# Climate Change and Health:

# Adaptation

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# Outline

- Describe meaning and contexts of adaptation to climate impacts on health
- Identify the purposes and processes of adaptation in different settings.
- Review some adaptation strategies for different kinds of disease-climate risks
- Characterize prioritization strategies for determining adaptation alternative needs

# Adaptation and Mitigation

- **Adaptation** involves actions taken by individuals, institutions, corporate sector and governments to address risks of climate change directly or indirectly through factors that increase vulnerability:
  - Anticipatory
  - Responsive
- *Goal of adaptation is to* ***prepare for, and effectively respond to the health risk of climate*** **change**
- **Mitigation** is a human intervention to reduce the sources or enhance the sinks of greenhouse gases.
- *Goal of mitigation, for health sector consists in* ***promoting and supporting initiatives*** *that protect health by* ***reducing greenhouse gas emissions***

WHO 2009

# Context for Adaptation

- Climate change is **one of many factors** influencing human health and social well-being
  - In most cases, it **multiplies the threats** of current drivers of climate-sensitive health outcomes
- Public health challenges presented by climate change need to be addressed within the **context of issues such as access to clean water and sanitation, inadequate nutrition, and diseases such as HIV/AIDS**
- **Poverty** is a major factor

# Local Context Matters

- Multiple **political, social, economic, technological, and human factors** determine whether adaptation strategies, policies, and measures are effective
- Therefore, **differences in culture, education, knowledge, availability and affordability of technology**, and other factors mean that a “one size fits all” approach is likely to fail

# Process is just as Important as Outcome

- Need to include stakeholders and policy makers
  - This is an expression of values, not a purely analytic exercise
- Explicitly address constraints and barriers
- Adaptation will affect and be affected by development pathways
  - Within the context of other pressing health needs
- A risk management approach may be most effective
  - Monitoring and evaluation important components

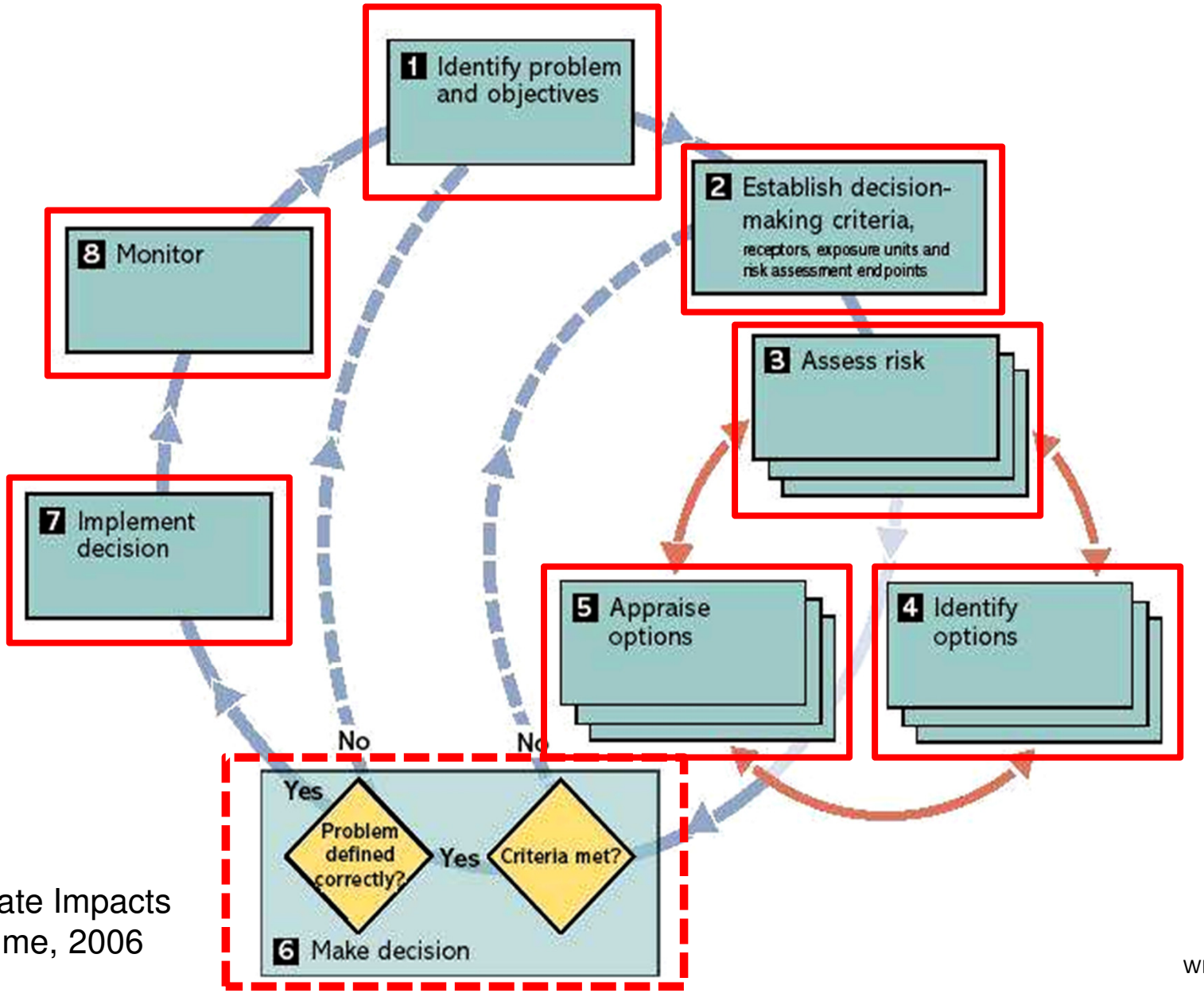
# Most Important – What is the Purpose?

