

# ADAP-T (Advancing co-Design of integrated strategies with AdaPtation to climate change in Thailand) for Water Disaster Risk Management and Sustainable Development

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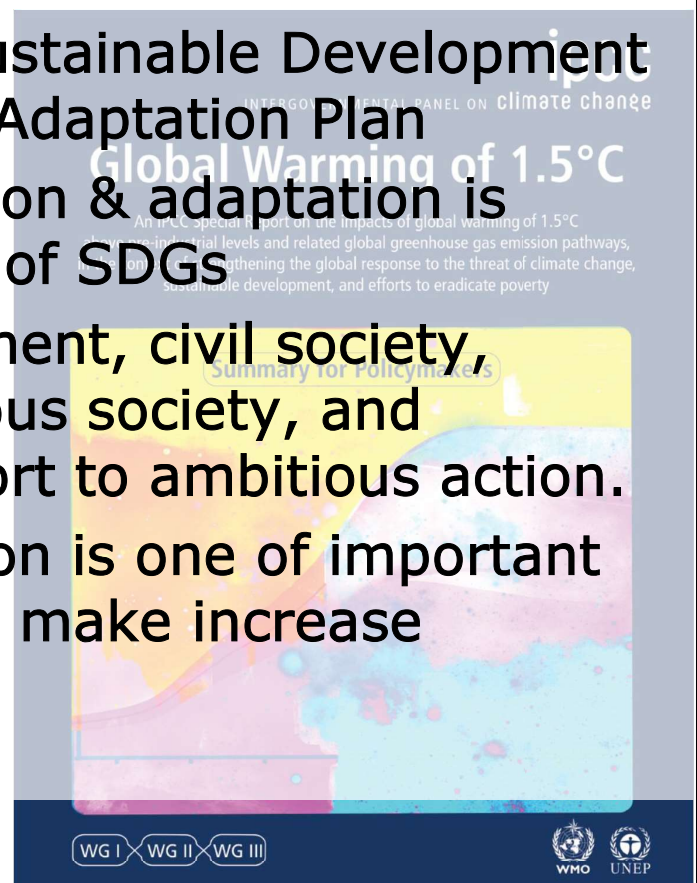


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## Climate change & human

- Strong linkages with Sustainable Development Goals (SDGs) National Adaptation Plan
- Combination of mitigation & adaptation is useful for achievement of SDGs
- Central & local government, civil society, civilian sector, indigenous society, and community could support to ambitious action.
- International cooperation is one of important elements to regulate to make increase temperature 1.5°C.



IPCC "Global Warming of 1.5°C" (2018)

