

Climate change health impacts and stakeholder perceptions in Indonesia – where are we?

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Climate Change and Global Health

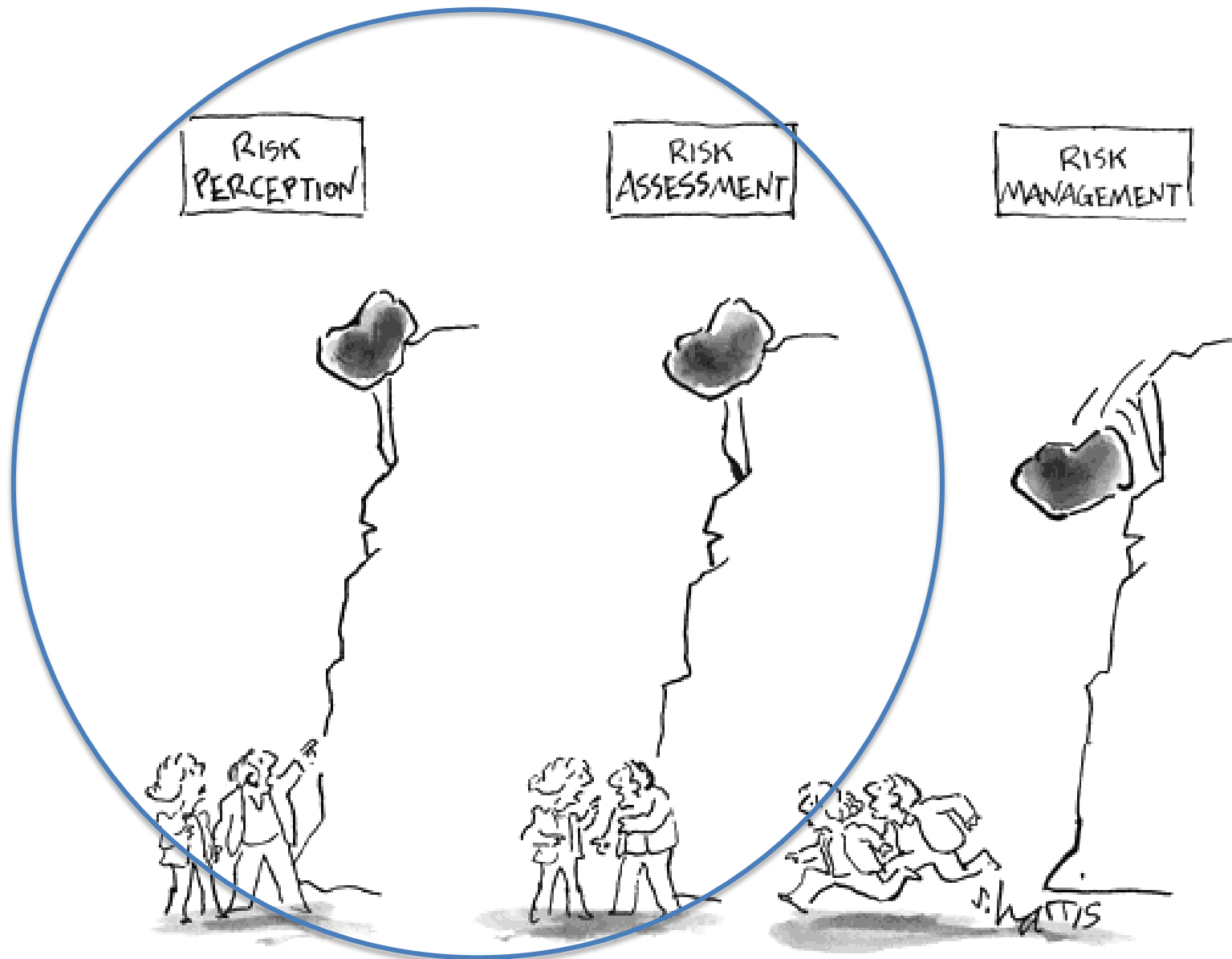
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Outline

1. Introduction
2. Health impacts
3. Perceptions
4. Way forward

1. Weather, climate and climate change



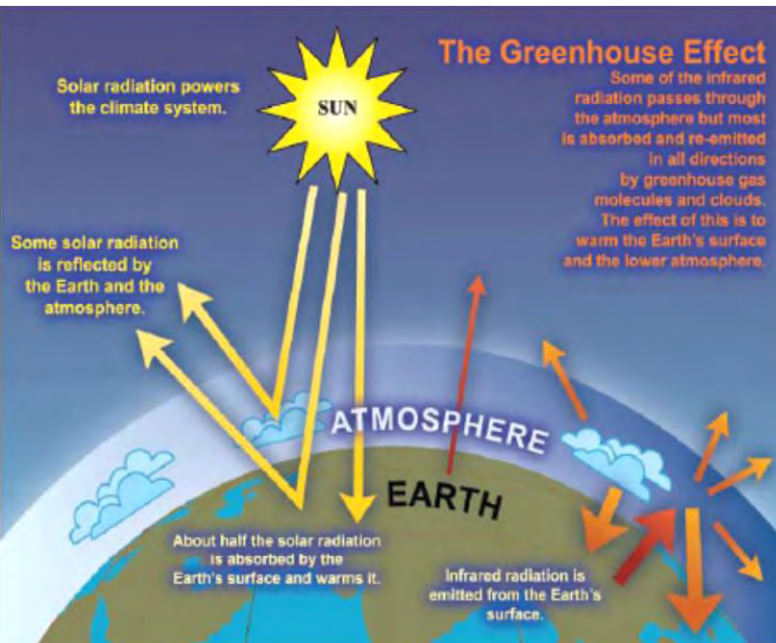
What is climate?



