 80%.





WMO & WHO, 2016

Table 5. Examples of health adaptation and resilience indicators[a]

Indicator	Definition
Existence of climate-resilient infrastructure in the health system	Number of health facilities that are "flood-proof" (out of total number of health facilities) per year
Extent of public awareness of and actions to address health risks of climate change	Number of climate change and health public awareness campaigns
Status of climate change integrated into financial planning for Ministry of Health	Climate change adaptation included in Ministry of Health budget
Status of development of technical guidelines for diagnosis, detection, control, prevention and treatment of vector-borne diseases associated with climate change	Number of updated guidelines and practices introduced into health care system
Access to safe water	Increase in percentage of population with access to protected water source per year
Effectiveness of enhancing early warning systems	Proportion of health care facilities reporting climate-sensitive health risk data on weekly basis

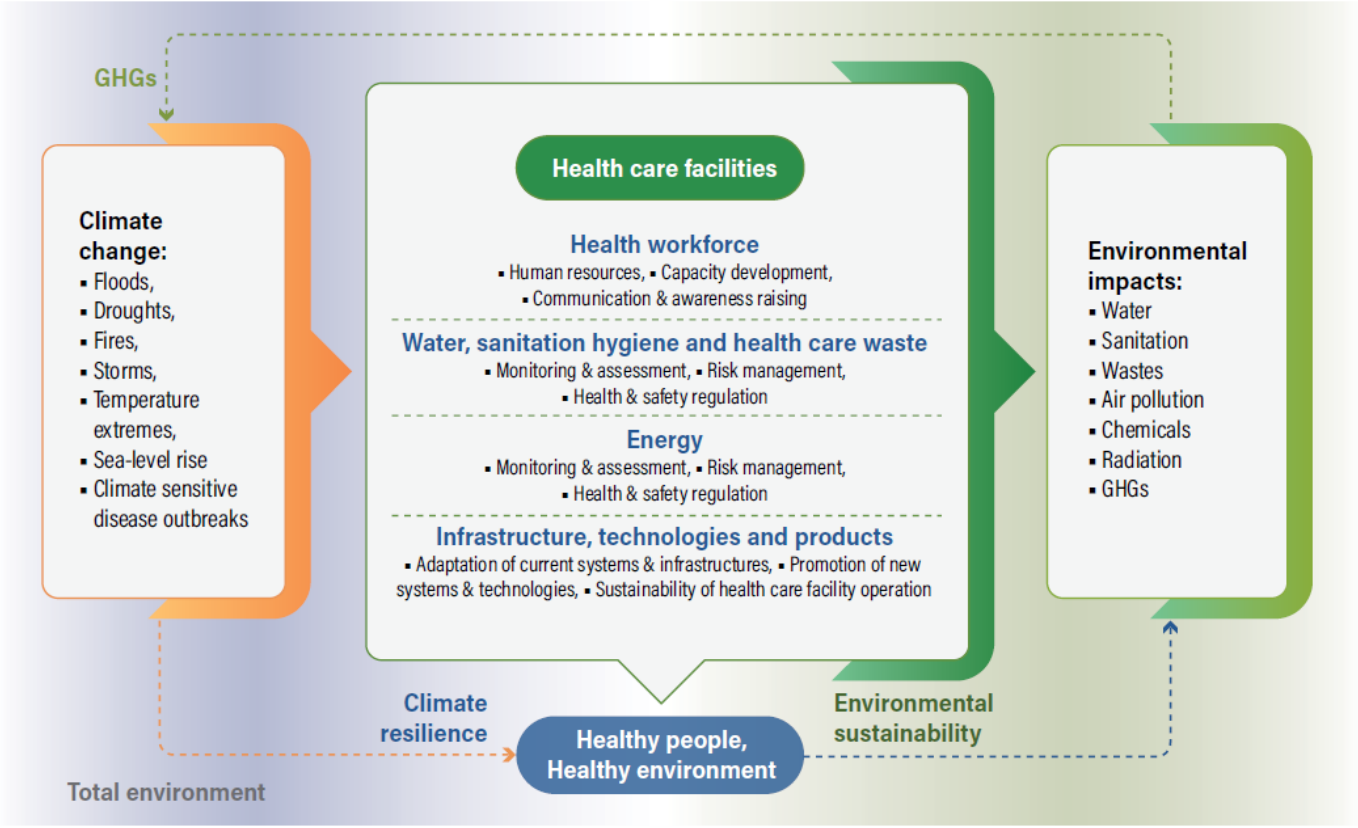
World Health Organization

WHO GUIDANCE FOR **CLIMATE-RESILIENT AND ENVIRONMENTALLY SUSTAINABLE** HEALTH CARE FACILITIES

World Health Organization

CHECKLISTS TO ASSESS **VULNERABILITIES IN HEALTH CARE FACILITIES** IN THE CONTEXT OF CLIMATE CHANGE

Climate Resilient & Environmentally Sustainable Health Care Facilities



Checklist for Health Care Facility Vulnerability

CLIMATE HAZARD TYPE	IS HAZARD OR EXPOSURE PRESENT? Yes/No	ARE THESE AREAS IMPACTED? X Current observed impacts O Possible impacts with changed conditions			
		Health workforce	WASH and health care waste	Energy services	Infrastructure, technologies, products, processes
Flood					
Storm					
Sea-level rise					
Drought					
Heatwave					
Wildfire					
Cold wave					

FLOODS

High: unprepared; unable to respond (Higher risk)
Medium: basic or incomplete preparation; low level of response (Medium risk)
Low: prepared; able to respond (Lower risk)