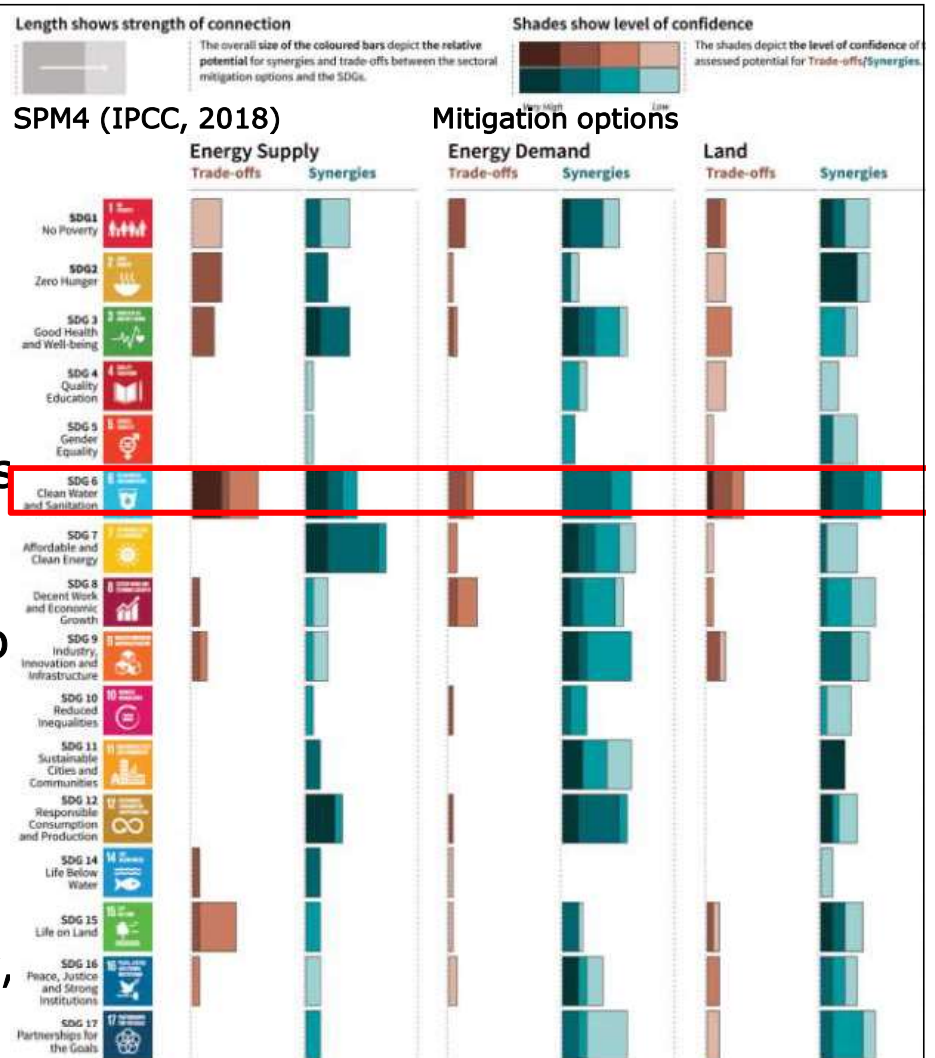
WG I WG II WG III



# Climate change & SDGs

- 1.5SR (IPCC, 2018) showed potential synergies & trade-offs between the sectoral portfolio of CC mitigation options the SDGs

- Our results are delivered to NAP
- Approved by cabinet on January, 2019



## SDGs (17goals/169targets) & Water issues under ADAP-T

- "leave no one behind"
  - Not only in developing countries, but also in developed countries.
- Goal 6 "Ensure availability and sustainable management of water and sanitation for all"
  - To; safe and affordable drinking water, adequate and equitable sanitation and hygiene, improve water quality, substantially increase water-use efficiency, **implement integrated water resources management**, protect and restore water-related ecosystems, **expand international cooperation and capacity-developing**, support and strengthen the participation of local communities
- Other goals
  - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters**, increase adaptive capacity to water-related disaster, combat water-borne diseases, combat desertification, sustainable use of marine resources, etc.



<http://www.jp.undp.org/content/tokyo/ja/home/sdg/post-2015-development-agenda.html>



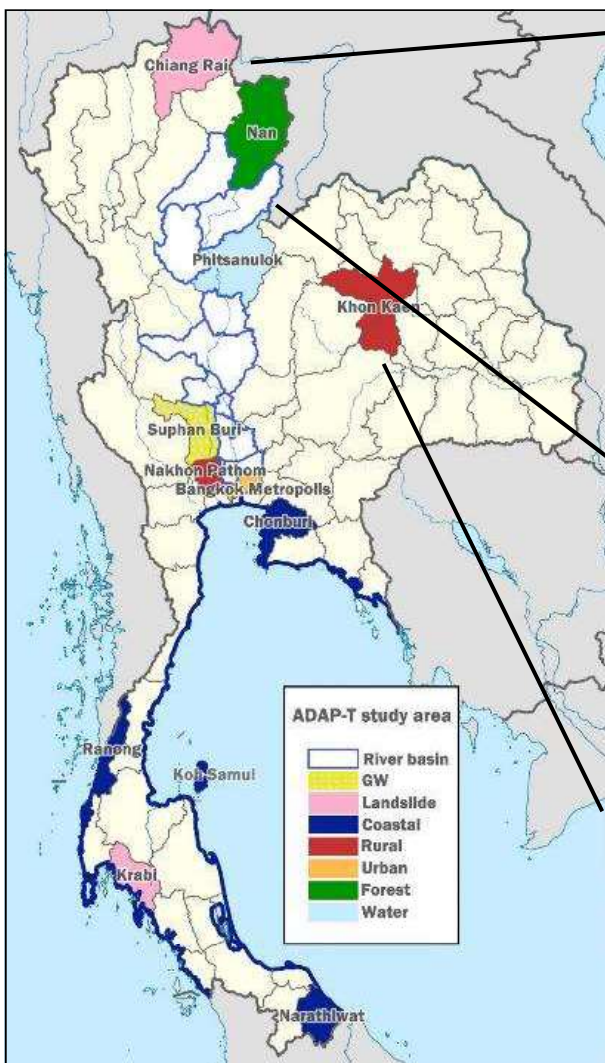
# Advancing co-Design of integrated strategies with Adaptation to CC in Thailand (ADAP-T)

