Challenge of climate change in public health: Southeast Asia perspectives

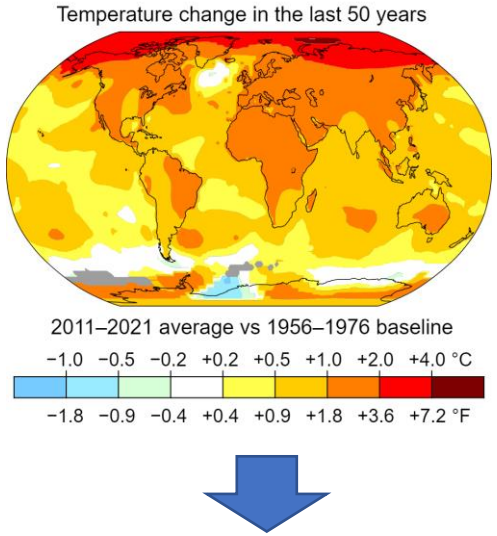
Kraichat Tantrakarnapa: E-mail: kraichat.tan@mahidol.ac.th

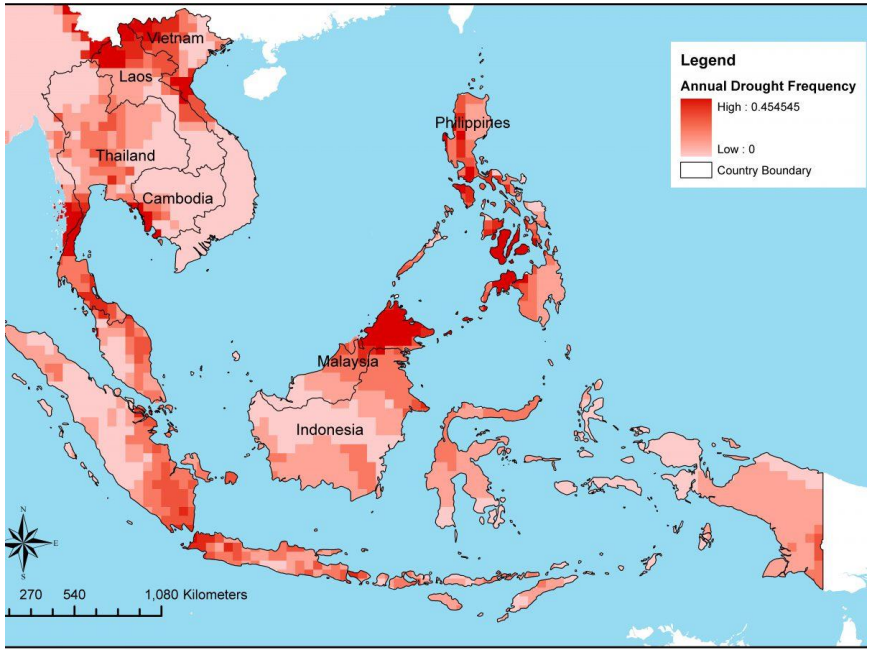
Faculty of Tropical Medicine,

MAHIDOL University, Thailand

Outline of my talk

- Global Climate Change
- Climate Change situation in Southeast Asia countries
- Climate Change and Health Impacts
- How to respond?



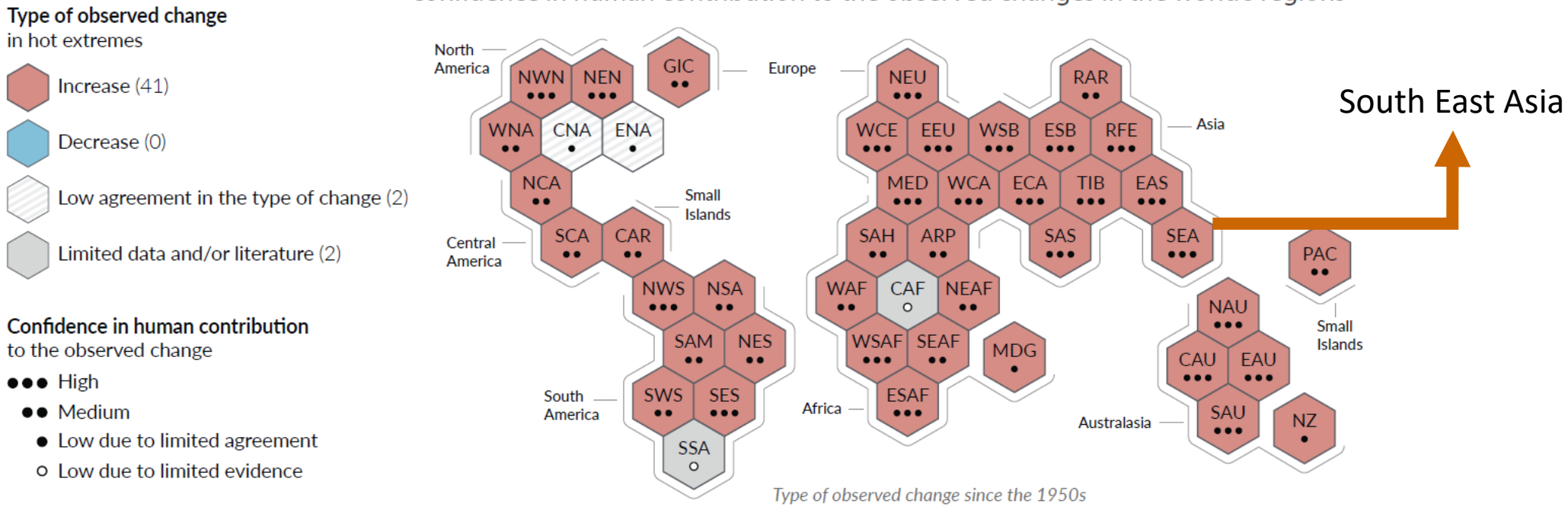


Heat Extreme

Global Situation of Climate Change

Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes

(a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions



Source: IPCC AR6 report

Heavy precipitation

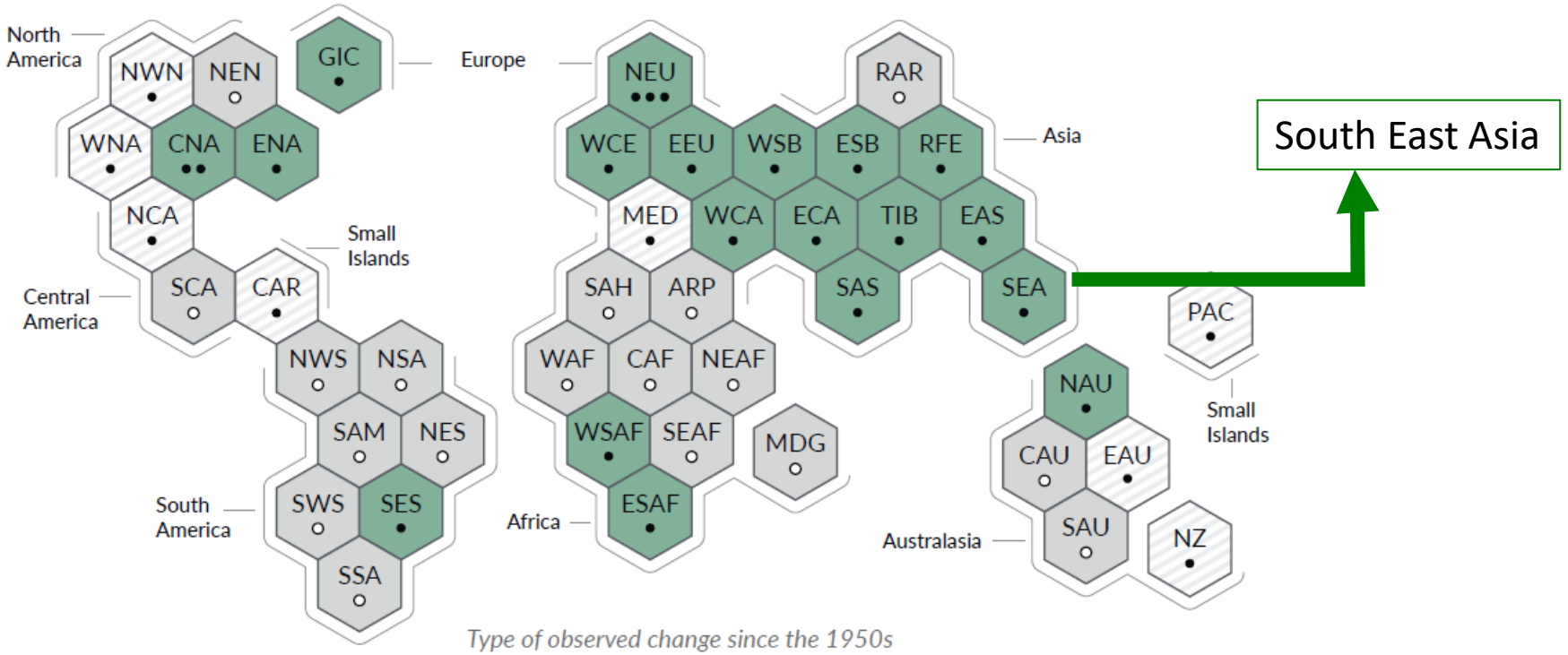
(b) Synthesis of assessment of observed change in **heavy precipitation** and confidence in human contribution to the observed changes in the world's regions

Type of observed change
in heavy precipitation

- Increase (19)
- Decrease (0)
- Low agreement in the type of change (8)
- Limited data and/or literature (18)

Confidence in human contribution
to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