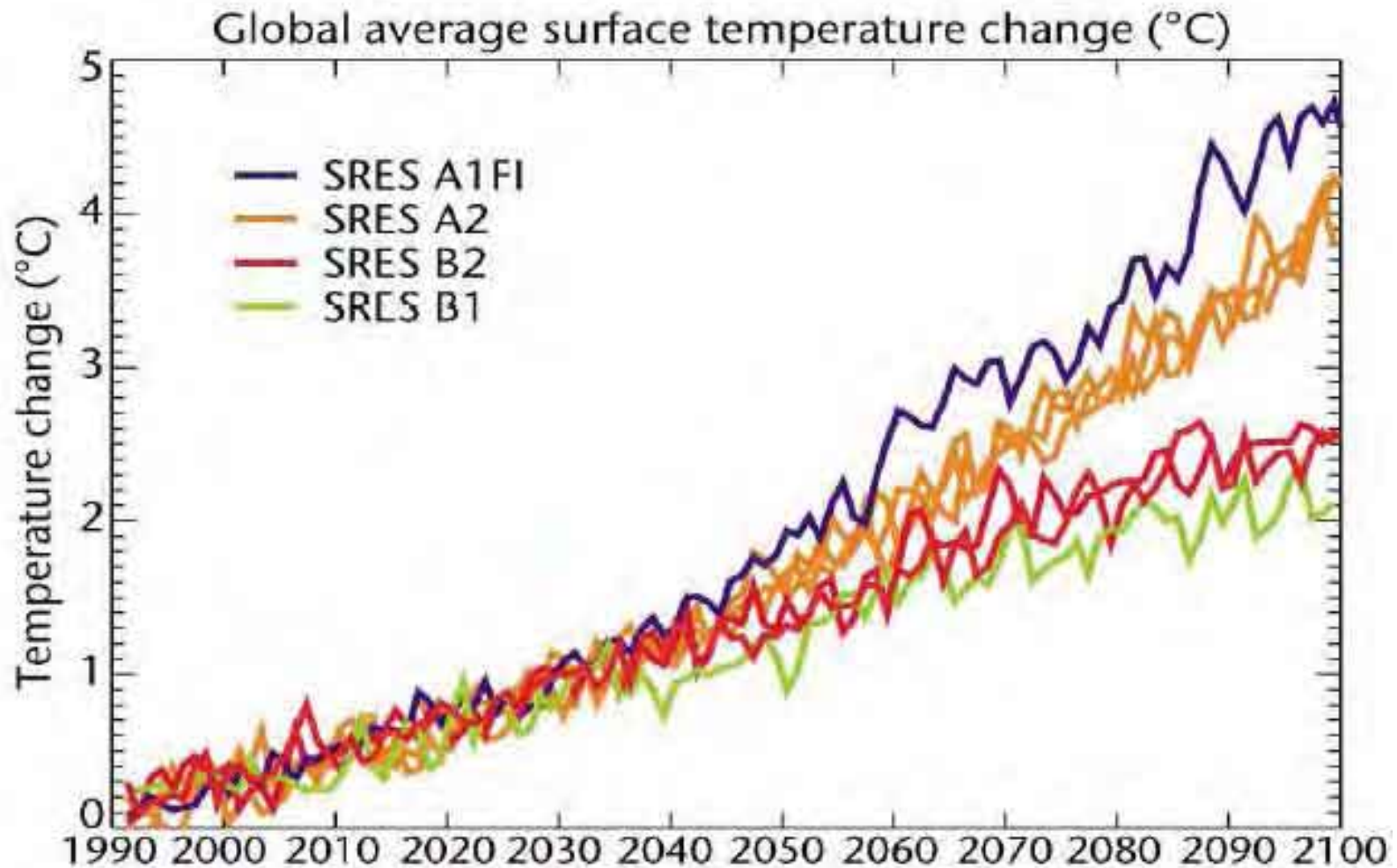
- Described by physical laws
- Complex interaction of atmosphere, sun, vegetation, oceans and humans
- Characterized by different climate types – e.g. arctic, temperate, tropical, step, monsoonal, arid...
- Realisation of weather (rain mm, sun hours, temperature, wind speed and direction, etc.)
- Statistics of weather (long term averages) describes the climate

What is climate change?