		Vulnerability level		
		High	Medium	Low
HEALTH WORKFORCE	**Is the health workforce,**			
	prepared with a contingency plan for continuing to provide services at other facilities or in the local communities (health primary care), if necessary?*	☐	☐	☐
	trained to detect posttraumatic stress disorder among staff to take prompt action?*	☐	☐	☐
	trained to manage hazardous chemicals in emergency situations?	☐	☐	☐
	trained to an appropriate standard to maintain the correct level of safety of electrical power supply, in both routine and emergency/disaster situations?*	☐	☐	☐
	(Communication and awareness raising)			
	provided with a safe internal communication system, specially in emergency situations?*	☐	☐	☐
	informed on how to use and follow a surveillance system to track health outcomes?	☐	☐	☐
	aware of contingency plans for accessing and leaving the facility during flood emergencies, and health workforce transportation?	☐	☐	☐
	regularly participating in community disaster planning committees to: improve knowledge on how to reduce risks, be prepared and respond to floods, and recover better than before through adaptation measures?*	☐	☐	☐
	prepared with clear messaging about water and food safety during and after a flood?	☐	☐	☐
	prepared with clear messaging, and staff trained on exit and evacuation routes that are clearly marked and free of obstacles to enable emergency evacuation)?*	☐	☐	☐
	equipped with a flood plan or programme with clear instructions on how to proceed during flood emergency situations?	☐	☐	☐
	equipped with a community health educational programme to assist the community to reduce vulnerabilities to flood impacts?	☐	☐	☐
	equipped with a community health educational programme to improve community health in the face of flood risks?	☐	☐	☐
WATER, SANITATION AND HEALTH CARE WASTE	**Does the health care facility,**			
	(Monitoring and assessment)			
	have an updated assessment plan to map risks to the sanitation infrastructure in place, and to identify where services could be disrupted from floods?	☐	☐	☐
	verify water safety conditions, including updated risk assessments to map water resources and water supplies for the facility?*	☐	☐	☐
	have a quality monitoring plan for drinking water during and after the event?	☐	☐	☐
	regularly assess its sanitation system for any possible damage in the event of flooding?	☐	☐	☐
	monitor sewer overflows in order to fix pumps in advance of the flood season?	☐	☐	☐
	regularly verify safety conditions and proper functioning of all elements of the water	☐	☐	☐

FLOODS

FLOODS

High: unprepared; unable to respond (Higher risk)
Medium: basic or incomplete preparation; low level of response (Medium risk)
Low: prepared; able to respond (Lower risk)

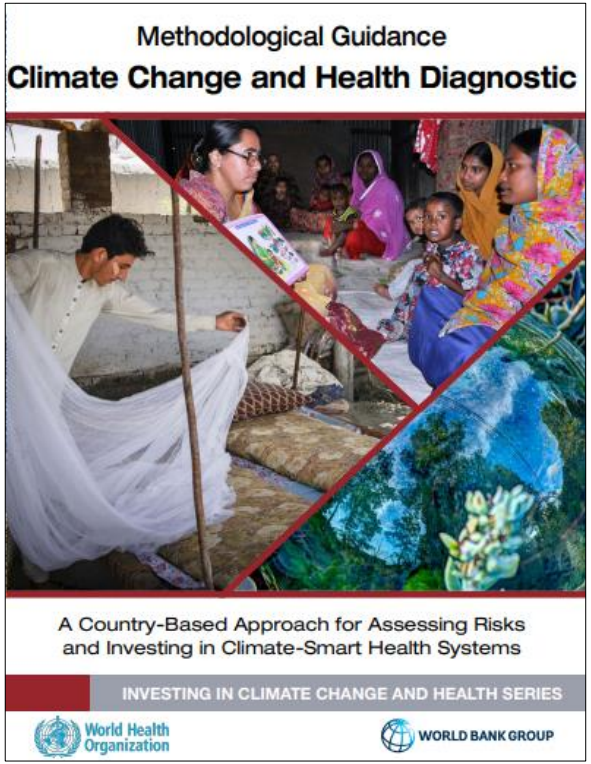
		Vulnerability level		
		High	Medium	Low
WATER, SANITATION AND HEALTH CARE WASTE	**Does the health care facility,**			
	have anti-mosquito breeding measures?	☐	☐	☐
	have a schedule for emptying latrines in advance of the flood season to avoid overflows?	☐	☐	☐
	have a safe health care waste storage place?	☐	☐	☐
	have a safe waste disposal system before, during and after floods?	☐	☐	☐
	have an established safe management approach to health care waste transport (including hazardous waste) in case of floods?*	☐	☐	☐
	have chemical, radioactive and biological hazardous waste stored in a safe place and on a level above the ground floor?*	☐	☐	☐
	have water storage tanks appropriately covered to prevent access or contamination, and safely located for flooding events?*	☐	☐	☐
	have onsite water purification equipment to provide safe drinking water?	☐	☐	☐
	have nonreturn valves installed on water supply pipes to prevent backflows?*	☐	☐	☐
	have waste pits able to withstand flood events?	☐	☐	☐
	have a surveillance system for diseases related to water quality and sanitation?*	☐	☐	☐
	keep waste sealed in rubbish bins to avoid rodents?	☐	☐	☐
	(Health and safety regulation)			
	have an emergency water supply plan?*	☐	☐	☐
	staff who are trained to an appropriate standard to maintain the correct level of safety of water quality controls, use of supplies and alternative sources?	☐	☐	☐
	have a water safety plan in place, in case of water contamination?*	☐	☐	☐
	have a mechanism or regulation to carry out sanitary inspections of water supply, and when necessary, establish a temporary ban on use, until improvements are made?	☐	☐	☐
	have a contingency plan to ensure effective and timely delivery of safe water during floods and emergencies over the short- and long-term?*	☐	☐	☐
	have a plan to provide and maintain adequate cleaning and disinfection supplies (such as chlorine, filters or other water treatment technology, rapid water testing kit) for water safety?	☐	☐	☐
	have an emergency plan for maintenance and restoration of waste management systems?*	☐	☐	☐
ENERGY	**Does the health care facility,**			
	(Monitoring and assessment)			
	regularly assess its energy system to ensure that it can cope with flood events?*	☐	☐	☐
	have an emergency backup generator (including fuel where relevant) that is able to cover	☐	☐	☐