Type of observed change since the 1950s

Source: IPCC AR6 report

Agricultural and ecological drought

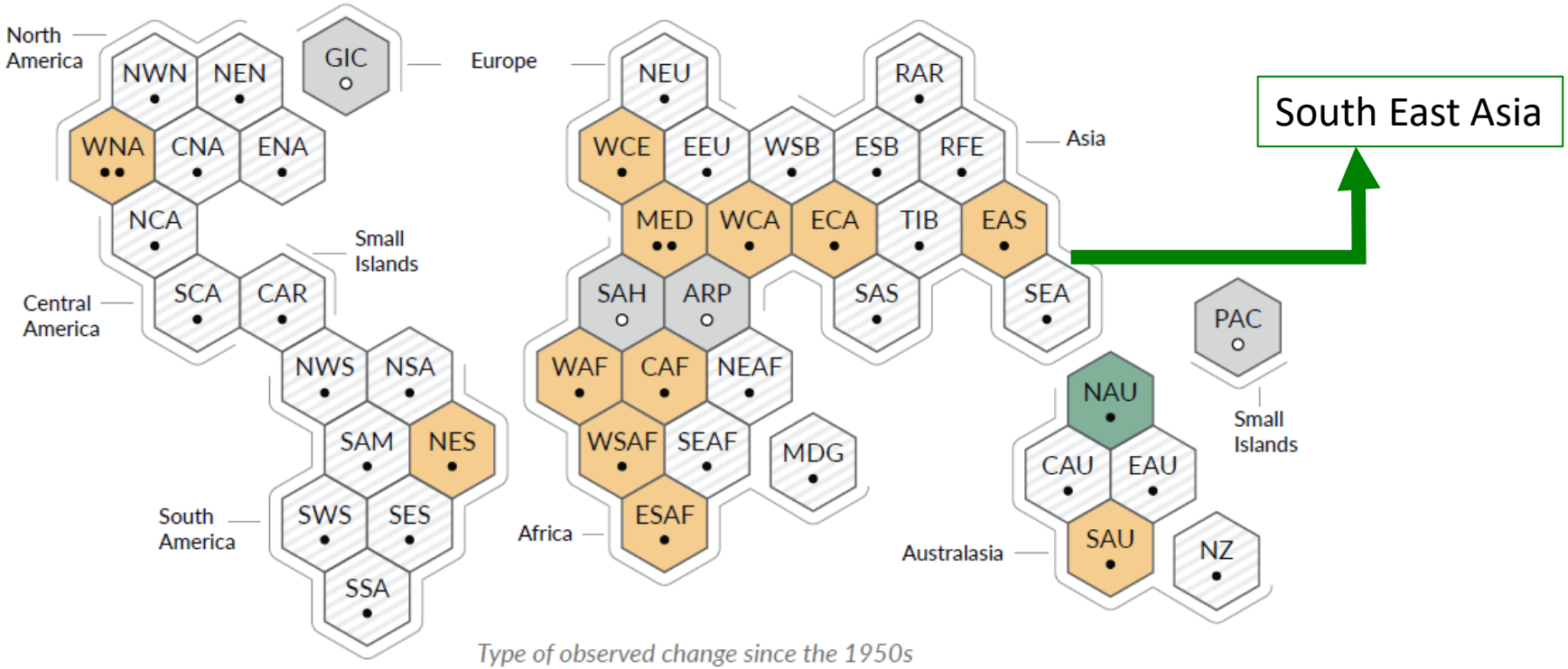
(c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions

Type of observed change
in agricultural and ecological drought

- Increase (12)
- Decrease (1)
- Low agreement in the type of change (28)
- Limited data and/or literature (4)

Confidence in human contribution
to the observed change

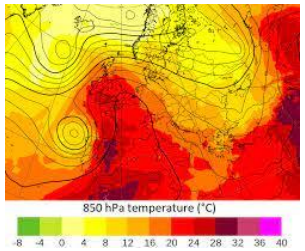
- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



Type of observed change since the 1950s

Southeast Asia facing calamitous weather extremes as 1.5°C global warming to hit by 2030s: IPCC report

IPCC's report found that human activity was "unequivocally" to blame for increasingly harsh climate events.



Heatwaves

Floods

Drought

Net zero GHG (Green House Gas) emission

COP26/27

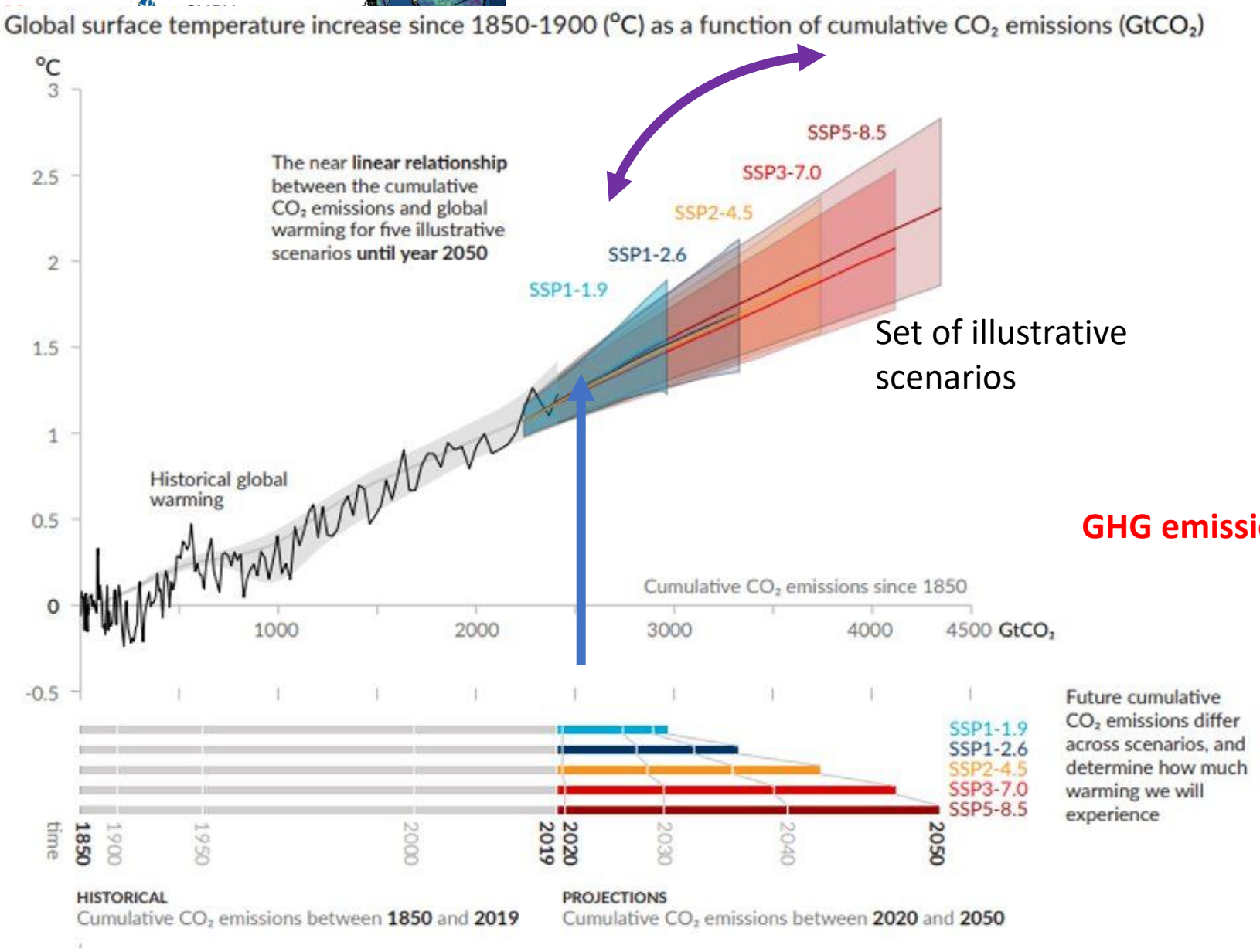
Indonesia, plans to achieve net-zero by 2060
Thailand set a goal to be net-zero by 2065
……..

Continental Temperature Anomalies		Regional Temperature Anomalies			Background		References		
	°C	°F	°C	°F		Rank (out of 112 years)	Year(s)	°C	°F
North America	+1.40	+2.52	+0.13	+0.24	Warmest	7th	2016	+1.92	+3.46
					Coolest	106th	1917	-1.31	-2.36
South America	+1.09	+1.96	+0.14	+0.26	Warmest	6th	2015	+1.41	+2.54
					Coolest	107th	1917	-0.89	-1.60
Europe	+1.28	+2.30	+0.15	+0.26	Warmest	9th	2020	+2.17	+3.91
					Coolest	104th	1956	-1.07	-1.93
Africa	+1.33	+2.39	+0.13	+0.23	Warmest	3rd	2016	+1.45	+2.61
					Coolest	109th	1918	-0.68	-1.22
Asia	+1.60	+2.88	+0.17	+0.31	Warmest	7th	2020	+2.06	+3.71
					Coolest	106th	1912	-0.89	-1.60

How is the situation of SEA country?

https://www.ncei.noaa.gov/access/monitoring/monthly-report/global-regions/202113

Code red for humanity



- It warns of a future of increasingly extreme heatwaves, droughts, fires and flooding.
- But it also shows how the worst impacts **can be avoided** if the world acts fast to cut greenhouse gas emissions.