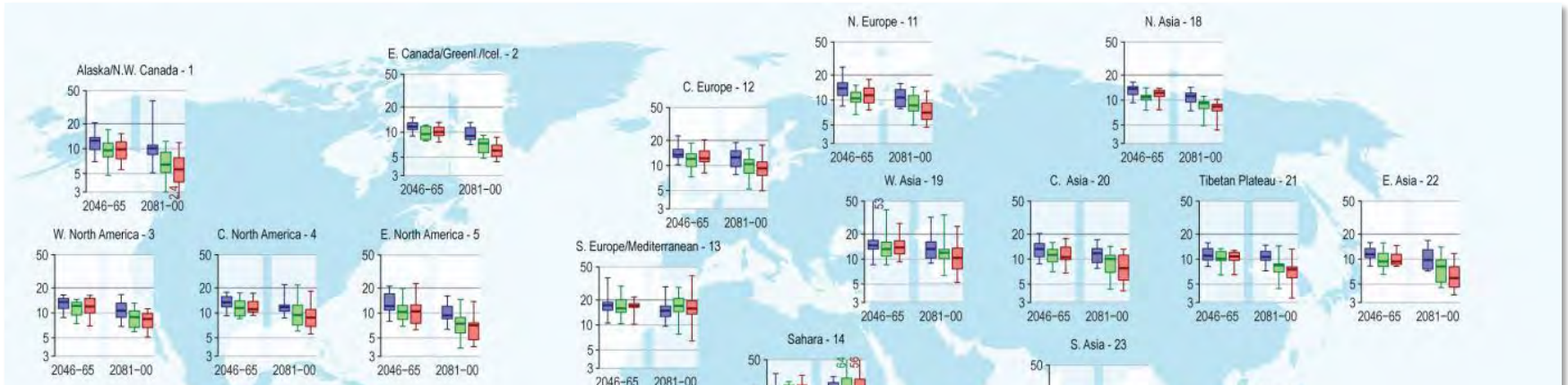
- Imbalance of energy in the climate system
- Manmade climate change is caused by greenhouse gases generated by human activities



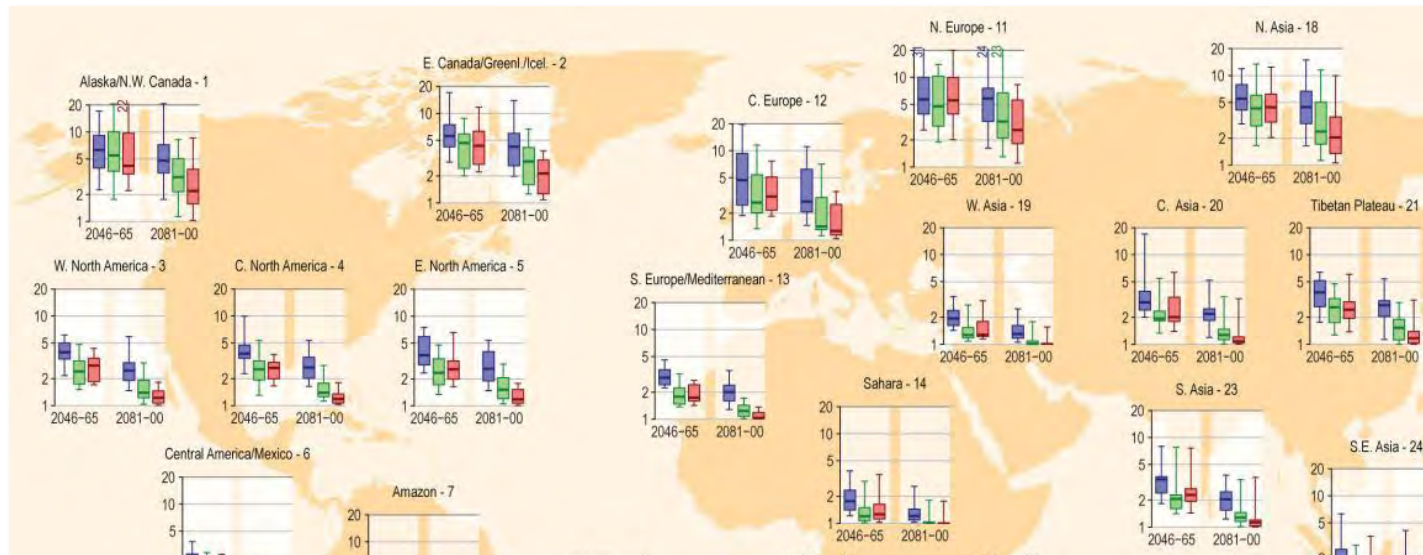
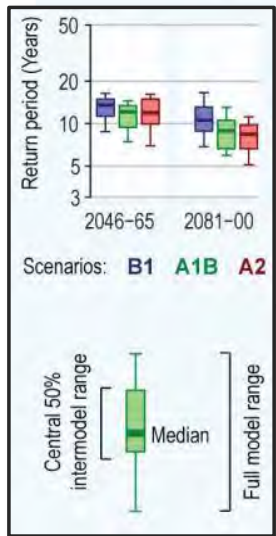
Future temperature according to different scenarios