FLOODS

Climate and Health Stress Test

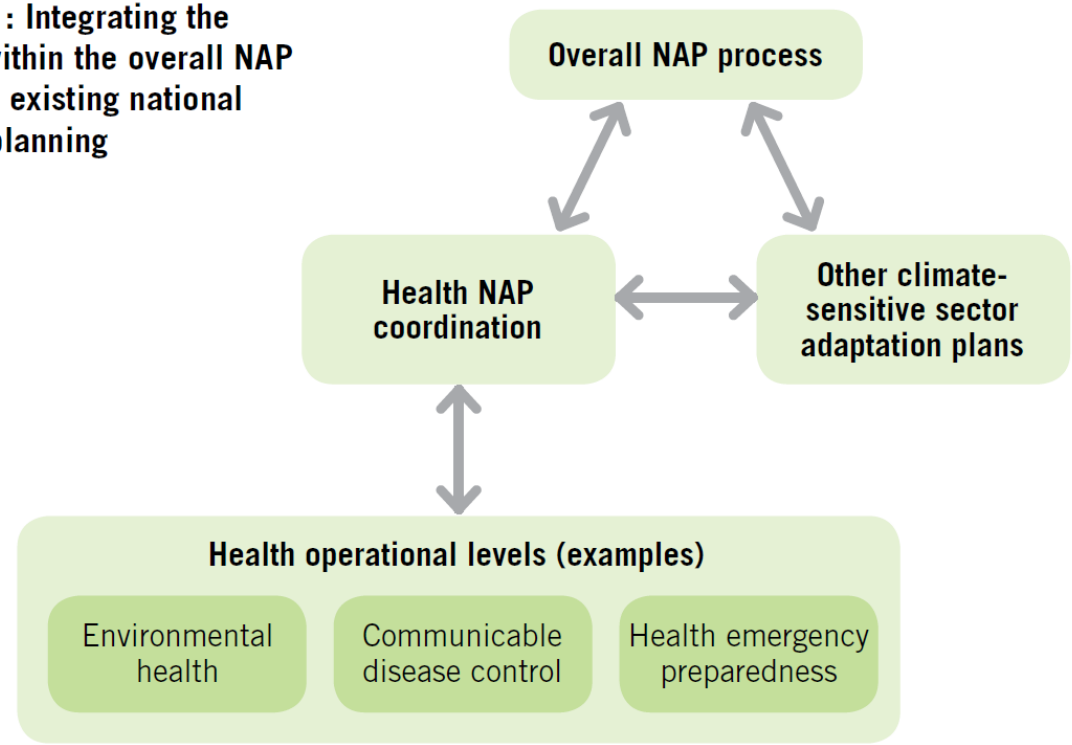
- The extended timeframe associated with climate change necessitates a broader scope for risk assessment and risk reduction efforts, increasing the time horizons for decisions.

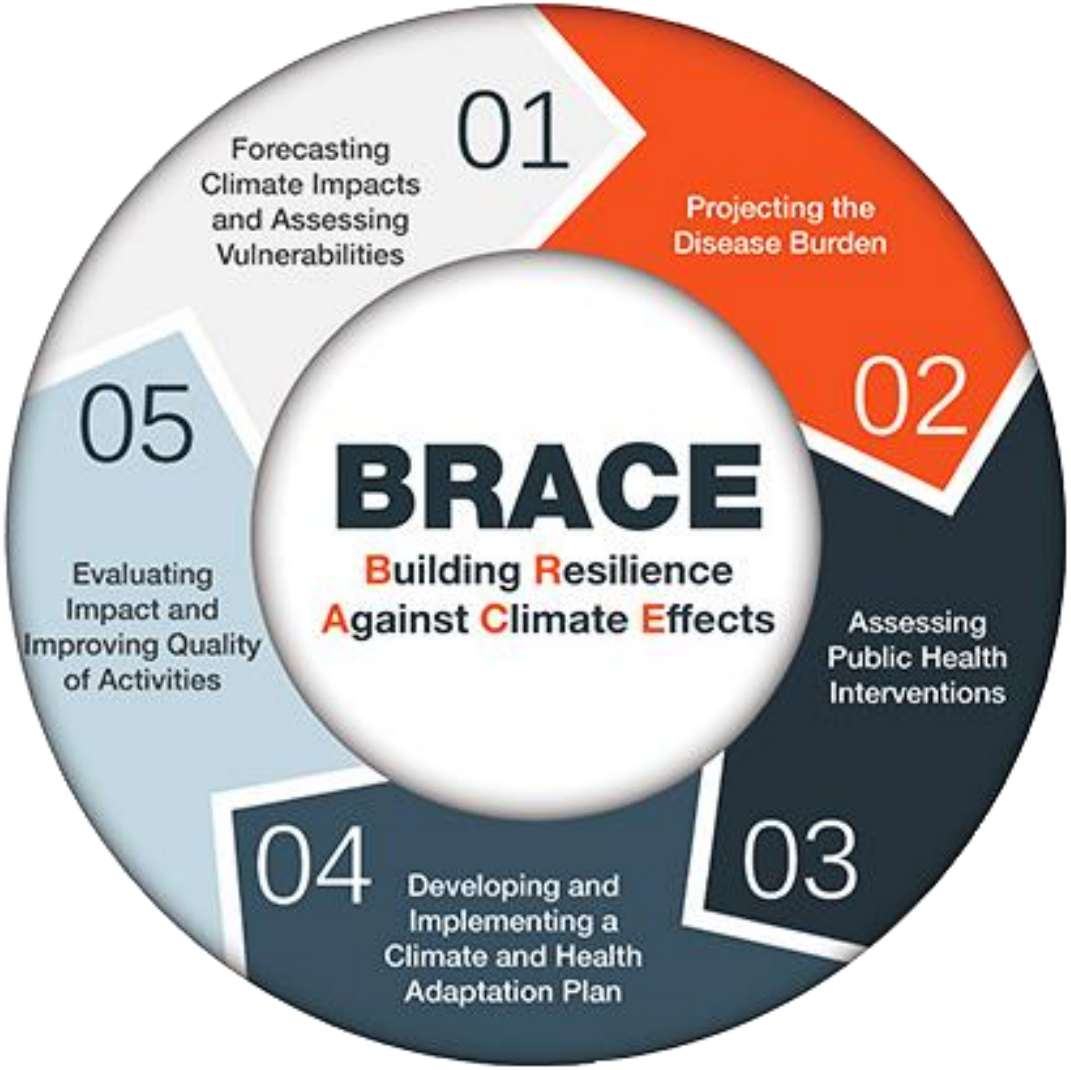
- A stress test focuses on acute and chronic climate-related events and conditions, including those far outside the range of historic experience, that could directly impact health systems and/or climate-related events and conditions in non-health sectors that can indirectly impact health or health system function.