- Who is the **audience** for process?
- What **questions** do they want to address?
- What kind of **information** do they need?
- How can it be most **effectively presented**?

# Public Health Adaptation to Climate Change

- Existing risks
  - Modifying existing prevention strategies
  - Reinstitute effective prevention programs that have been neglected or abandoned
  - Apply win/win or no-regrets strategies
- New risks

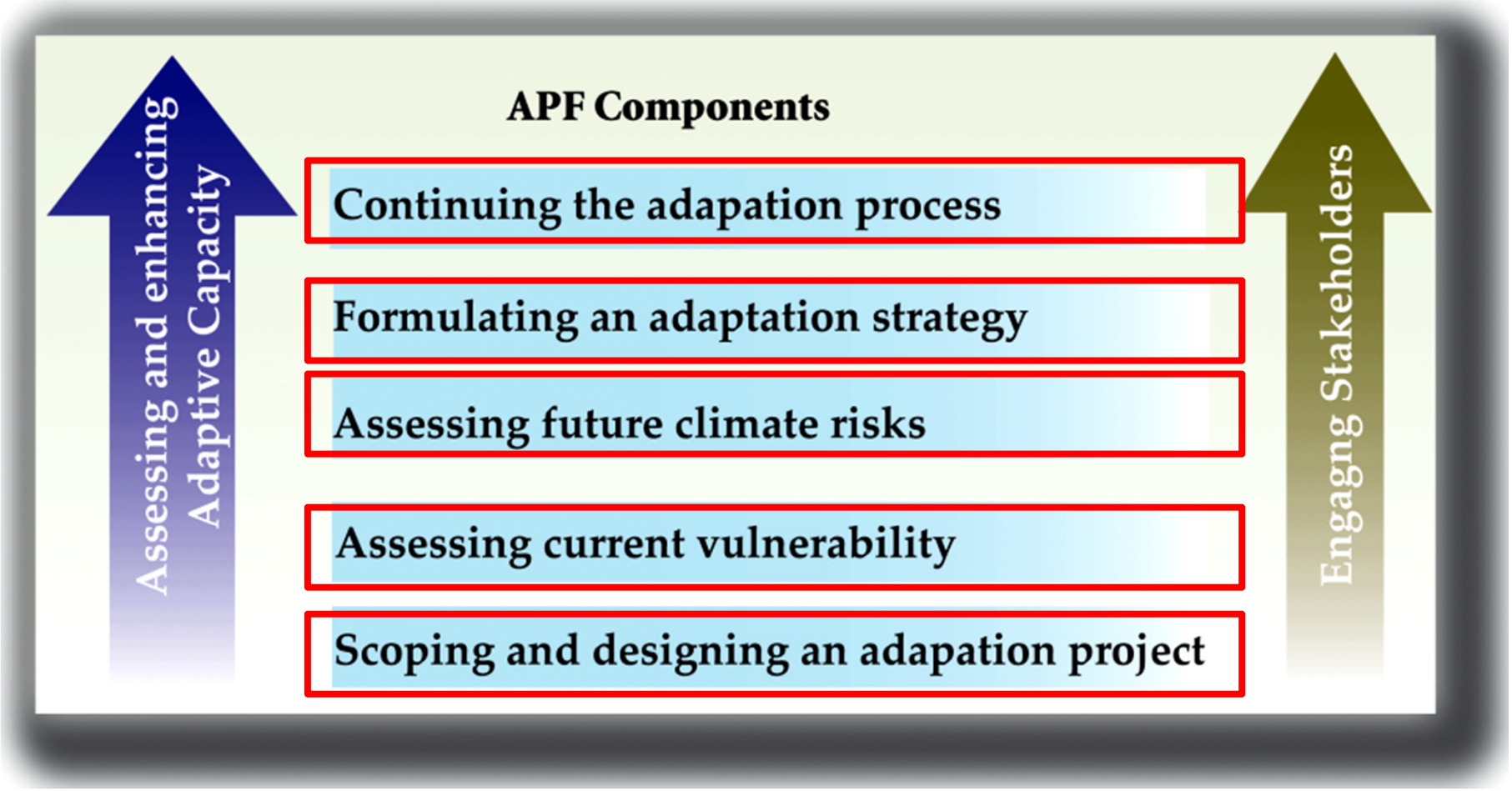
# Framework for Adaptation



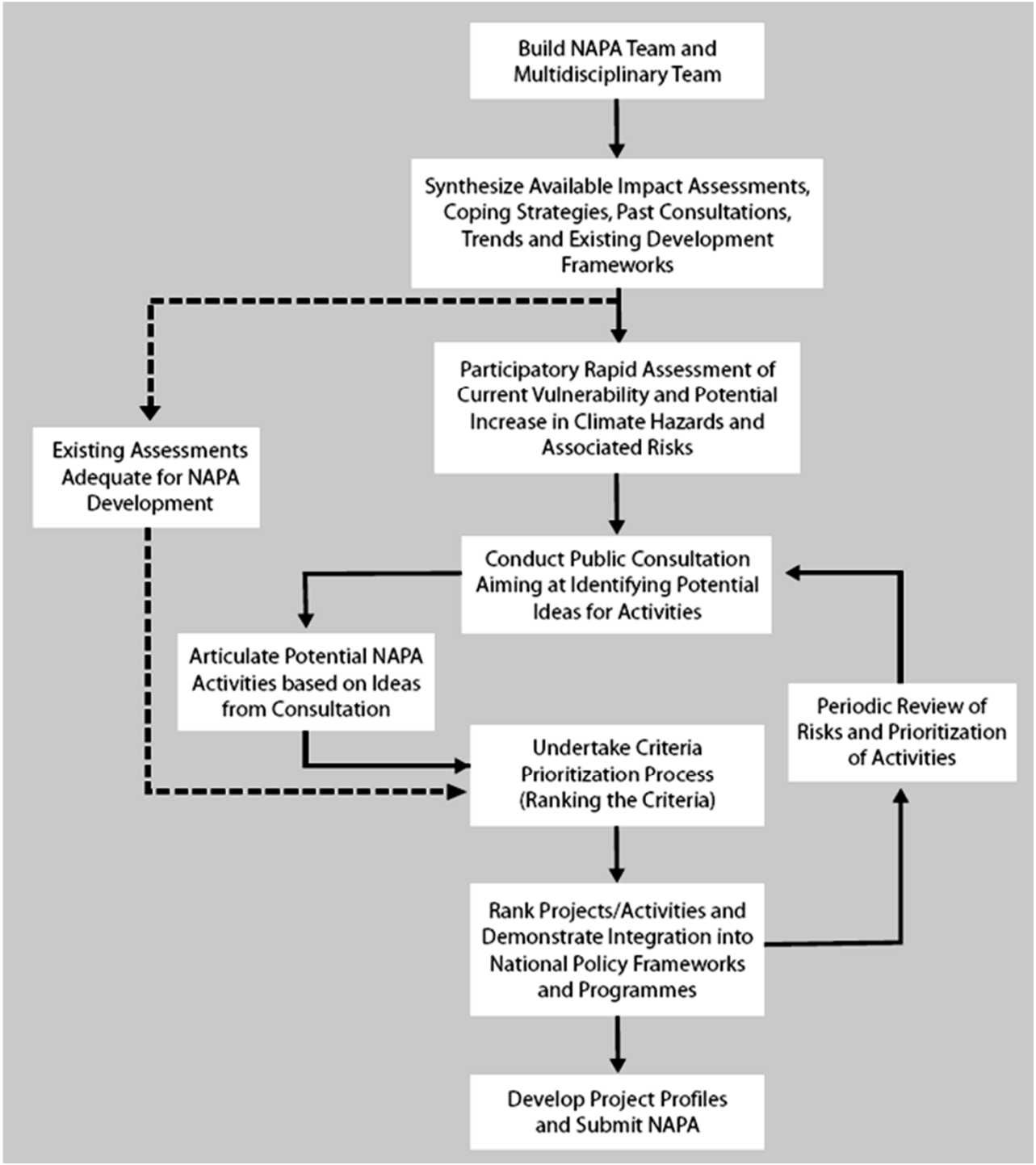

UK Climate Impacts Programme, 2006

WHO 2009

# UNDP Adaptation Policy Framework




WHO 2009




# National Adaptation Programmes of Action (NAPAs)

WHO 2009

# Health Impact Assessment (HIA)

- A combination of **procedures**, **methods** and **tools** by which a **policy**, **project**, or **hazard** may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population

# Elements in HIA

- **Integrated assessment** of **impacts**, i.e., not concentrating on single risk factors and disease outcomes (a holistic view of health)