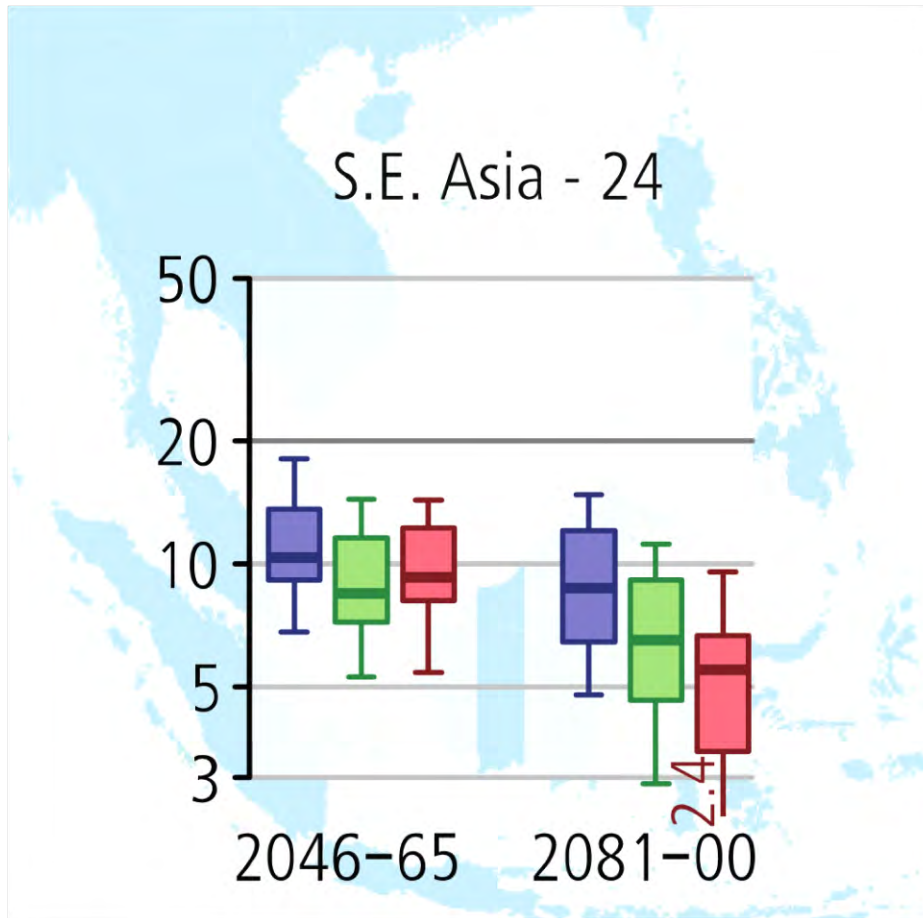
Climate models project there will be more heavy rain events throughout the 21st century



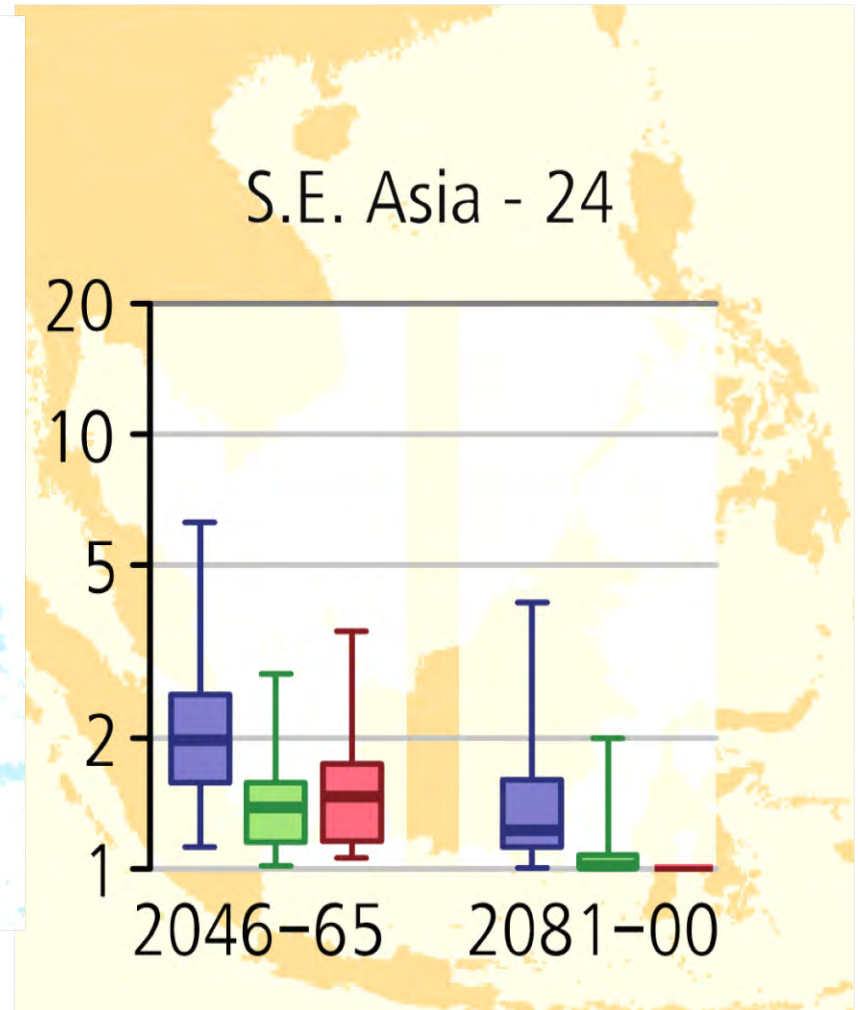
Climate models project more frequent hot days throughout the 21st century



Heavy Rain



Extreme Heat



Projected Impacts of Climate Change

Global temperature change (relative to pre-industrial)