## ◆ Clarifying

- ❄ Impact of CC in Thailand
- ❄ Possible adaptation measures: their cost and benefit
- ❄ in major 6 sectors: freshwater, coast, sediment, urban, forest, & rural

## ◆ Support policy making of adaptation to CC

- ❄ national master plans (NAP: National Adaptation Plan) by ONEP
- ❄ **action plans of each related organizations in adaptation to CC**
- ❄ Synergy with existing national policies such as disaster risk management, integrated water resources management, rural planning, land use management, ...
- ❄ Co-design balanced adaptation portfolio with various stakeholders, such as central & local governments, citizens, researchers, ...
- ❄ Good practice/prototyping of adaptation to CC, to be further refined and disseminated in neighboring states



### Sediment



Install landslide early warning system → Hazard map based on risk assessment

### Fresh Water

### Forest

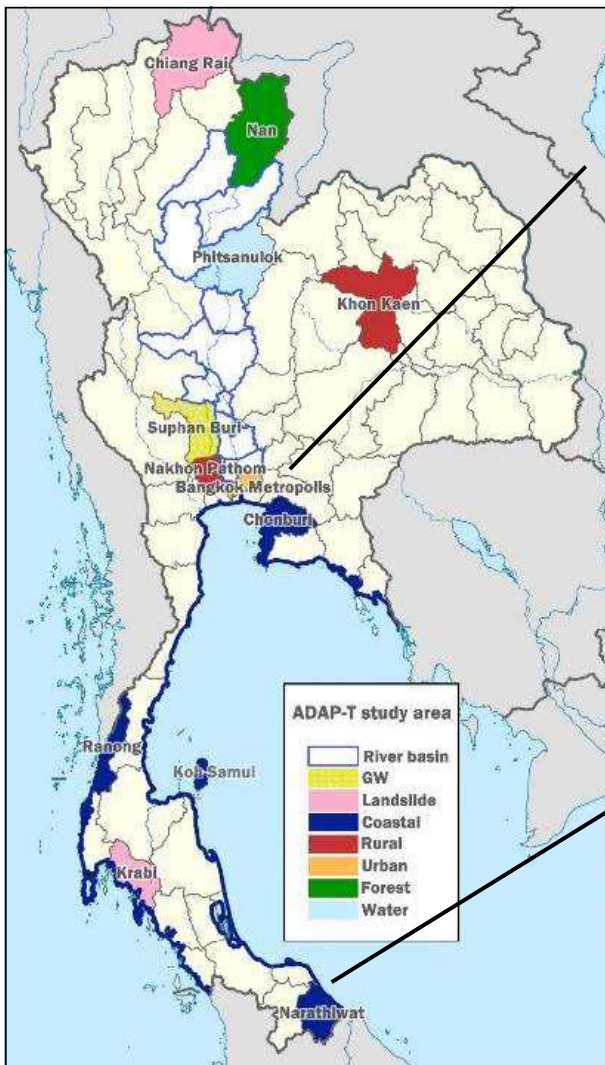


Overlooking local heavy rain by low density → Strengthening AWS network

### Rural



Monitoring risk of salinity by satellite → Salt accumulation data for accuracy improvement