Source: AR6 (IPCC), 2022

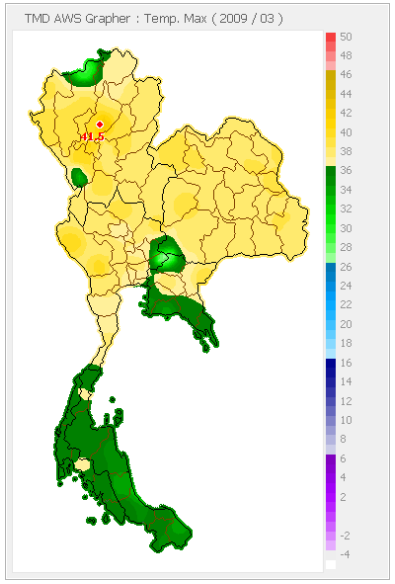
2009

2020

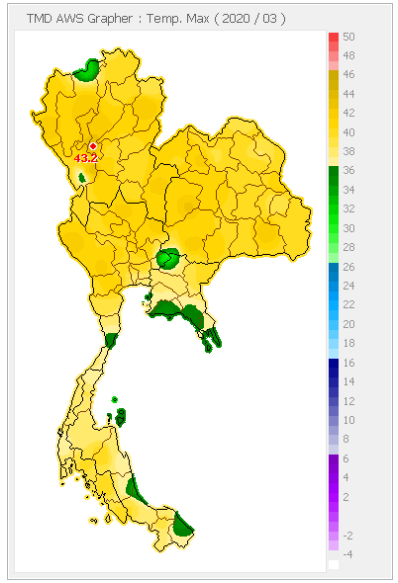
Temperature change

MAR

41.5

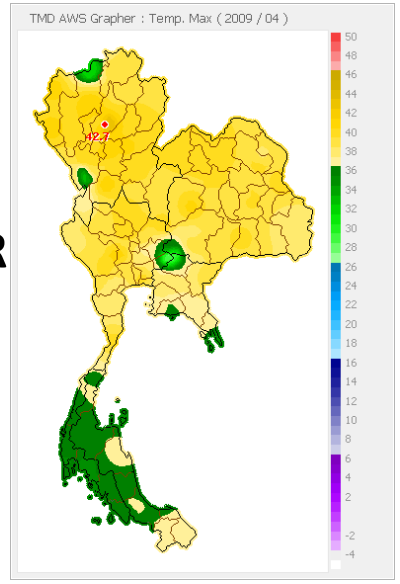


43.2

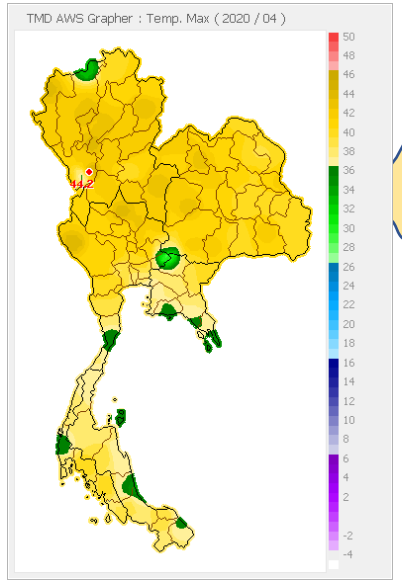


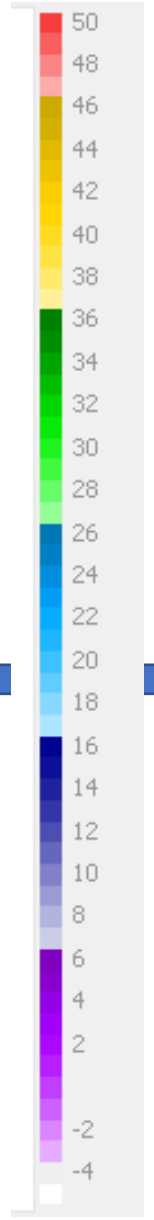
APR

42.7

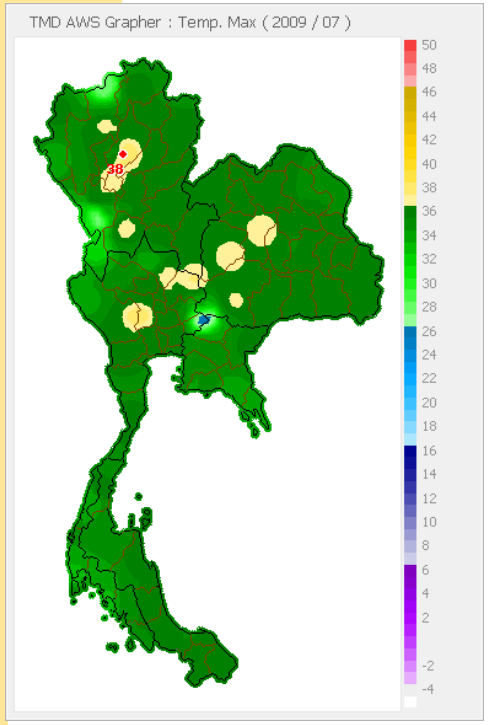


44.2

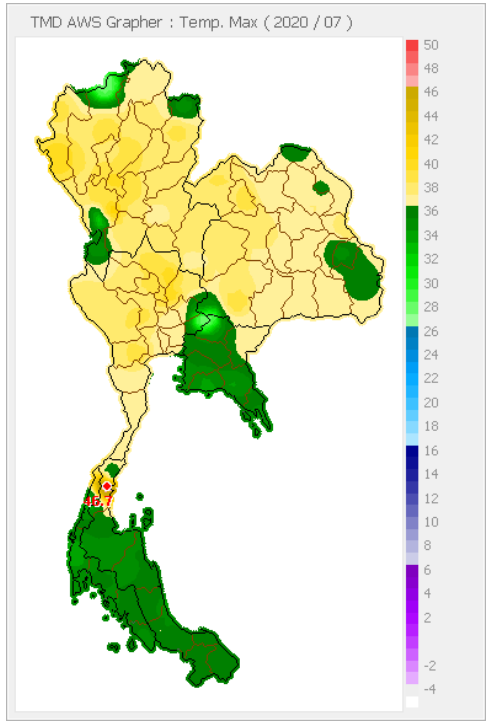




MAY 2009



MAY 2020

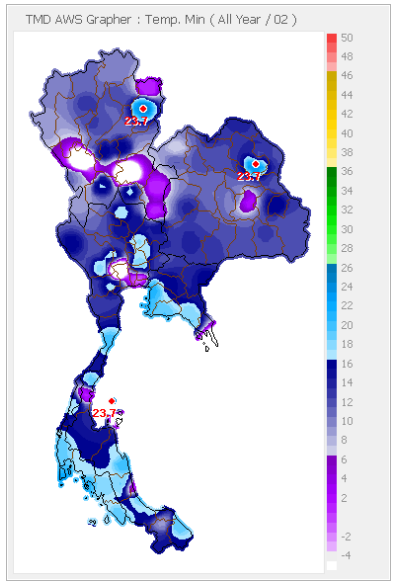


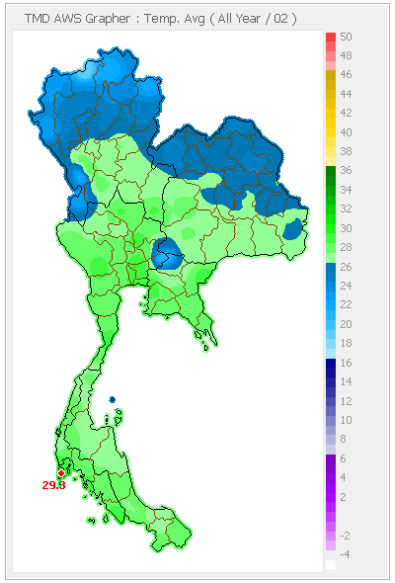
Maximum temperature

Temperature change

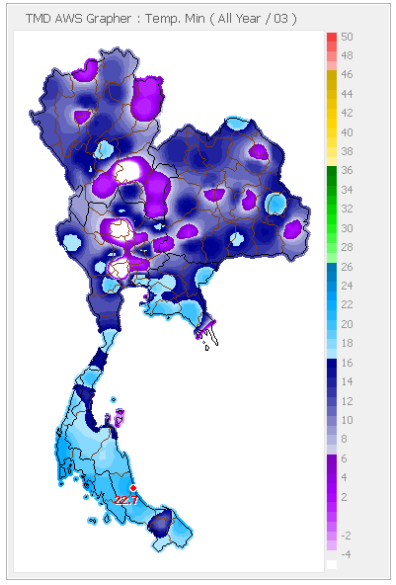
2009 2020

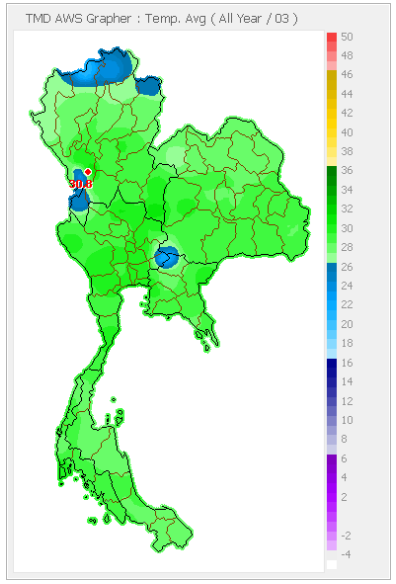
Feb



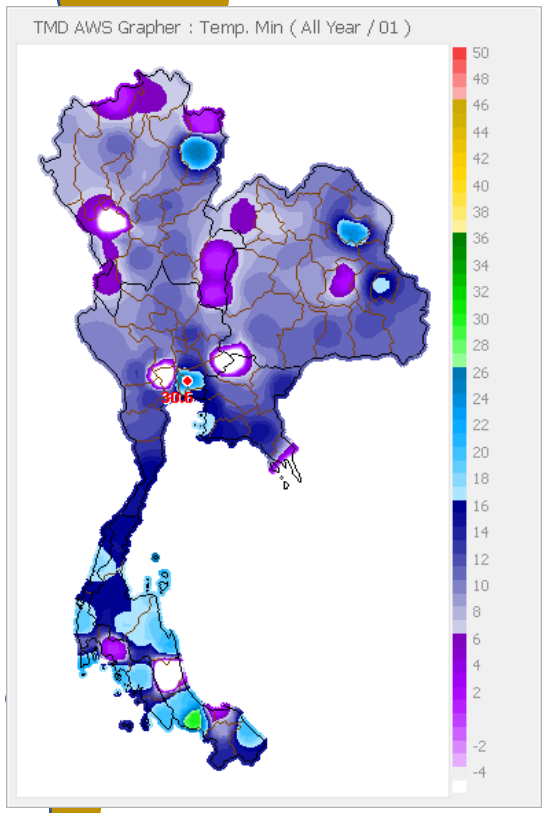


Mar

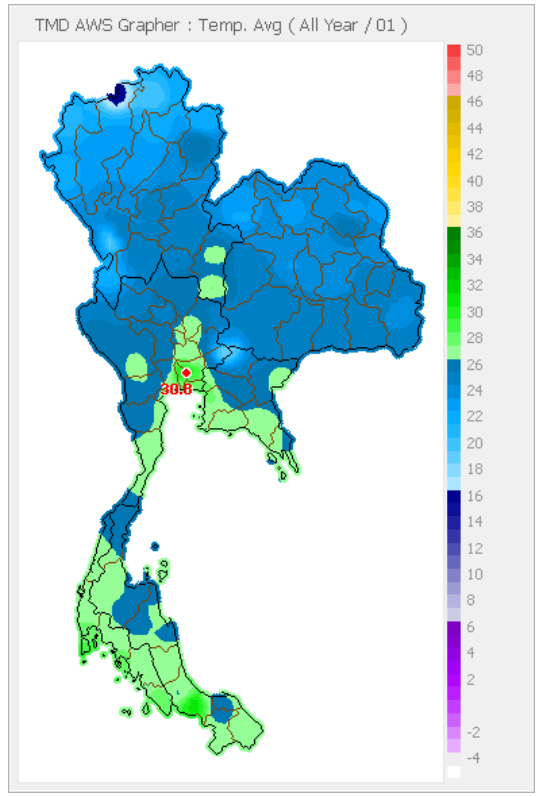




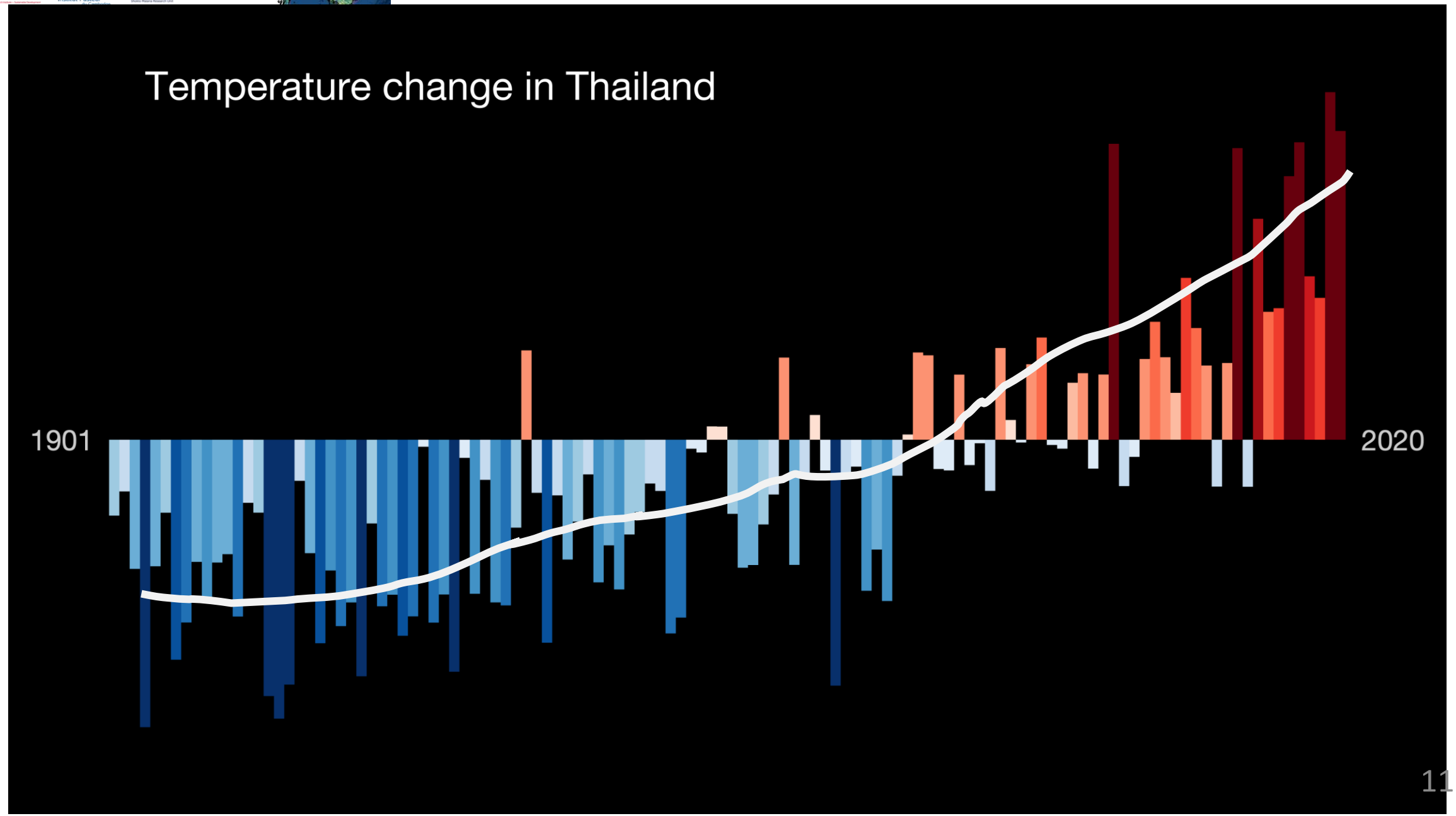
JAN 2009



JAN 2020



Minimum temperature


Temperature change in Thailand
1901
2020

Cooperative Research Project :

Climate Change and Human Health in Asia:
Current Impacts, Future Risks, and Health Benefits of Mitigation Policies

e-ASIA Joint Research Program (e-ASIA JRP)

Research Team