0°C

1°C

2°C

3°C

4°C

5°C

Food

Falling crop yields in many areas, particularly developing regions

Possible rising yields in some high latitude regions

Falling yields in many developed regions

Water

Small mountain glaciers disappear – water supplies threatened in several areas

Significant decreases in water availability in many areas, including Mediterranean and Southern Africa

Sea level rise threatens major cities

Ecosystems

Extensive Damage to Coral Reefs

Rising number of species face extinction

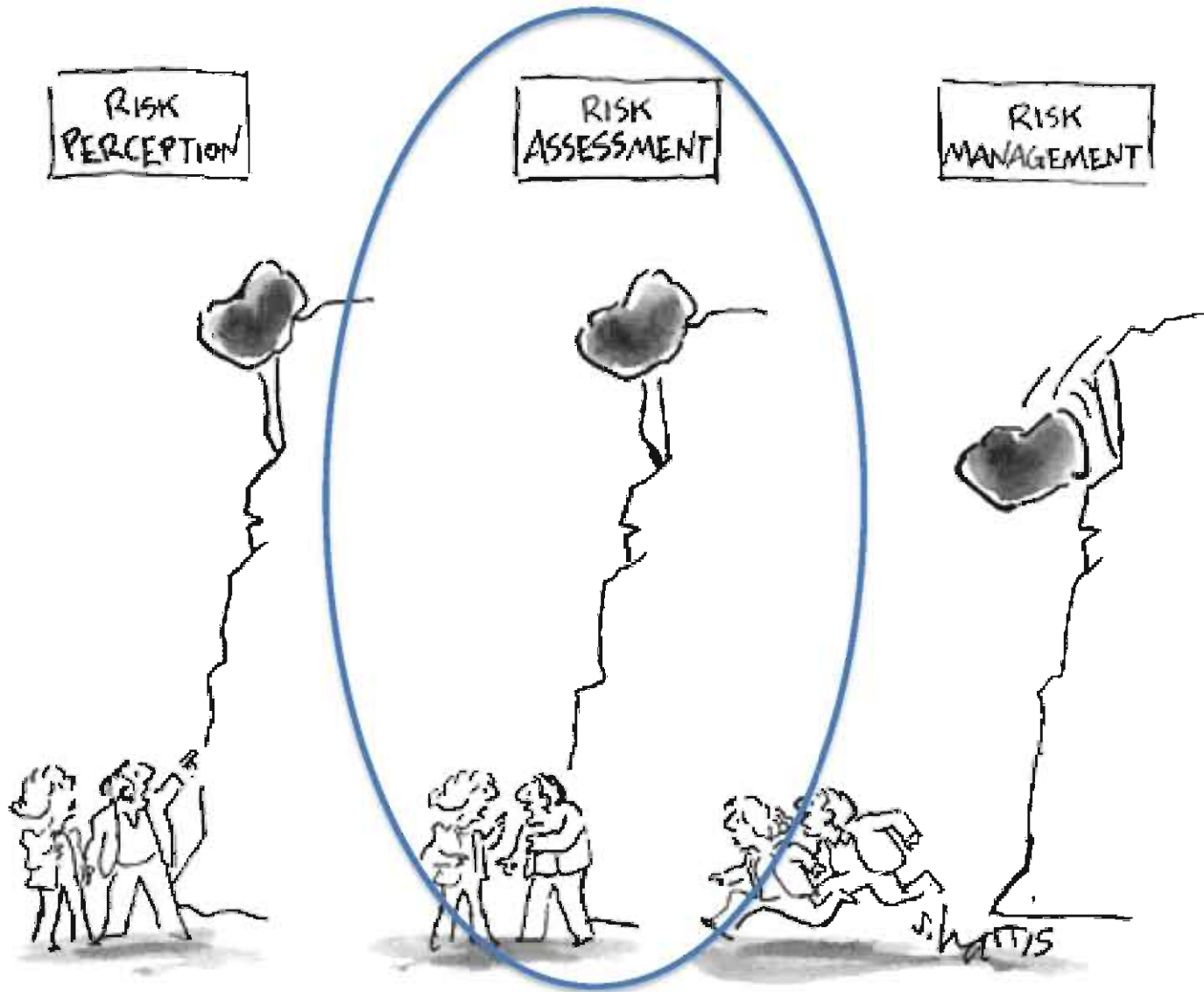
Extreme Weather Events

Rising intensity of storms, forest fires, droughts, flooding and heat waves

Risk of Abrupt and Major Irreversible Changes

Increasing risk of dangerous feedbacks and abrupt, large-scale shifts in the climate system

2. Health impacts in Indonesia





Sea level rise

- An archipelago with more than 17,500 islands and 81,000 km coastline, Indonesia is vulnerable to sea-level rise, flood, and sea-water intrusion
- Coastal fishermen are subject to more erratic weather and reduced fish stocks due to impaired coastal ecosystem, such as damaged coral reefs.
- Nearly 25% of Indonesian population live in areas less than 10 metres above the average sea level, many of them are underprivileged fishermen at risk of coastal inundation and other adverse events threatening their livelihood.