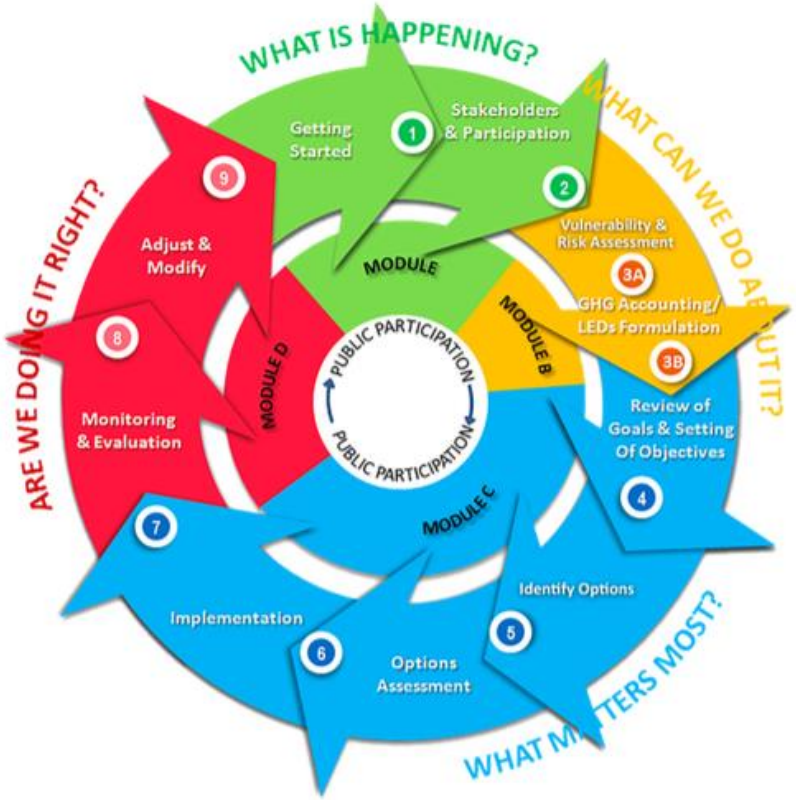
Health in National Adaptation Plans (H-NAP)

Figure 1: Integrating the HNAP within the overall NAP process existing national health planning

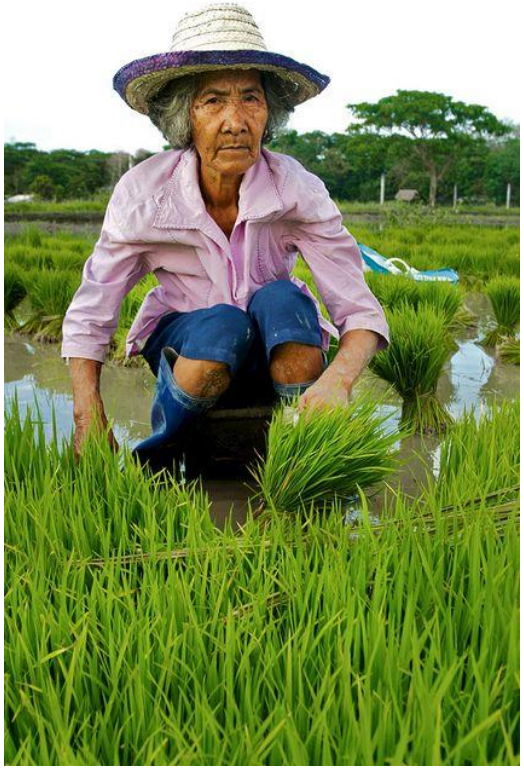



01
Forecasting Climate Impacts and Assessing Vulnerabilities
02
Projecting the Disease Burden
03
Assessing Public Health Interventions
04
Developing and Implementing a Climate and Health Adaptation Plan
05
Evaluating Impact and Improving Quality of Activities
BRACE
Building Resilience Against Climate Effects