## Urban



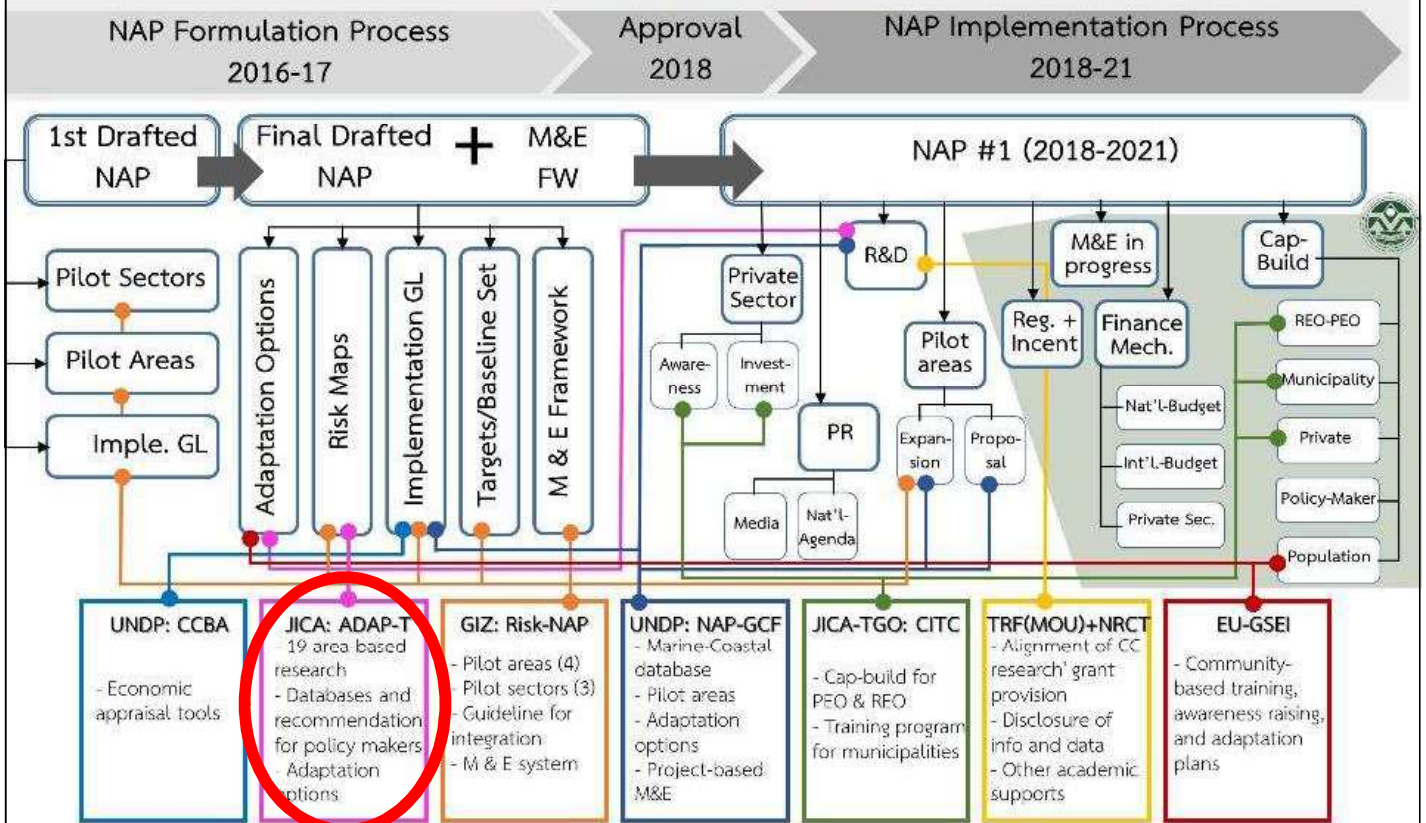
Economic damage by urban flood → Adaptation measures, e.g. elevated road.

## Coastal



Beach erosion by sea level rise → Monitoring changes in past decade

## The Overview of Climate Change Adaptation Operation in Thailand (2017 – 2021)



Reference from Office of Natural Resources and Environmental Policy and Planning (ONEP, 2017)



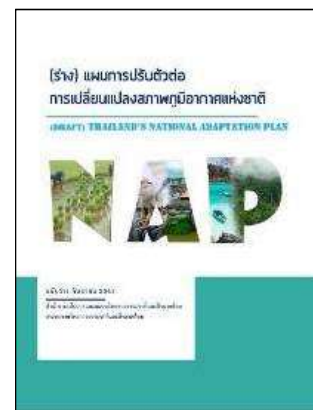
# Contribution to ONEP

## National Adaptation Plan (NAP)

- Results from ADAP-T are delivered to NAP
- Approved by cabinet in January, 2019