- Relates to policies and projects **outside the health sector**
- **Multidisciplinary** process
- Provides **information for decision-makers**, designed with needs of decision-makers in mind
- **Quantification** of the expected health burden due to an environmental exposure in a specific population

# Questions for Identifying Adaptation Policies and Measures

- Adaptation to what?
- What is the current burden of disease?
- Is additional intervention needed?
- What are the future projections for the climate-sensitive health outcome?
- Who is vulnerable?
- On scale relevant for adaptation?

# Questions for Identifying Adaptation Policies and Measures (cont.)

- Who adapts?
- How does adaptation occur?
- When should interventions be implemented?
- How good or likely is the adaptation?

# Adaptation Baseline

- What is being done **now** to reduce the burden of climate-sensitive health outcomes?
- **How effective** are these policies and measures?
- What **could be done now** to reduce current vulnerability?
- What are the **main barriers** to implementation (such as technology or political will)?
- What measures **should begin** to be implemented to increase the range of possible **future** interventions?

# Steps in an Adaptation Assessment

- Determine the **scope** of the assessment
  - Region
  - Health outcome(s)
- Identify and convene **stakeholders**
- Identify and evaluate **current strategies, policies, and measures** to reduce that burden (**adaptation baseline**)
- Estimate **future potential health impacts** using socioeconomic and climate change scenarios
  - Can be qualitative or quantitative
- Identify **additional adaptation measures** to reduce potential negative health effects

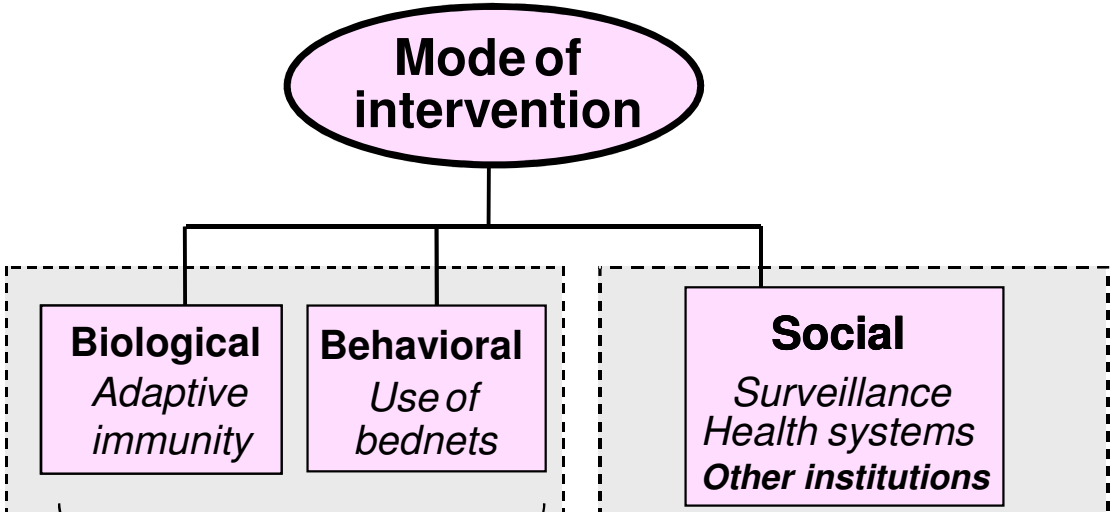
# Scope of the Assessment

- Health issues of concern **today** and of potential risk in the **future**
  - Interactions between weather/climate and health are location-specific
- Geographic **region** to be covered
- **Time** period
  - Include time periods appropriate to planning
- Project must **aim to reduce vulnerability** to climate change