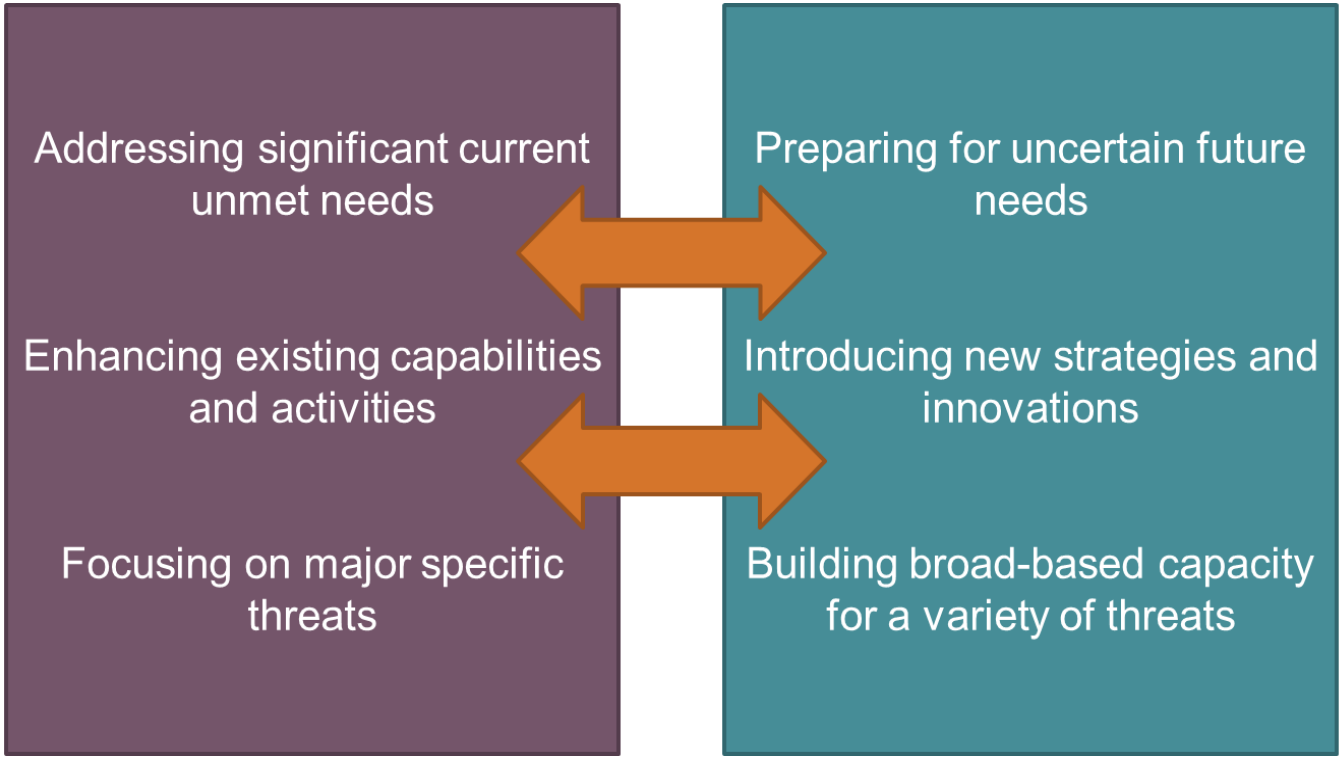
Philippines: Local Climate Change Action Plan



Individuals, Households, Communities



Tensions Faced in Implementing Resilience



Guinto, 2019

Successful Resilience & Adaptation Initiatives

Clear vision and alignment with country development goals

Focus on policies and not just projects

Existing implementation capacity already exists

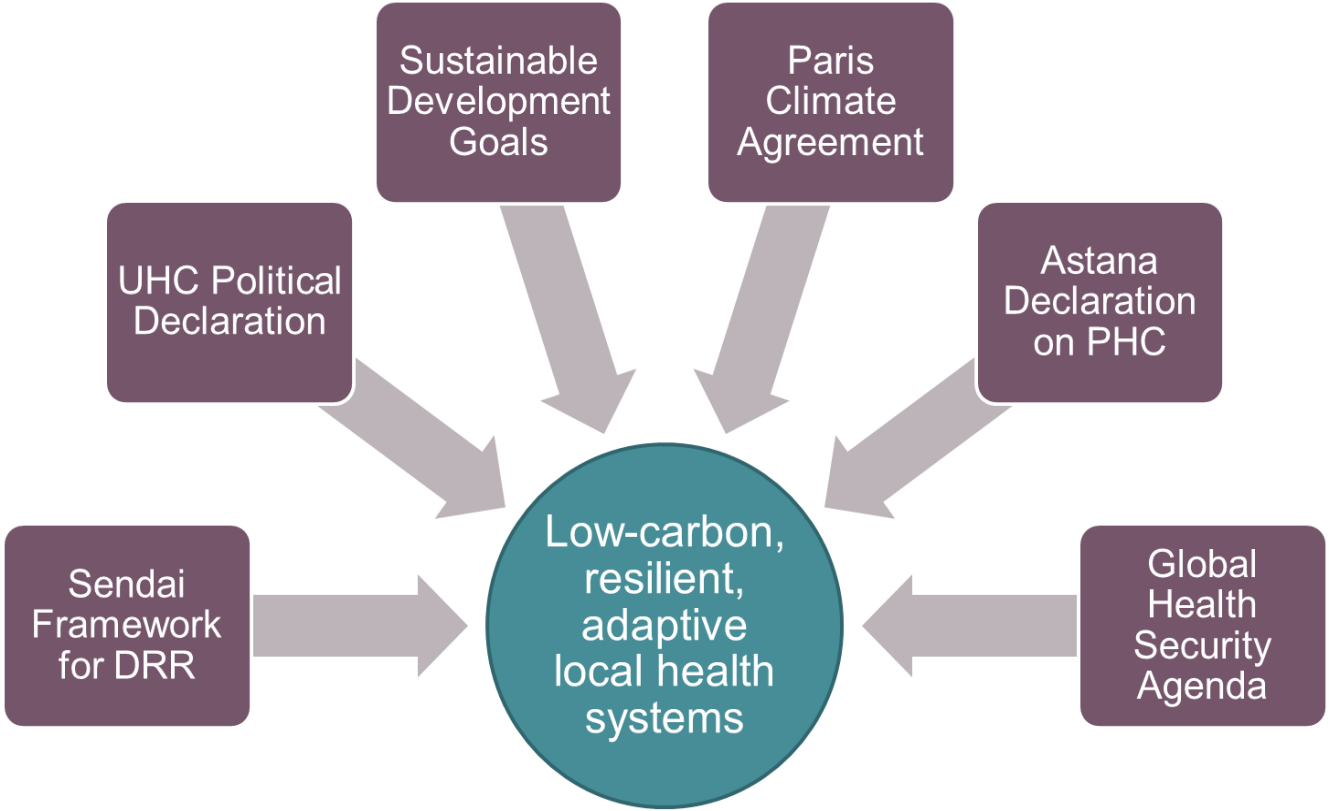
Institutionalization of climate and health program