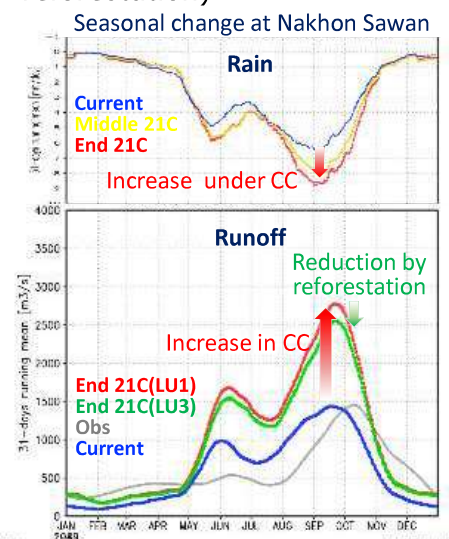
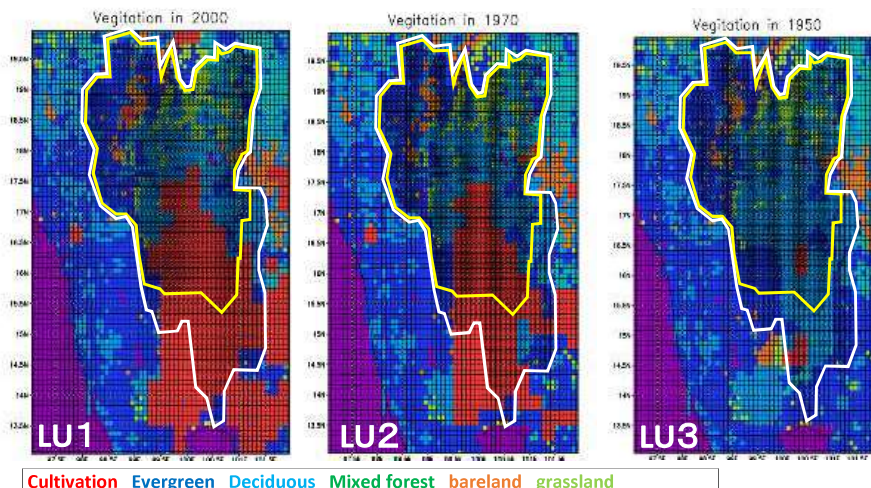
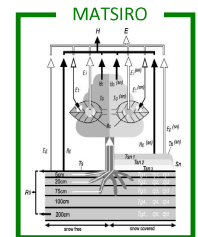
Special Report on climate change effects and adaptation measures on water related sectors in Thailand (Apr., 2018)



Draft of Thailand's National Adaptation Plan (Sep., 2018)

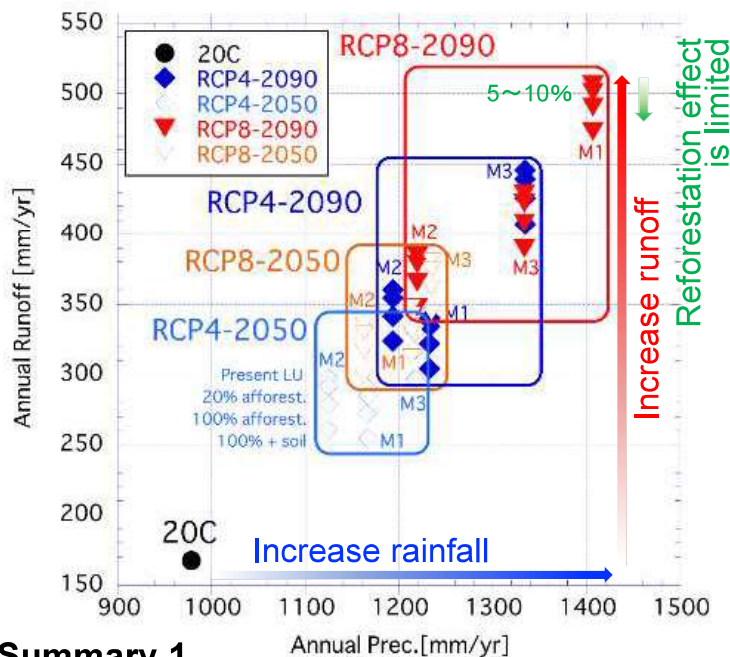
## How about effect of adaptation "reforestation"?

- Background;** rapid decrease of forest in N. Thailand, & concern of increase runoff under global warming → expectation of reduction of flood risks by reforestation
- Method;** Estimation of runoff reduction affected by reforestation for increase runoff under global warming using hydrological model
  - LU1 : Land use in 2000
  - LU2 : Land use in 1970 (about 20 % of cultivation area → reforestation)
  - LU3 : Land use in 1950 (about 100 % of cultivation area → reforestation)
  - 3 GCMs(M1,M2,M3) under RCP4.5 and RCP8.5