Our team members (Australia, Japan, Thailand, and Philippines) have already established a solid foundation for collaboration to assess the impacts of climate change on human health.

Australia

Well-known for development of large international collaboration, advanced statistical modelling, future projection for extreme climate events, assessing the health co-benefits of climate mitigation policies, and research translation

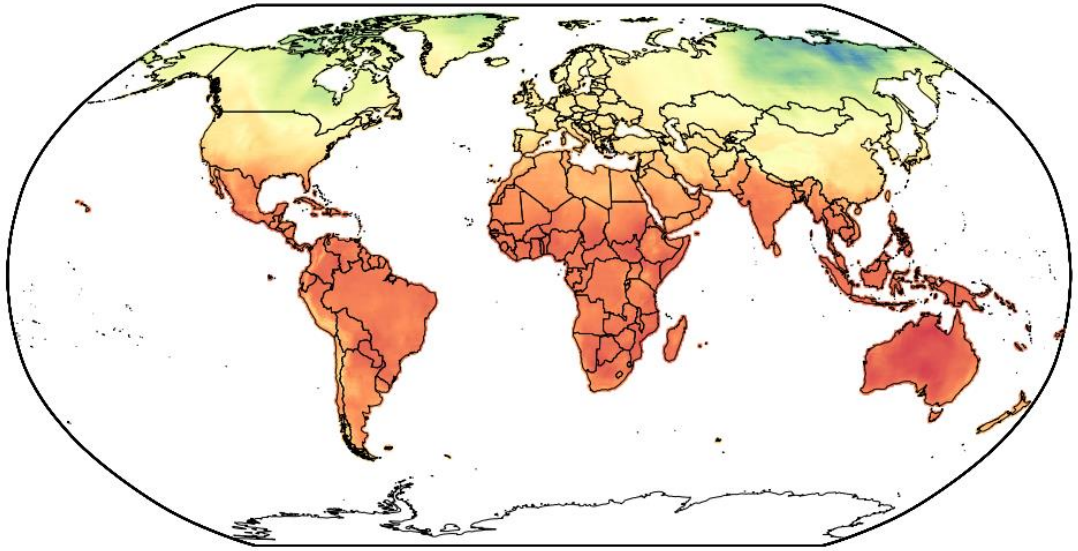
Japan

Recognized for climate change and human health

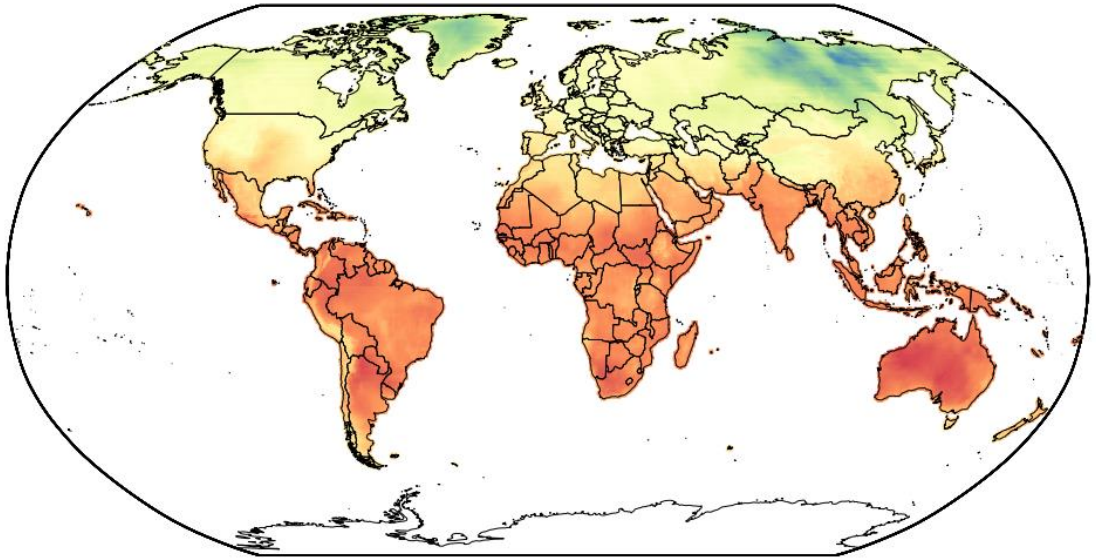
Thailand

Good at environmental health risk assessment

2015-2020



2091-2100

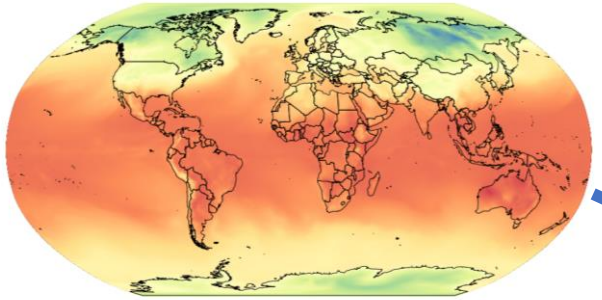


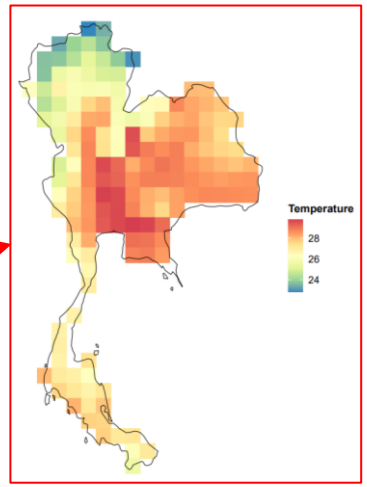
ISIMIP
Inter-Sectoral Impact Model Intercomparison Project

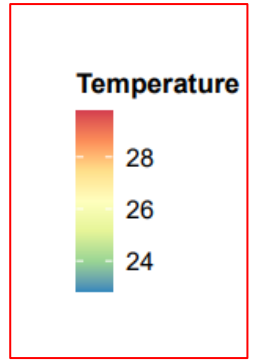
GCM downscale

ISIMIP3

ISIMIP3b (GCM-based quantification of impacts at different levels of climate change)







126

Emission scenarios

SSP126: represents a strong mitigation pathway for achieving the warming target of the Paris Agreement.