# Possible Impacts Scenarios

- Slow, steady change in weather
- Increasing climate variability
- Increasing extreme events
- Crossing thresholds
- Any combination of the above

# Adaptation Mode, Level, and Stage (examples shown are for malaria)




Based on McMichael and Kovats, 2000

# Adaptation Options to Reduce the Health Impacts of Climate Change

| Health Outcome | Legislative | Technical | Educational-advisory | Cultural & Behavioral |
|---|---|---|---|---|
| Thermal stress | Building guidelines | Housing, public buildings, urban planning, air conditioning | Early warning systems | Clothing, siesta |
| Extreme weather events | Planning laws, economic incentives for building | Urban planning, storm shelters | Early warning systems | Use of storm shelters |
| Vector-borne diseases | | Vector control, vaccination, impregnated bednets, sustainable surveillance, prevention & control programmes | Health education | Water storage practices |
| Water-borne diseases | Watershed protection laws, water quality regulation | Screening for pathogens, improved water treatment & sanitation | Boil water alerts | Washing hands and other behavior, use of pit latrines |

McMichael et al., 2003a

WHO 2009

# Adaptation Measures to Reduce Vector-borne Diseases

- Decision support tools
  - Early warning systems
- Technology development
  - Vaccines and more rapid diagnostic tests
- Surveillance and monitoring
  - Effective vector surveillance and control programs that incorporate climate change concerns
- Infrastructure development
  - Consider possible impacts of infrastructure development, such as water storage tanks

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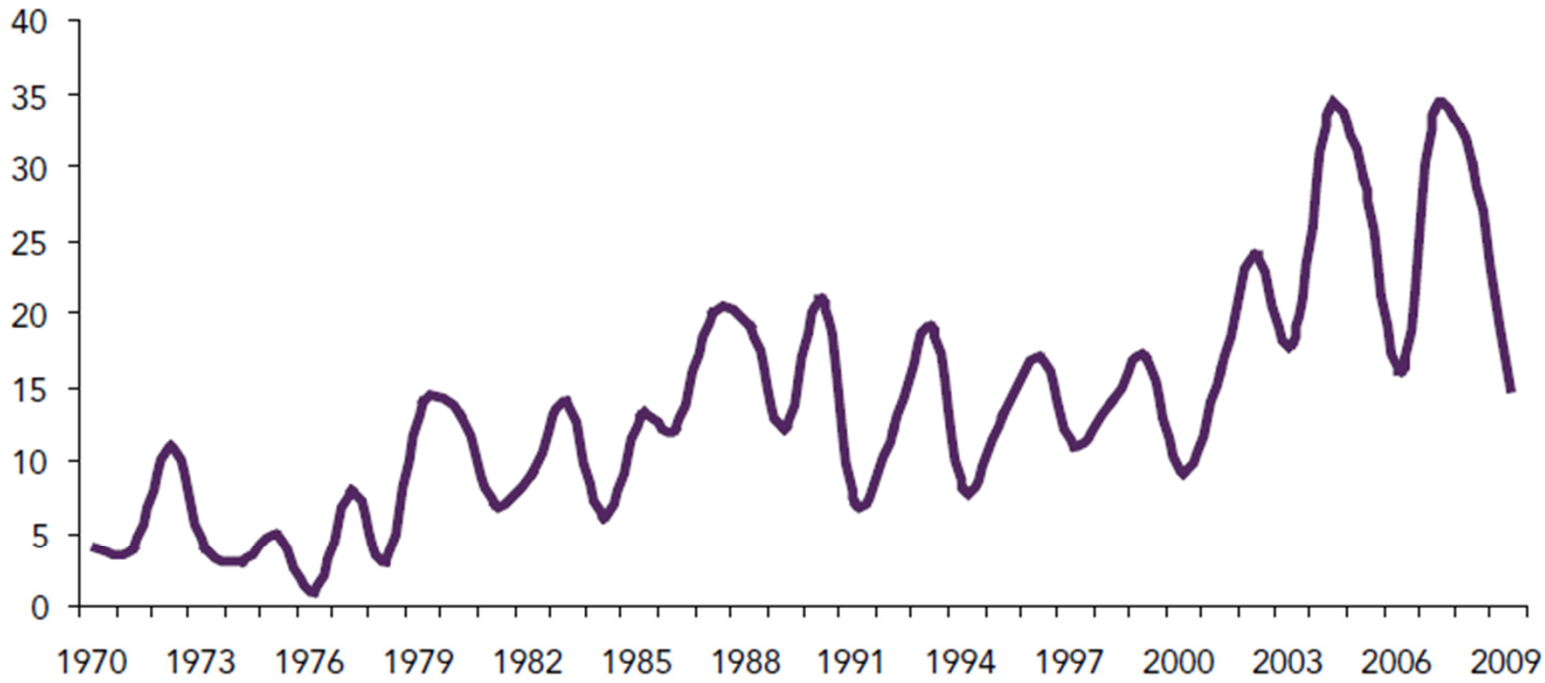
## Number of SIDS affected by natural disasters