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Extreme rainfall and floods

- Changes in rainfall patterns have resulted in floods and landslides, directly caused injuries and deaths
- People who work in agricultural sector (estimated as 40% of the Indonesian population) have been more seriously affected by disasters related to precipitation patterns
- Extreme weather events associated with El Nino – Southern Oscillation (ENSO) include El Nino, causing more droughts, and La Nina which is responsible for more floods. These extreme climatic events have been more frequent and caused more calamities in the past years.

Extreme heat, landslides and forest fires

- Climate change may produce direct health impact, such as from extreme temperatures and injuries due to landslides
- Increasing temperature may enhance the risk of forest fires. For example, forest fire was extensive during El Nino 1997, damaging 6.8 million hectare of peat land in Indonesia, causing morbidity and mortality due to respiratory and cardiac problems.



CLAS
TOKO BU HA

Vector-borne diseases

- Higher temperature will facilitate distribution of disease vectors to areas previously not infested by these vectors
- The relationship between climate change and malaria transmission is complicated by land use changes, malaria control measures
- Climate change in the previous years might contribute to increasing global incidence of dengue infections, however, recurrent epidemics of dengue indicated that herd immunity to the four serotypes of dengue virus also played important roles in the transmission of dengue virus

Waterborne diseases

- Warm and nutrient-rich sea water maintain and promote cholera vibrio growth in coastal areas in Indonesia, such as Tangerang District, near Jakarta.
- Phytoplankton blooms nourish copepods and other zooplankton, which enhance the multiplication of cholera vibrio.
- Droughts increase salinity in local waters, which in turn facilitate the growth of cholera vibrios. The distribution of the bacteria will become wider due to floods. ENSO, as a climate phenomenon, has been responsible for 70% variance of cholera incidence.

Food security

- Decreased food production due to droughts and other climate related catastrophies has threatened food security among Indonesian people. Food security is complex though as many food items are imported.
- Climate change models indicated that there would be high probability of a 30 days monsoon delay and increased precipitation which could lead to annual rice deficits

Climate related stressor	Outcomes	Comments
<p>Temperature (and humidity), changes in the frequency of heat waves and wild fires causing air pollution, and concentrations and formation of air pollutant (e.g. ozone)</p>	<p>For example, cardio-respiratory deaths and hospital admissions, but not exclusively.</p>	<p>Well understood in general. Heat extremes are very likely to increase. However, impacts today depend on population adaptation to the current climate regimen, and future impacts highly depend on the level of transition to more chronic disease and urbanisation. In Indonesia this has not been studied, and local studies are needed to guide local adaptation strategies.</p>

<p>Changes in the frequency of weather and climate extremes (flood, storms and droughts)</p>	<p>Accidental deaths immediately, and potential followed by infectious outbreaks. Potential longer term mental health effects. Effects on agriculture and water availability. Socioeconomic effects and displacement.</p>	<p>Projections support more extreme and frequent floods and heavy rainfalls. Immediate effects are well understood, but do also in the future rely on demographic and epidemiological transitions. Long term effects following extreme events are not very well understood. For example, mental health impacts are rarely studied in this context. Studies on health impacts at the present and under future climate change scenarios for Indonesia are needed.</p>
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<p>Rainfall, temperature (sea and air) and soil moisture as determinants of crop yields, livestock, and fishery yields (including socioeconomic consequences)</p>	<p>Nutrition related health outcomes. Systemic ill health. Mental health.</p>	<p>Medium level of understanding. The estimation of health effects under climate change is complex because of the trade with food is global and with political influences, but also because of migration an adaptation alternative. The effects are potentially better understood among subsistence farmers, and local fishermen whom are only to a minimal extent interacting with the global food market. Studies and adaptation strategies to cope with these issues are needed.</p>
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<p>Rates of spread and multiplication of pathogens (virus, bacteria, toxins, pollens)</p>	<p>Infectious diseases, e.g. food and waterborne disease and reproduction of virus and bacteria transmitted by vectors. Intoxication.</p>	<p>Well understood in general. However, studies on human health impacts in relation to pathogens transmitted by food and water are still needed, especially in the Indonesia local context.</p>
<p>Abundance, spread and activity of vectors transmitting diseases</p>	<p>Infectious diseases, e.g. lyme disease and tick borne encephalitis, dengue, malaria among others.</p>	<p>Relatively well understood. Studies on the capacity of vectors in relation to climate is needed (entomology). Early warnings of epidemics need to be developed to guide timely action.</p>

Sea level rise and storm surges

Accidents, waterborne disease, nutrition related disease, epidemics. Mental health.

Relatively well understood. Coastal floodings are very likely to increase with sea level rise. However, impacts relies largely on the resilience of communities and societies, e.g. if they can afford to adapt or not or if societies migrate. Long-term health effects after event has lead to displacement and migration is not well understood. Food production may be affected among fishermen. May contribute to population displacement as necessary adaptation strategy in low-lying areas. Health impacts from such effects are unknown. More studies are needed to identify risk populations, and areas, and adaptation strategies.