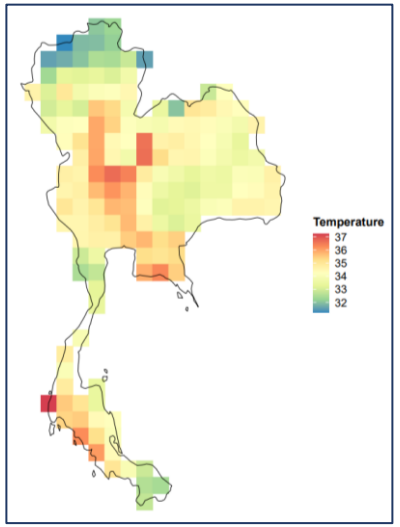
SSP245,
SSP370 and
SSP585

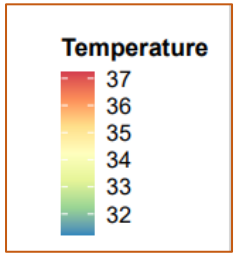
→ **SSP126**

Current situation (2015-2020)

?

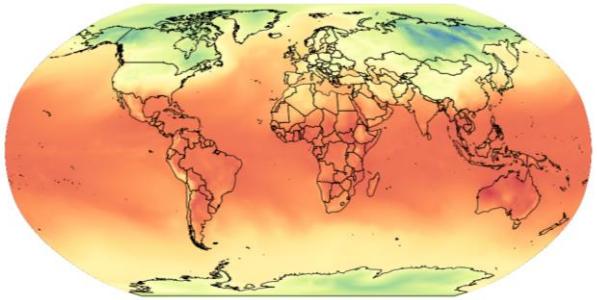
If it is worst scenario (SSP585)

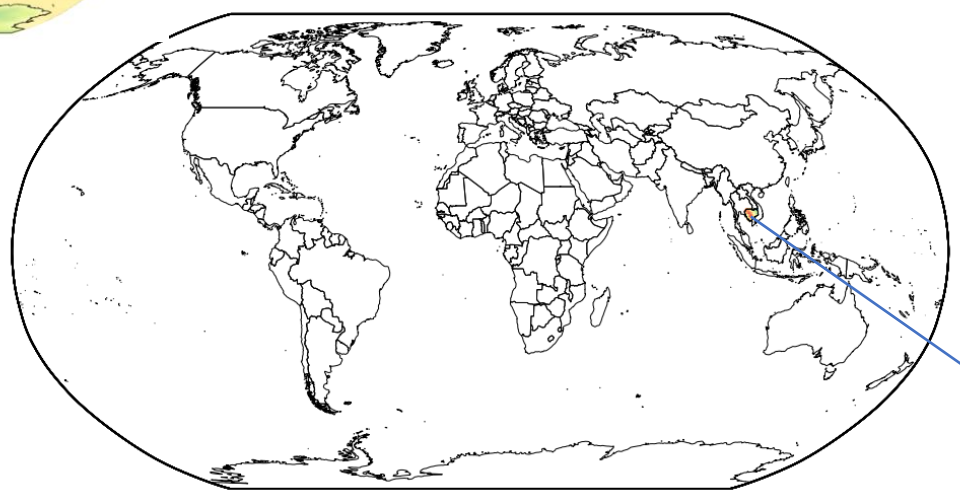




585

GCM downscale

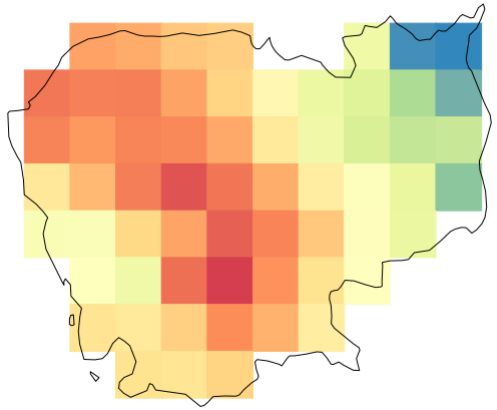




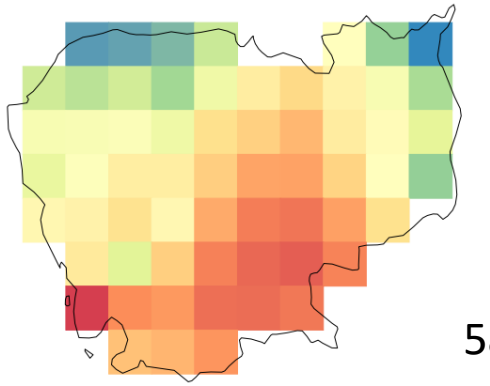
ISIMIP3

ISIMIP3b (GCM-based quantification of impacts at different levels of climate change)

A case of Cambodia



126



585

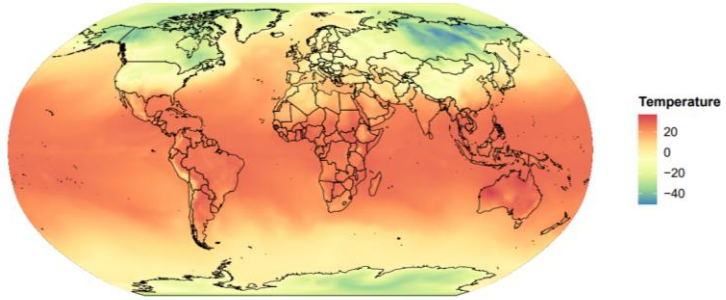
SSP126: represents a strong mitigation pathway for achieving the warming target of the Paris Agreement.
SSP245,
SSP370 and
SSP585

GCM downscale

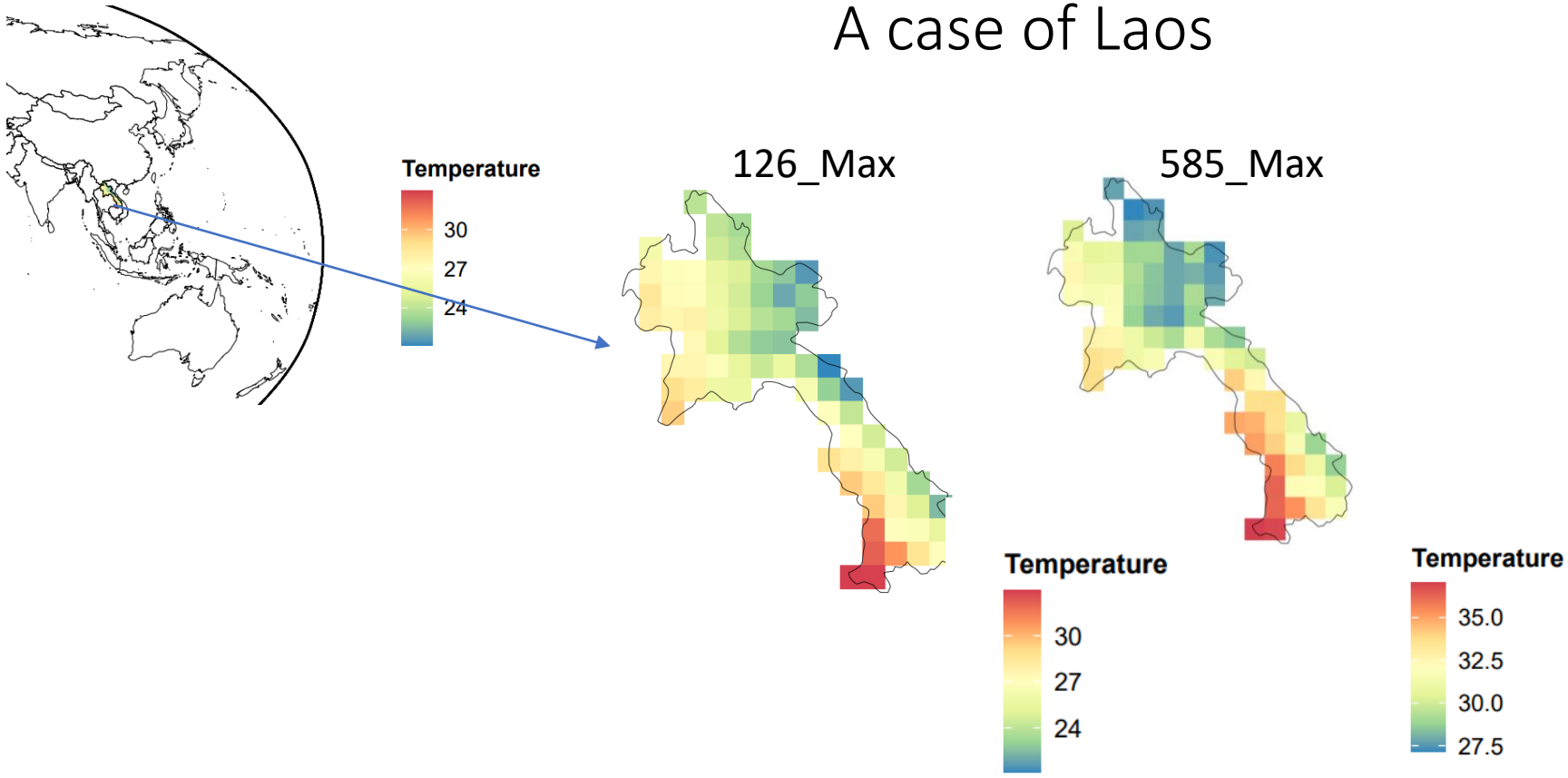
ISIMIP
Inter-Sectoral Impact Model Intercomparison Project