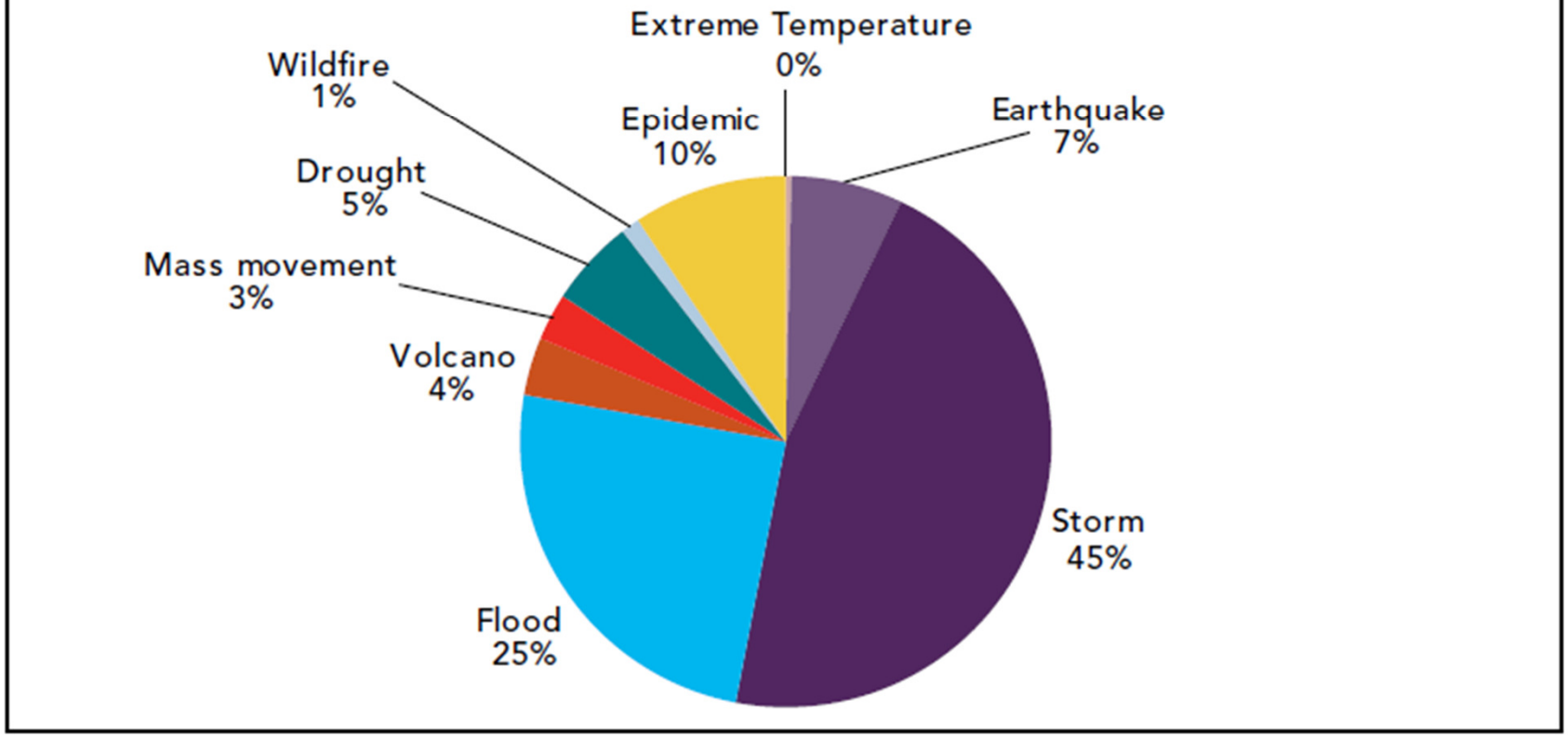



*Source:* EMDAT: The OFDA/CRED International Disaster Database, 2010.