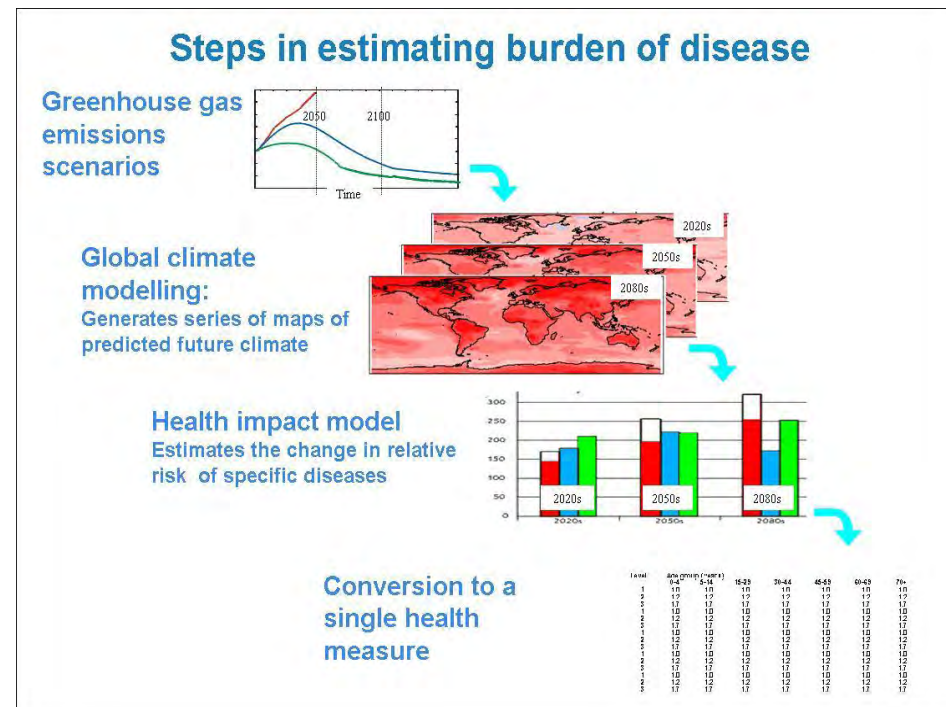
Displacement of humans and animals due to climate related stressors and events	Can facilitate the spread of disease within and between regions during e.g. floods when people need are displaced	Not well understood. Consequences could be of epidemic proportions.
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Summary

- Knowledge about health impacts are scarce in Indonesia
- The evidence that exists is mostly of "qualitative" judgements and from the international litterature
- It is key to generate and provide local evidence on health impacts to guide adaptation and better understaning of the challenges the society face
- Projection of the near and longer term future health impacts can guide policies
- Mapping of impacts and vulnerabilities as a tool for policies and stakeholder action is important

Epidemiologic research tasks



- Exposure-response relationships between climate variation and health outcomes
- Estimate the current health burden (e.g., annual deaths) attributable to climate change
- Develop scenario-based modelling to project health risks
- Assess health harms and benefits of proposed mitigation and adaptation policy options



3. Stakeholder perceptions

Survey about climate change in the health sector – pilot run results

Who responded?






Response	Average	Total
Men	 67%	12
Women	 33%	6

Mean age

Average

28.09

19. Your main institution (Choose the main one where you spend most of your working time)

Response	Average	Total
Public hospital	 6%	1
University / colleges	 33%	6
Provincial health office	 11%	2
District health office	 33%	6
Other profession, specify: -	 11%	2

Is climate change on their radar?

- 9 out of 19 respondents considered global warming the most pressing political and societal issue
- They considered themselves as fairly well informed about the cause and potential impacts and ways to mitigate climate change
- They considered society to also take serious on climate change in general (6.7 out of 10)
- But they considered themselves to take it more seriously than society at a whole (8.2 out of 10)
- When compared to terrorism, population growth, poverty, ageing population and NCDs, globalisation, armed conflicts etc – climate change was, however, considered the least important....(!)

Climate change perceptions








- all agreed we are already experiencing climate change
- They considered climate change being caused by humans and us being able to do something about it
- They consider companies and not the health sector as the main contributors to climate change
- They indicated that the movement against climate change can positively affect peoples health
- However, for many questions there was also disagreement

Climate change information

- Climate change information was mainly from TV, newspapers and internet
- To a little or less extent from friends and professional environments

Climate change and health

	Average rank				
	Strongly disagree Disagree	Neither disagree nor agree	Agree	Strongly agree	
A. Climate change is unimportant to my health.	■				1.7
B. The consequences of climate change to health will be severe.	■				2.9
C. I have been directly exposed to the consequences of climate change.	■				2.8

E. Fatalities related to climatic extreme events such as floods, landslides, forest fires & heat waves might be related to climate change.		2.9
F. The evidence on how climate change impacts health is controversial.		2.2
G. Occupation health problem from heat stress might be related to climate change.		2.6
H. The increase of cardiovascular disease might be related to climate change.		2.3
I. Climate change might influence the population's mental health.		2.6
J. Climate change can increase the frequency of food-borne and water-borne diseases.		3.1
K. With climate change, we might see more infectious disease cases, such as dengue and malaria.		3.2

Are the health sector doing enough to mitigate impacts and warming?

- Not according to the respondents



Summary

- The respondents considered climate change serious in general
- They thought extreme events and infectious disease spread to be the most serious threat to health
- They thought the health sector could do more to adapt to and mitigate climate change
- This indicate some succesful dissemination of the risks with climate change, however, obvious gaps can be seen in the identified impacts
- There is still large uncertainty in the perceptions – and in the evidence on local impacts!