ISIMIP3

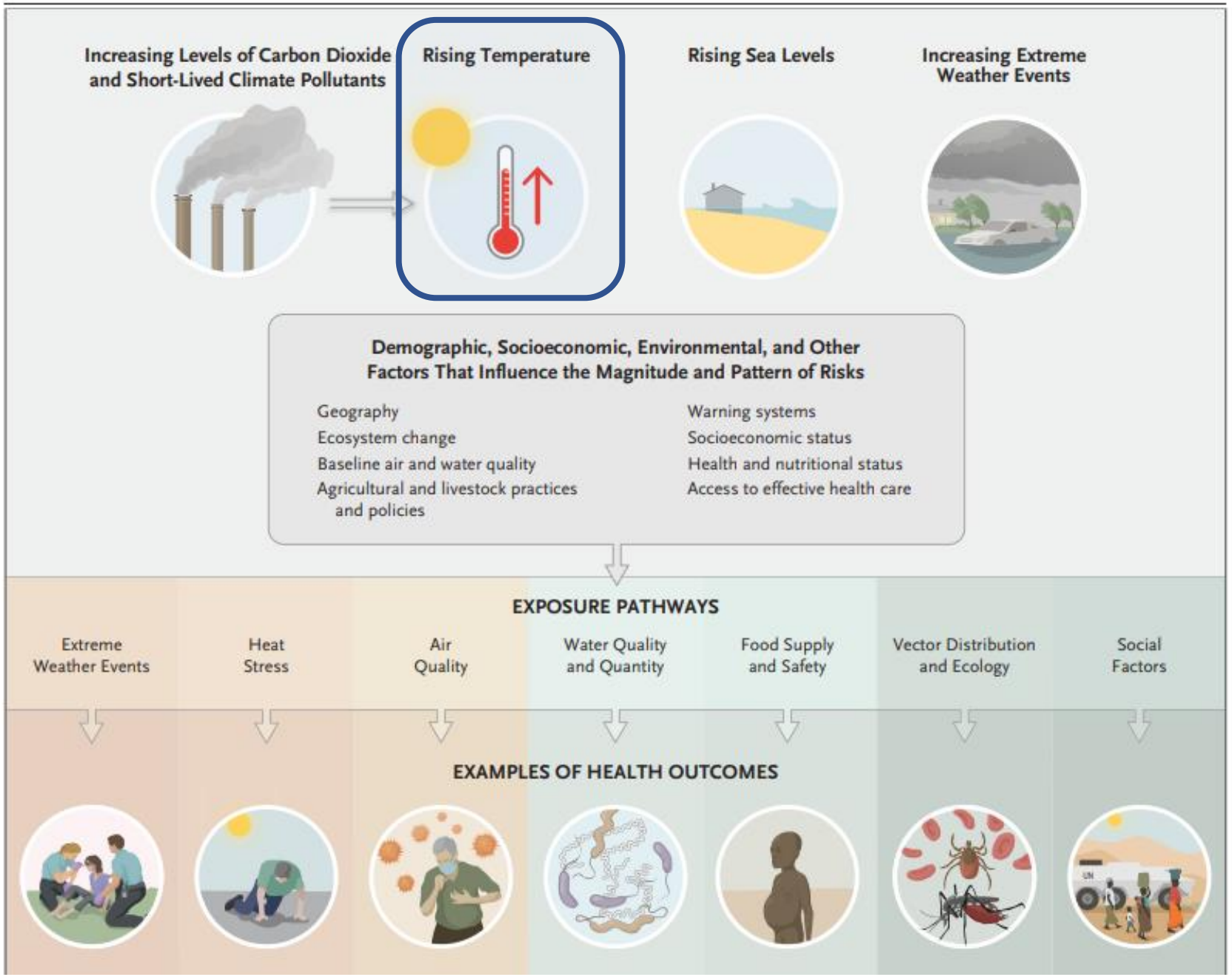
ISIMIP3b (GCM-based quantification of impacts at different levels of climate change)



A case of Laos



SSP126: represents a strong mitigation pathway for achieving the warming target of the Paris Agreement.
SSP245,
SSP370 and
SSP585



State of Climate Change

Exposure

- Impacts

Health Outcomes

Source: Haines, 2019

Global heating: an urgent call for action to protect health

This century is a special one, where we as humans destroy ourselves.” The Countdown is our best chance of putting health at the center of a **response** to protect human wellbeing.

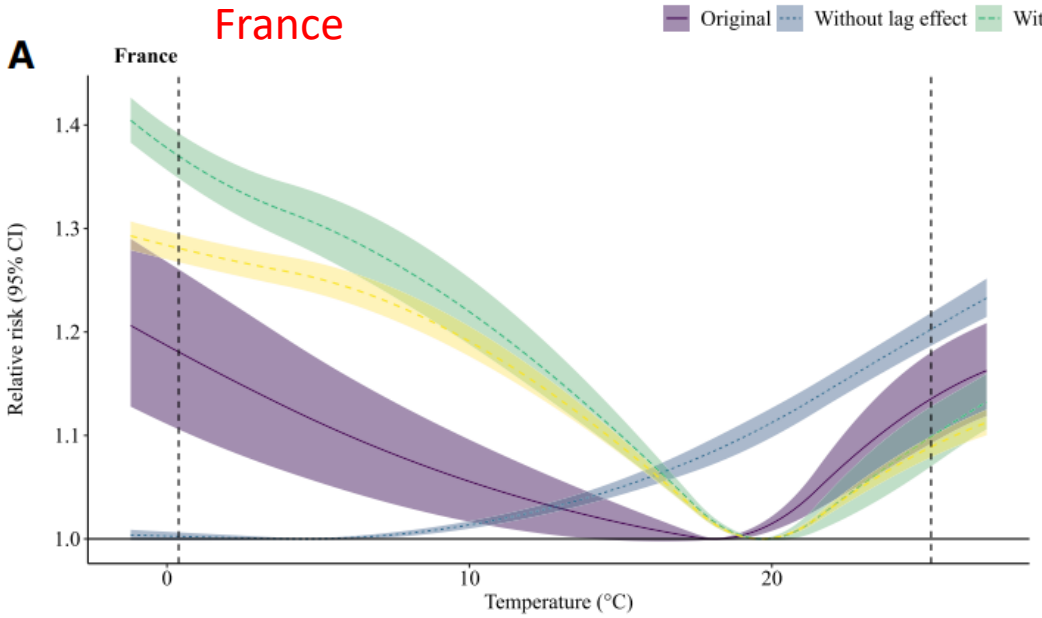
The **reliable data has impeded** the evaluation of the health impacts of climate change.
Greater **international and multidisciplinary collaborations** are necessary to inspire more studies on the **assessment of health impacts** and the development of adaptation strategies in low- and middle-income countries.

CellPress

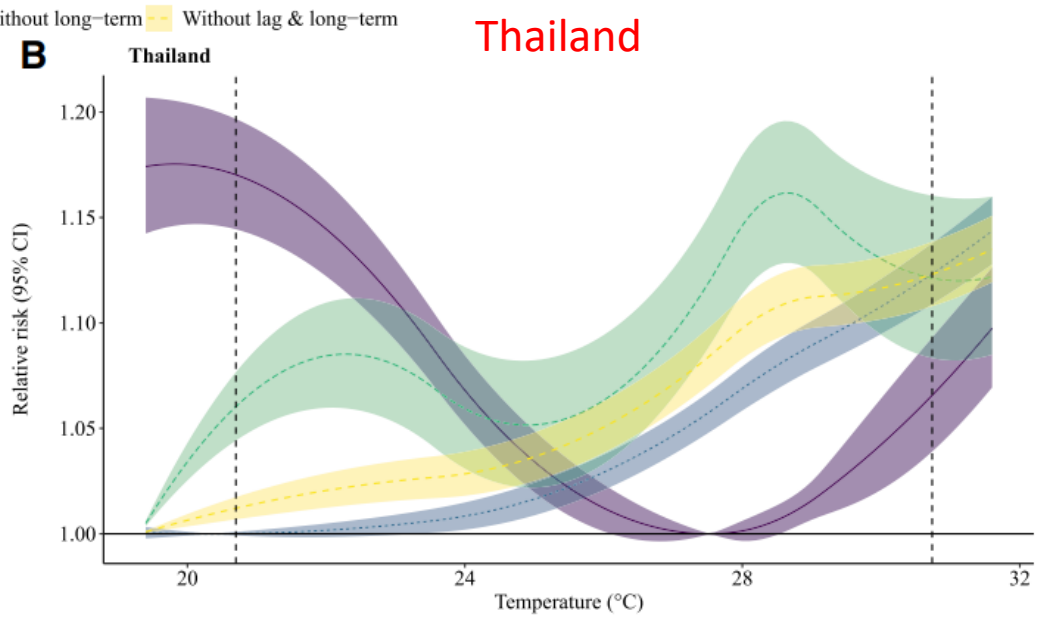
Extreme temperatures and mortality in Latin America: Voices are needed from the Global South

Yuming Guo,[1,*] Bo Wen,[1] Yao Wu,[1] Rongbin Xu,[1] and Shanshan Li[1,*]

France



Thailand



Heat-related mortality: an urgent need to recognise and record

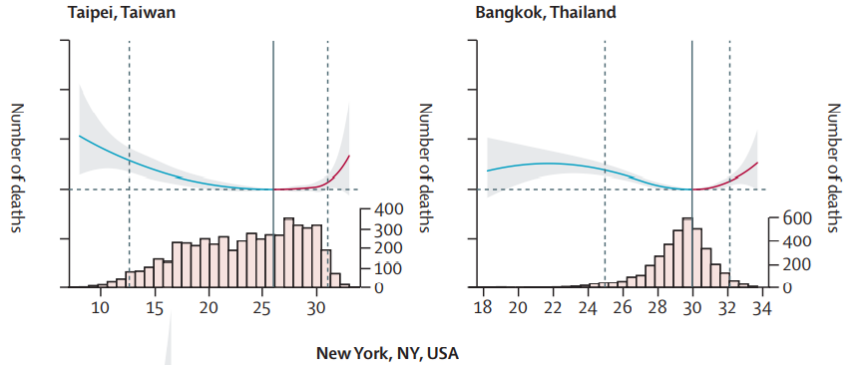
National mortality records in Australia suggest substantial under-reporting of heat-related mortality. Less than 0·1% of 1·7 million deaths between 2006 and 2017 were attributed directly or indirectly to excessive natural heat (table). However, recent research[1] indicates that official records underestimate the association at least 50-fold.