*Note:* Including extreme temperatures, earthquakes, storms, floods, volcanoes, mass movements and droughts.

TRENDS IN SUSTAINABLE DEVELOPMENT
Small Island Developing States (SIDS)
United Nations 2010

# Total number of disasters affecting SIDS by type of disaster: 1990 - 2009




*Source:* EMDAT: The OFDA/CRED International Disaster Database, 2010.

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# Adaptation Measures to Reduce Health Outcomes from Floods

- Legislative policies
  - Improve land use planning
- Decision support tools
  - Early warning systems and emergency response plans
- Technology development
- Surveillance and monitoring
  - Alter health data collection systems to monitor for disease outbreaks during and after an extreme event

WHO 2009

# Adaptation Measures to Reduce Health Outcomes from Floods

- Infrastructure development
  - Design infrastructure to withstand projected extreme events
- Other
  - Conduct research on effective approaches to encourage appropriate behavior during an extreme event

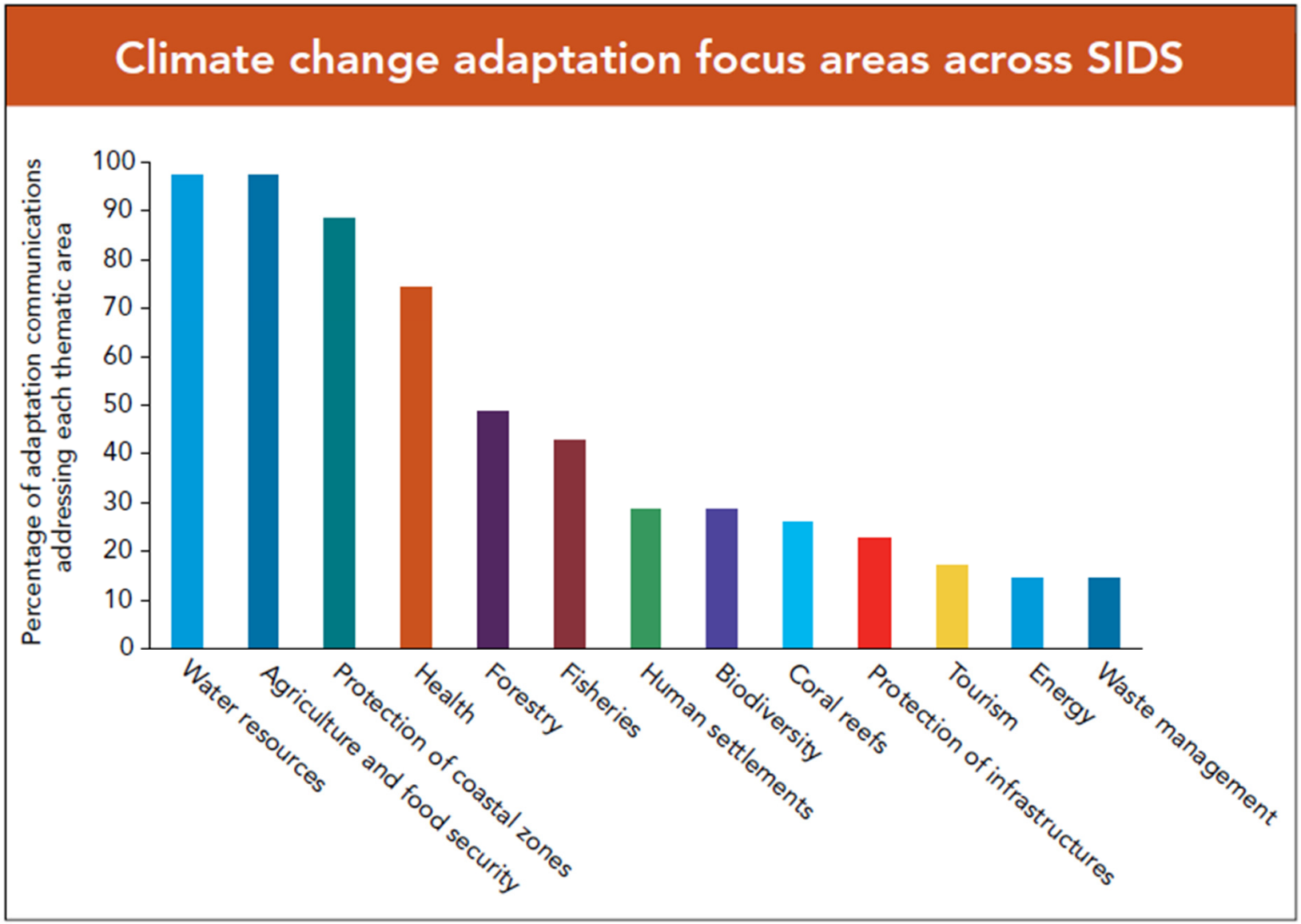
# Particularly Vulnerable Populations for Floods