Multisector collaboration

Adaptation projects can facilitate mitigation

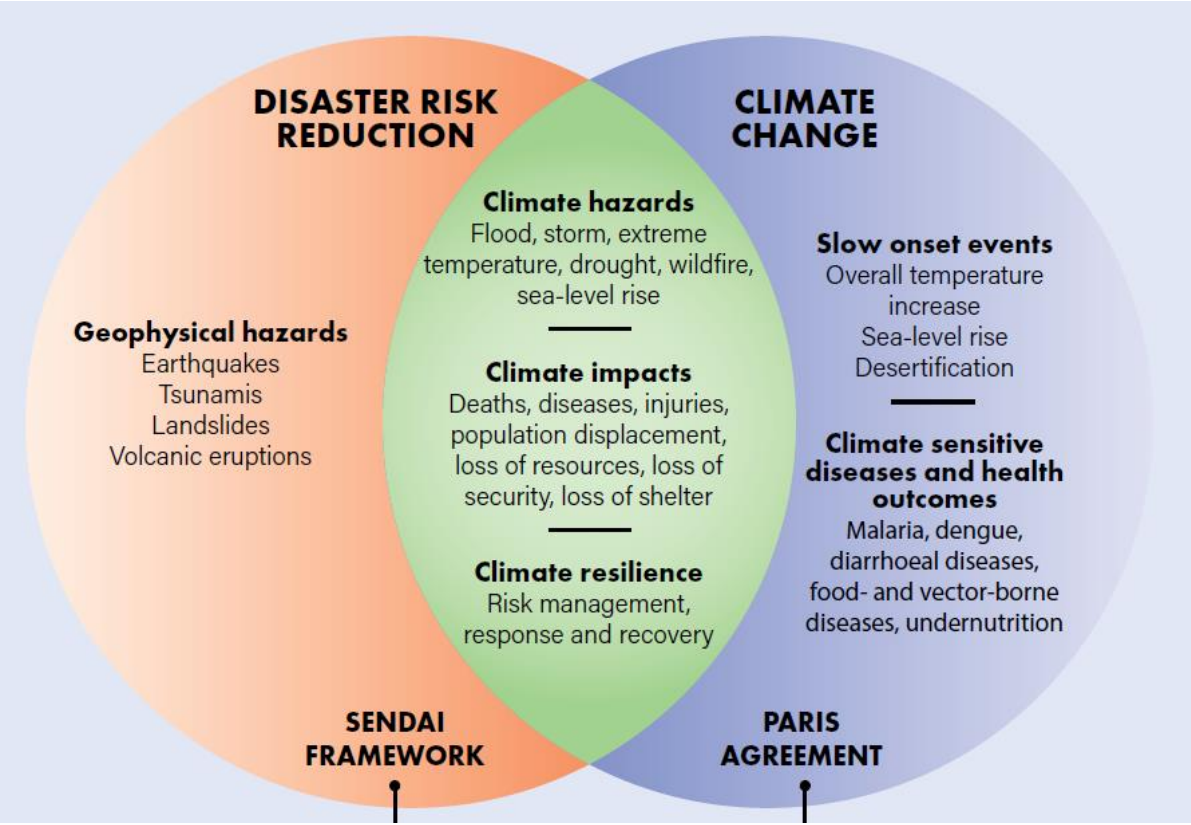
Ebi and del Barrio, 2017

International Policy Landscape for Resilience



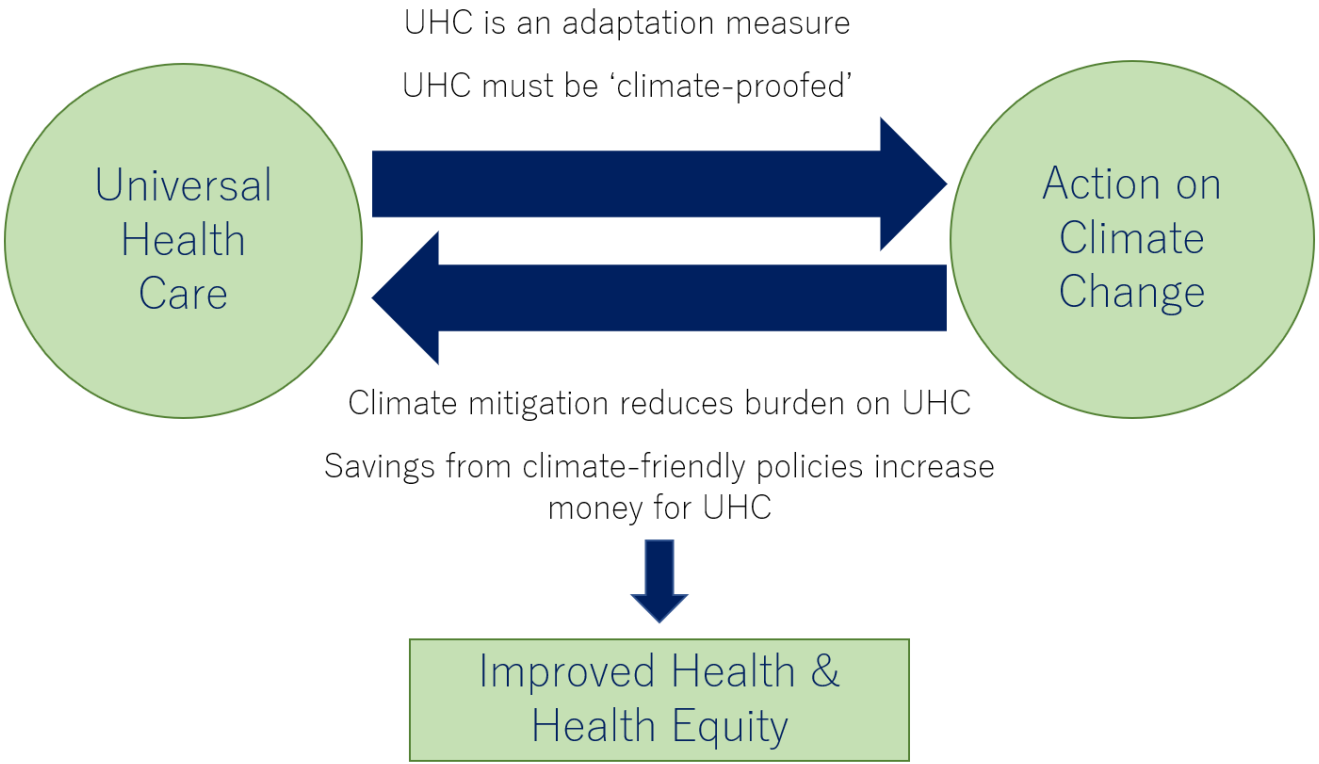
Guinto, 2019

Disaster Risk Reduction & Climate Adaptation



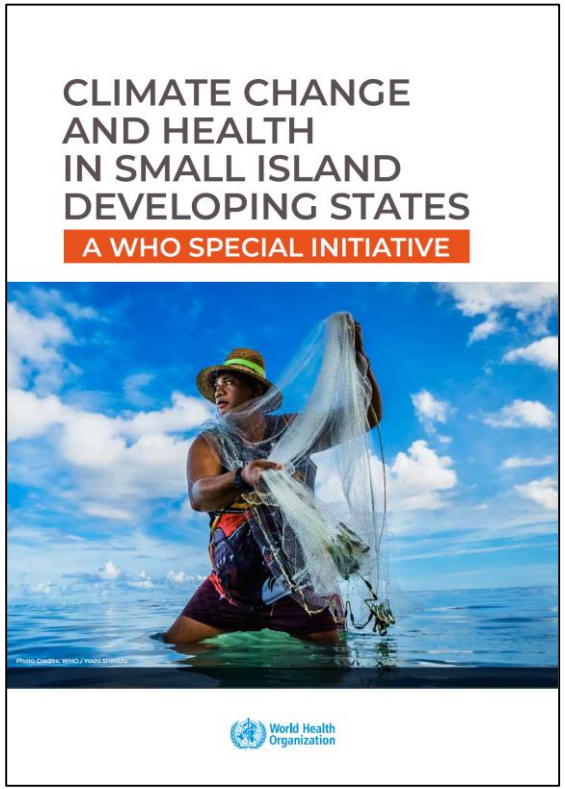
WHO, 2022

Universal Health Care and Climate Action

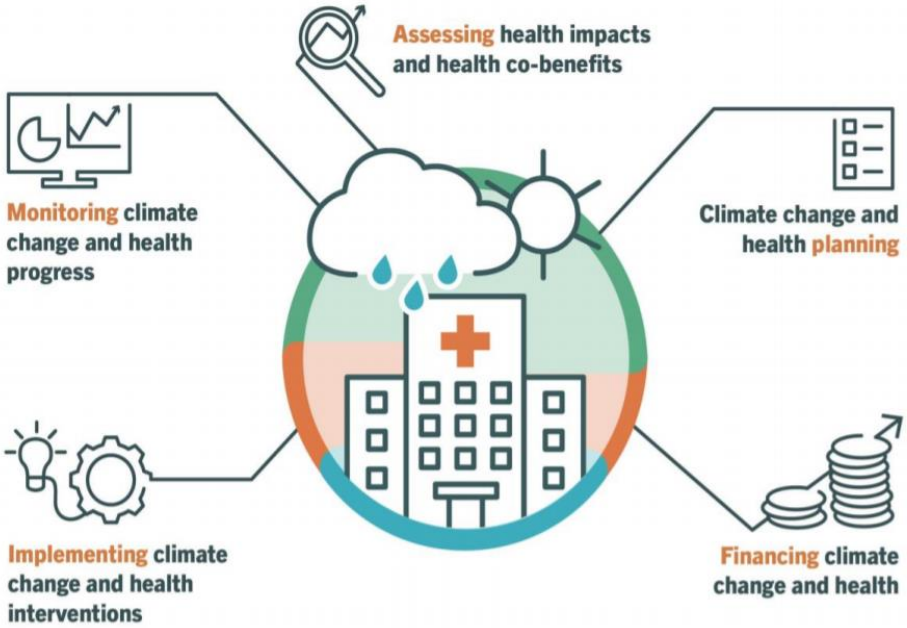


Guinto, 2019

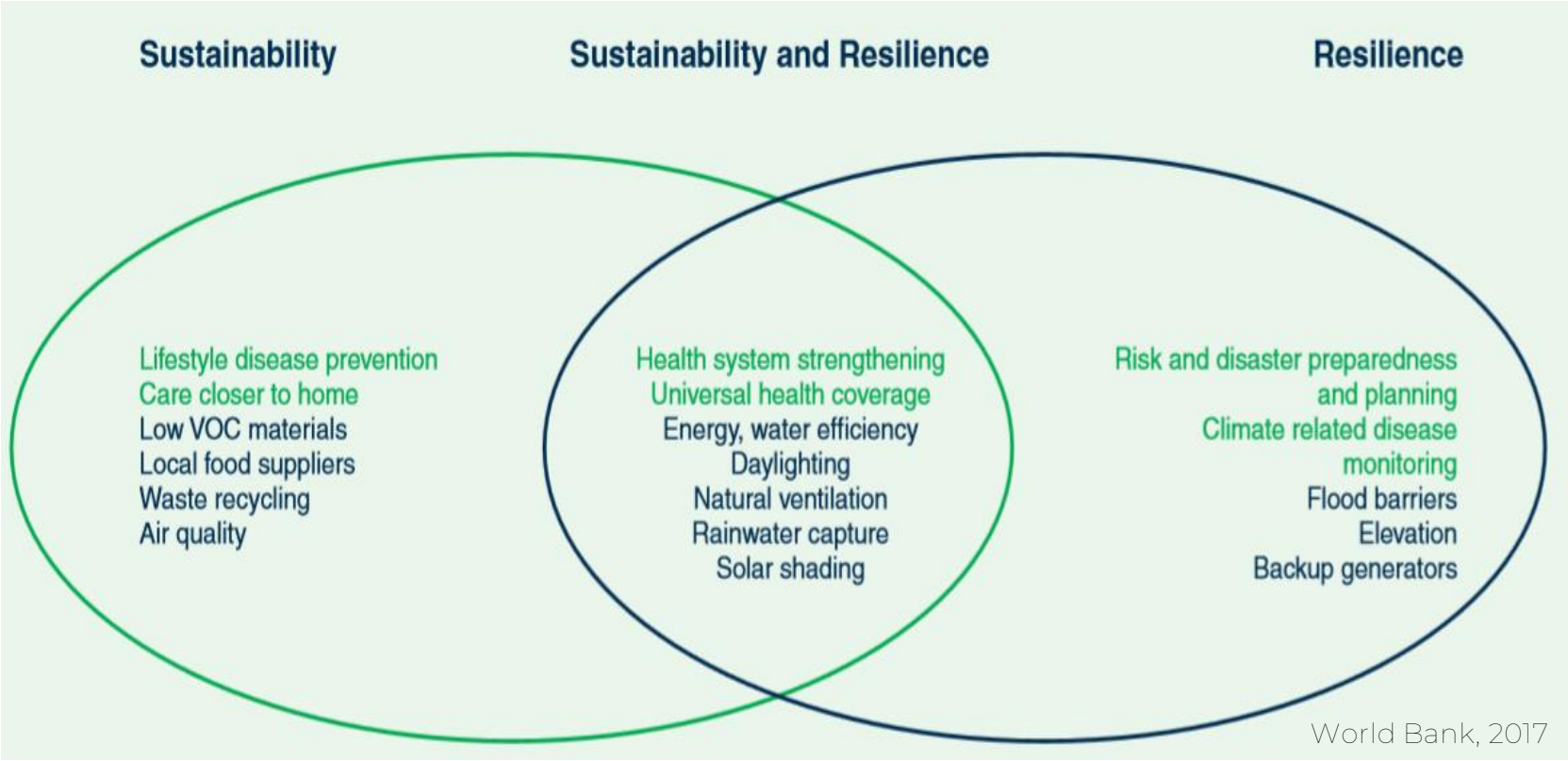
Recent WHO Initiatives



Climate Resilient Health Systems Initiative under the Adaptation Action Coalition



Climate-Smart Health Care



World Bank, 2017

Countries commit to develop climate-smart health care at COP26 UN climate conference

Effort to Reframe Climate Change as a Health Crisis Gains Steam

Research has increasingly shown that warming is taking a deadly toll on human health. At the global climate summit in Glasgow, the issue has gained new prominence.

Health Systems in the Era of Planetary Health

Universal

Leaving no one behind
Beyond borders & citizenship

High-value

Good outcomes, quality & safe
Affordable & responsive

Climate-smart

Climate-resilient, disaster-ready
Low carbon, green sustainable

Pandemic-resistant

Detects early, responds quickly
Resources ready, better recovery

Thank you for listening!

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EarthMedic
EarthNurse
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