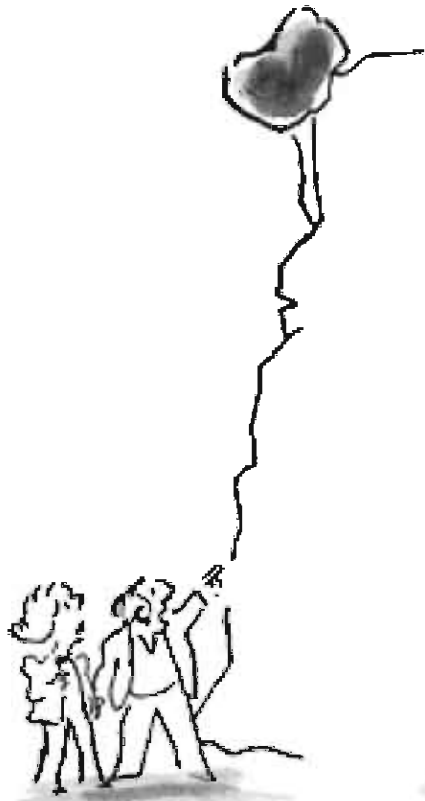
4. Way forward

Research on human health and climate change based on local data

- To do research on climate change and health in Indonesia, with local data, and by Indonesian researchers
- To interact with the public and policy makers
- To convince stakeholders to act based on local data
- To foster local and national experts on climate change and health
- To involve health professional in climate change adaptation and mitigation

Climate change health impacts –
who, where, and when?

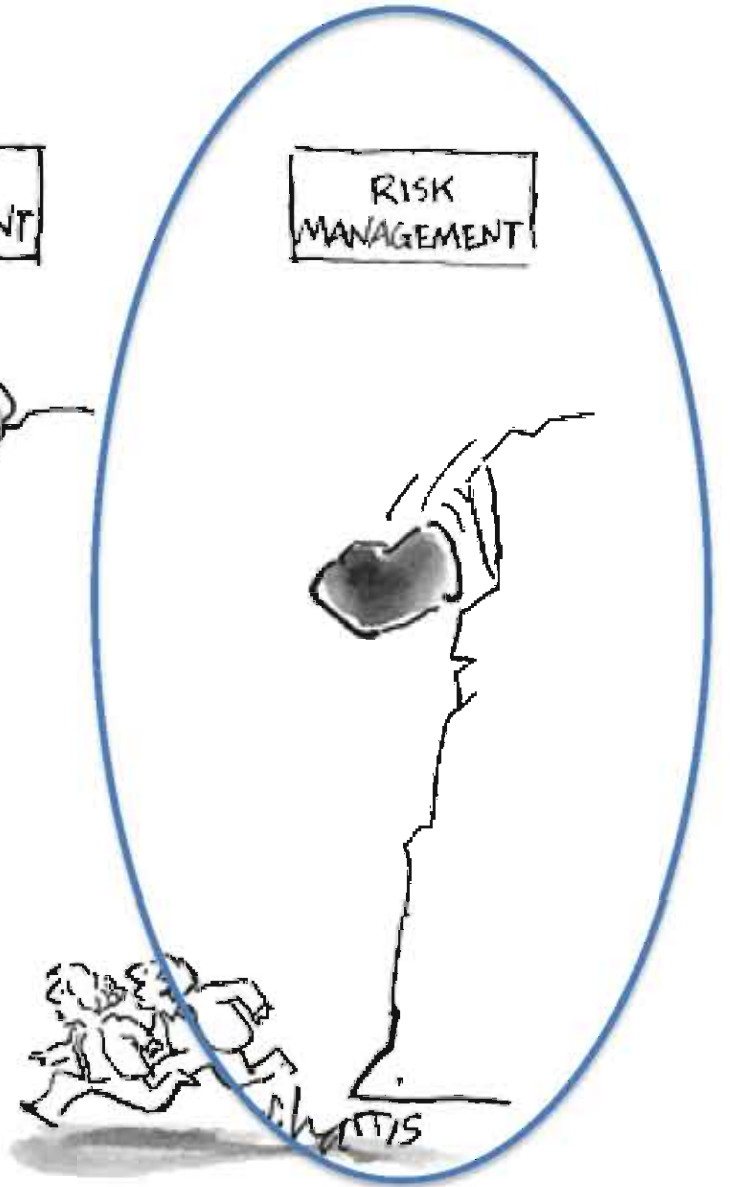
RISK
PERCEPTION



RISK
ASSESSMENT



RISK
MANAGEMENT



Adaptation

= preparedness and prevention of impacts

- Education
- Policies
- Interventions

Both top-down and bottom-up perspectives are needed:

- National policies and strategies
- Community involvement

Example - Sweden

Impacts and adaptation strategies:

- Health conditions in Sweden are sensitive to climate change, and the potential impacts was described where such evidence existed in the 2007 National Climate and Vulnerability Assessment (SOU 2007:60)
- Recommendations in form of adaptation strategies was developed in and after the assessment
- Many of which are being emphasized and implemented presently

Examples of undergoing adaptation activities:

- Heat waves (warnings system under development)
- Borreliosis (increased surveillance and preparedness northwards)
- Drinking water (surface water sources; under research; new technology investments, e.g. UV-light)

Thanks!