- ***Glacial lake floods:*** Elderly, poor, nomadic, children, disabled or infirm, women, independently living ethnic groups in remote areas
- ***Flash:*** Everyone in the path of the floods
- ***Riverine (plains):*** Elderly, poor, nomadic, children, the disabled or sick, women, and people in poor housing, coastal areas, institutions, or on isolated islands

WHO 2009

# Prioritization

- We can't make major changes to anticipate climate change decades from now
- Options selected for implementation should:
  - Make sense anyway
    - And makes even more sense considering climate change
    - Policies and measures that reduce vulnerability to climate variability will generally reduce risk to climate change
  - Have marginal adjustments and low cost
  - "No regrets"




*Source:* SIDS Unit, based on NAPAs and UNFCCC National Communications.

TRENDS IN SUSTAINABLE DEVELOPMENT
Small Island Developing States (SIDS)
United Nations 2010

# No Regrets Adaptations

- Should perform well under a variety of new climates:
  - Current climate
  - Hotter and drier
  - Hotter and wetter
- Can be easily modified as the climate continues to change

# Three Key Criteria for Prioritization of Adaptations

- Benefits / effectiveness
- Costs
- Feasibility

*But* … adaptations must also consider:

- Timing
- Significance
- Certainty
- Adaptive capacity

# Screening the Theoretical Range of Adaptation Options for Malaria

| Theoretical Range of Choice | Technically feasible? | Effective to address health outcome? | Environmentally acceptable? | Economically feasible? | Socially & legally acceptable? | Closed/ Open (Practical Range of Choice) |
|---|---|---|---|---|---|---|
| Improve public health infrastructure, including surveillance programs | Yes | Low | Yes | Sometimes | Yes | Open |
| Source reduction | Yes | Yes | Spraying may not be acceptable | Yes | Sometimes | Open |
| Insecticide-treated bednets | Yes | Yes | Yes | Yes | Yes | Open |
| Indoor residual spraying | Yes | High | Yes if applied correctly | Yes | Yes | Open |
| Malaria prophylaxis | Yes | Yes | Yes | Only for the few. | Yes | Closed for the many |
| Weather-based forecasting & early warning systems | Yes | Medium | Yes | Often | Yes | Open |
| Public information and education /awareness campaigns | Yes | Low | Yes | Yes | Yes | Open |
| Vaccination | No | | | | | Closed |
| Genetic modification of mosquitoes and/or parasite | No | | | | | Closed |

Ebi and Burton, 2008

WHO 2009

# Questions for Second Stage Screening

- What is the exposure intensity or size of the event?
- Is the adaptation technically feasible?
- Is it economically possible?

But… also need to consider:

- Is institutional support and human capital available?
- Is it compatible with current policies?
- Is policy change needed?
- Transboundary issues?

# Health Risks May Arise from Adaptations in Other Sectors

- Water
  - Climate change very likely to exacerbate water stress/floods/water quality
  - Adaptation measures may increase exposure to a range of infectious diseases
- Food
  - Magnitude of climate change impacts on factors determining food security
  - Magnitude of possible impacts on health through adaptation and mitigation measures, such as biofuels
- Energy
  - Health co-benefits and harms of altering energy and transport systems

WHO 2009

# Discussion

**Questions?**

**Thoughts?**

**Concerns?**

**Suggestions?**

# Acknowledgements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