http://www.thelancet.com/planetary-health

*Thomas Longden, Simon Quilty, Philip Haywood, Arnagretta Hunter, Russell Gruen
thomas.longden@anu.edu.au

Mortality risk attributable to high and low ambient temperature: a multicountry observational study

Antonio Gasparrini, Yuming Guo, Masahiro Hashizume, Eric Lavigne, Antonella Zanobetti, Joel Schwartz, Aurelio Tobias, Shilu Tong, Joacim Rocklöv, Bertil Forsberg, Michela Leone, Manuela De Sario, Michelle L Bell, Yue-Liang Leon Guo, Chang-fu Wu, Haidong Kan, Seung-Muk Yi, Micheline de Sousa Zanotti Stagliorio Coelho, Paulo Hilario Nascimento Saldiva, Yasushi Honda, Ho Kim, Ben Armstrong



Interpretation

We report that non-optimum ambient temperature is responsible for substantial excess in mortality, with important differences between countries. Although most previous research has focused on heat-related effects, most of the attributable deaths were caused by cold temperatures. Despite the attention given to extreme weather events, most of the effect happened on moderately hot and moderately cold days, especially moderately cold days. This evidence is important for improvements to public health policies aimed at prevention of temperature-related health consequences, and provides a platform to extend predictions on future effects in climate-change scenarios.

Quantifying excess deaths related to heatwaves under climate change scenarios: A multicountry time series modelling study

Yuming, 2018 https://doi.org/10.1371/ journal.pmed.1002629

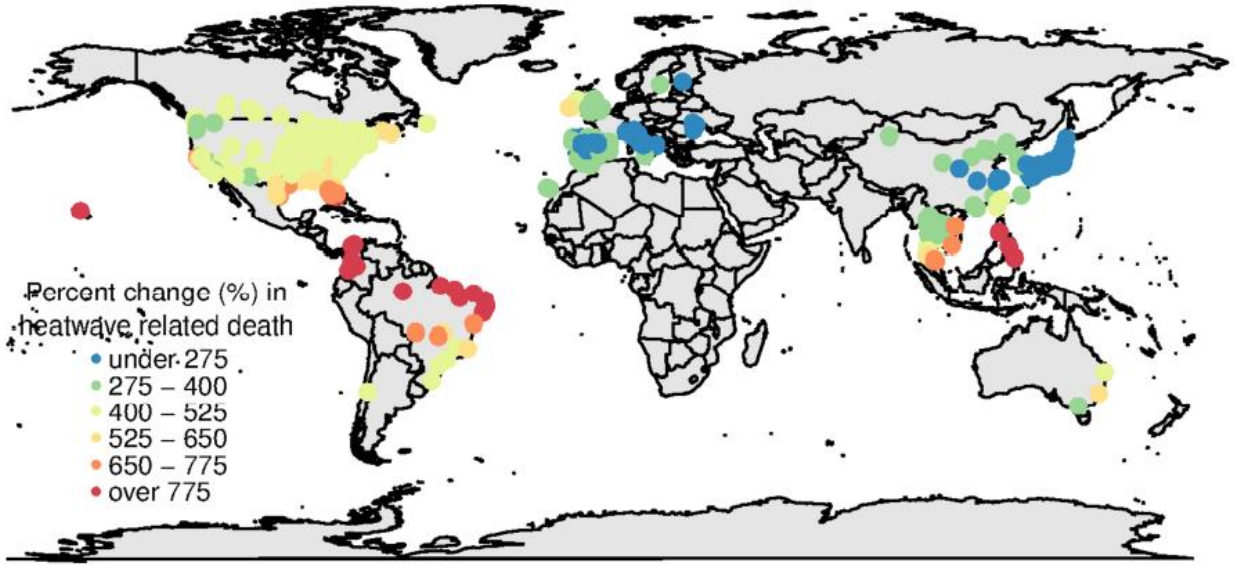


Fig 1. Locations of communities and mean percent change of heatwave-related excess deaths in 2031–2080 comparing to 1971–2020, under RCP8.5 scenario and high-variant population scenario, with assumption of nonadaptation. RCP, Representative Concentration Pathway.

https://doi.org/10.1371/journal.pmed.1002629.g001

This study provides a comprehensive characterization of **future heatwave-related excess mortality** across various regions and under alternative scenarios of greenhouse gas emissions, different assumptions of adaptation, and different scenarios of population change.

The projections can help decision makers in **planning adaptation and mitigation strategies** for climate change

The *Lancet* Countdown: tracking progress on health and climate change

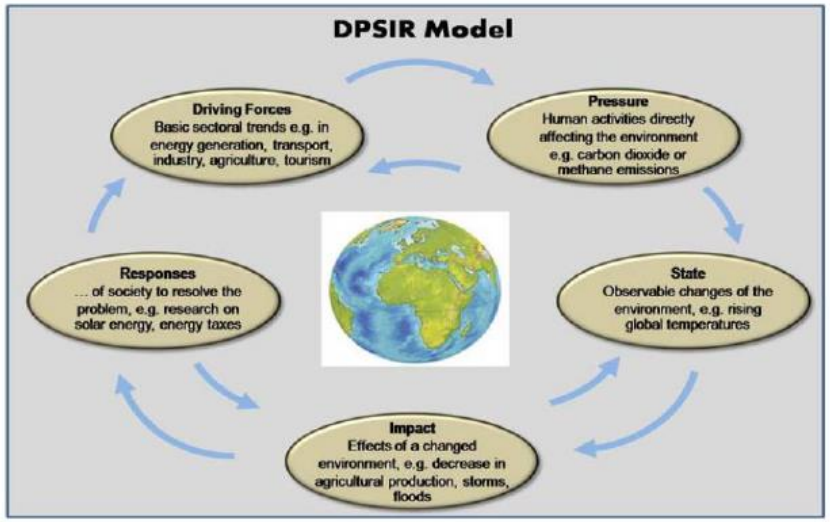
The accelerated action on **adaptation and mitigation** are essential to prevent the worst health impacts from climate change. Importantly, mitigation could also deliver significant health co-benefits from **cleaner air**, more plant-based diets, more active lifestyles, and healthier and more livable cities, representing the "**biggest global health opportunity of the century**"

The Lancet Countdown: tracking progress on health and climate change, 2022

Thailand Climate Change Master Plan

Climate Change Master Plan

2015-2050

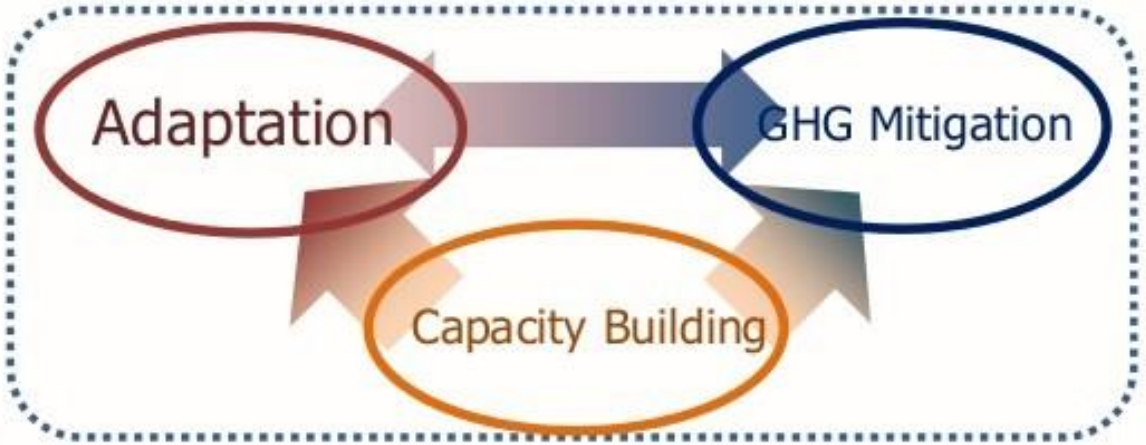


CCMC's Key Tasks

Source: ONEP

Climate Change Master Plan 2015-2050

CCMP 3-Key Approaches



fao.org/in-action/naps | adaptation-undp.org/naps-agriculture | international-climate-initiative.com

Climate Change Master Plan 2015-2050

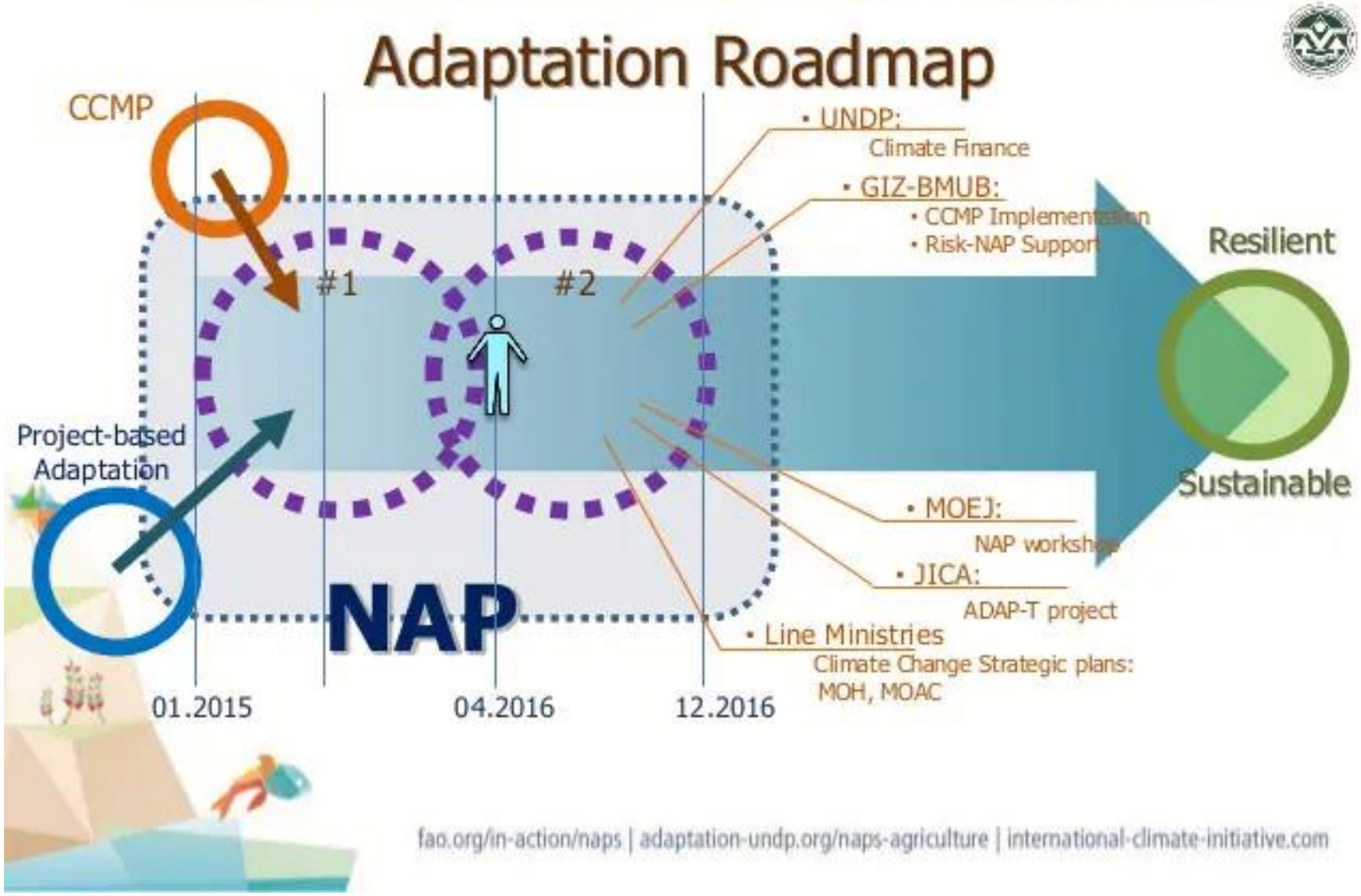
Climate Change Adaptation Approach

- Flood, Drought, and Water Management
- Agriculture and Food Security
- Tourism
- **Public Health**
- Natural Resource Management
- Human Settlement and Security

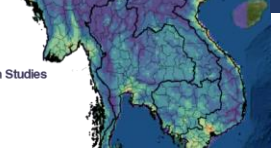
fao.org/in-action/naps | adaptation-undp.org/naps-agriculture | international-climate-initiative.com

Source: ONEP

Thailand's Climate Change Adaptation

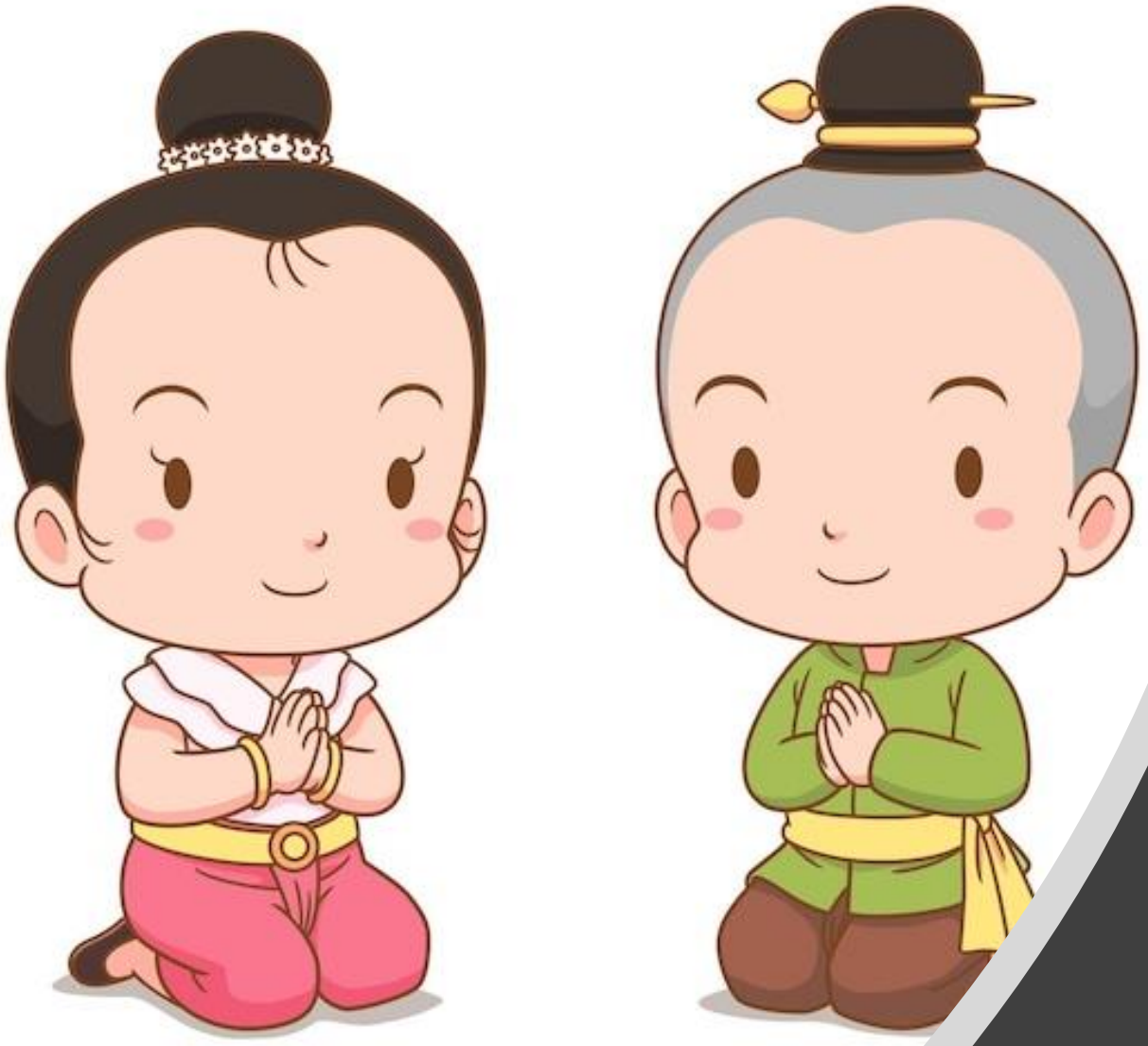


Source: ONEP

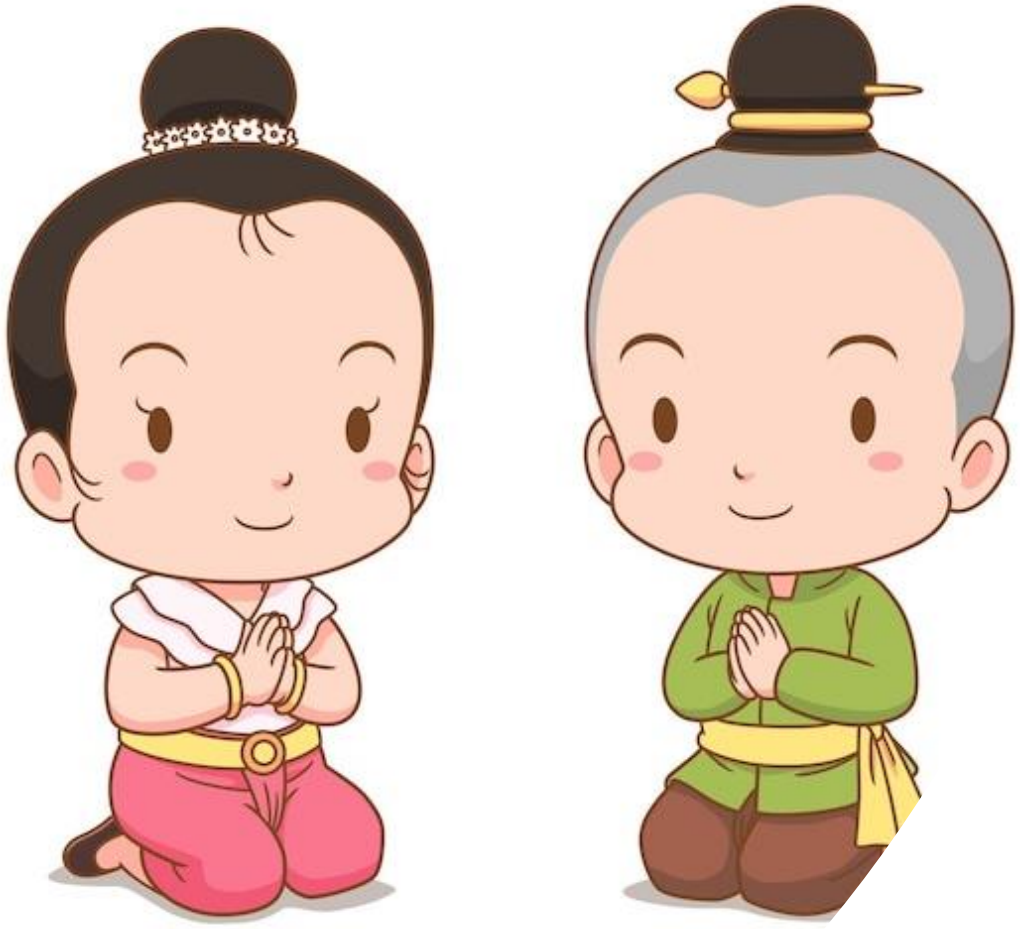


Required research

- Develop methods to apply possible **global-scale changes** in air temperature and precipitation patterns to **local-scale** conditions that **affect air quality**
- Understand the influence of **climate change on fine particulate matter and other air pollutions.**
- Identify **co-benefits of reducing air pollutants** that also reduce the **impacts of climate change**.
- Understand **how mitigation options** to reduce carbon dioxide, a greenhouse gas, can affect emissions of particulate matter, ozone, precursors, and other air pollutants.



Thank you



Thank you