# How about effect of adaptation "reforestation"?

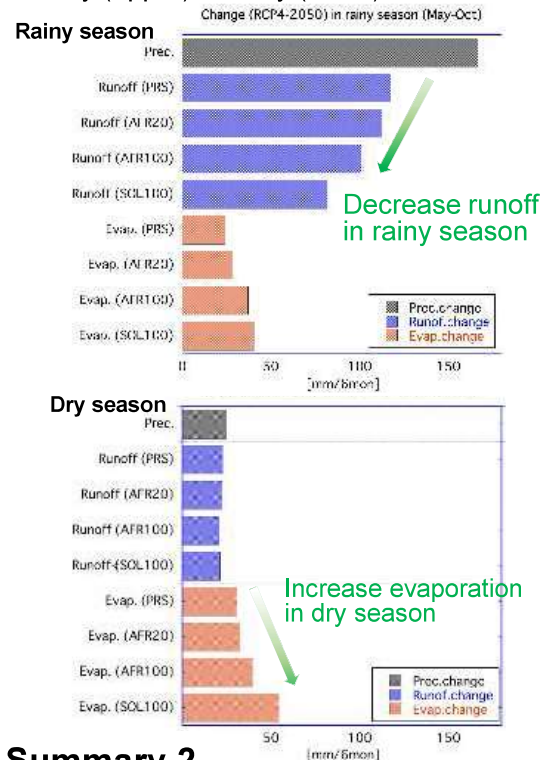
## Water balance at Nakhon Sawan



### Summary 1

- Reduction rate of runoff for increase runoff under CC are;
- 3~5% by realistic reforestation (20 % of cultivation area)
  - 10~15% at middle 21C, 5~10% at end 21C (100% of cultivation area)
  - Make it strengthen that reduction runoff due to change of land property by reforestation.

## Change of water balance of rainy (upper) and dry (down) season



### Summary 2

- Seasonal effect of reforestation is;
- Decrease runoff in rainy season, increase evaporation in dry season



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## Beyond SDGs

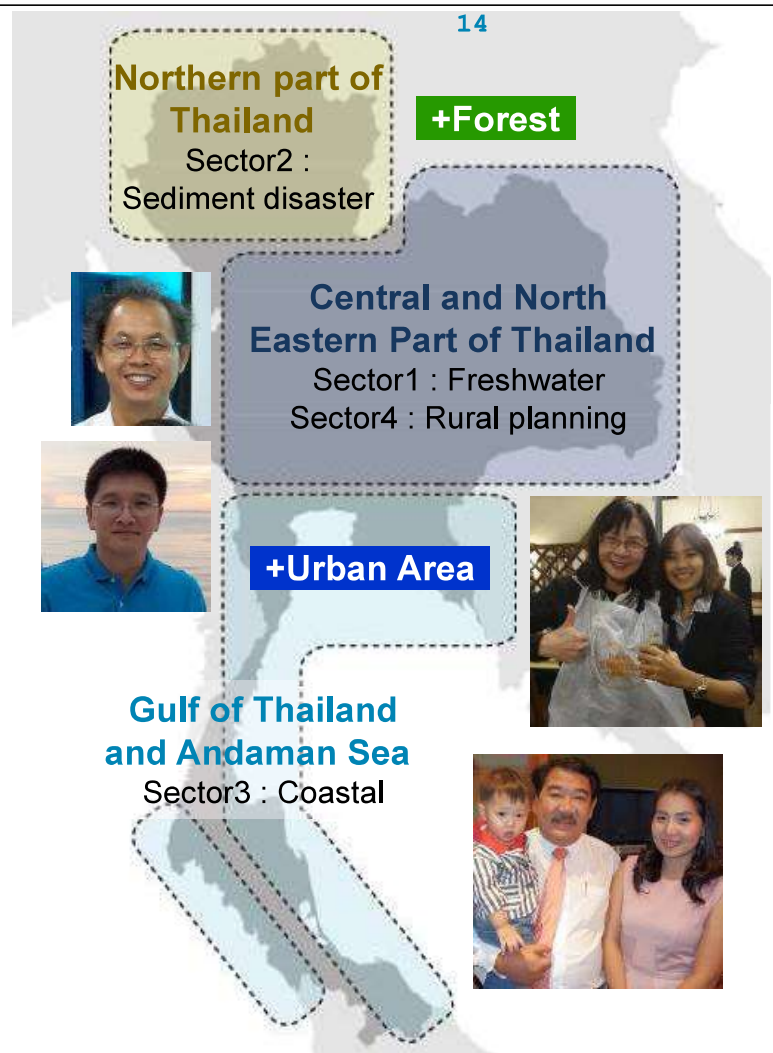
- ◆ "The future we want" will not be realized by solely achieving SDGs.
  - ❄ Many other issues should be solved synergistically.
    - Population, LGBT, removal of explosive remnants of war, ...
    - Trade-offs should be examined and avoided precautionary.
- ◆ Free from wants, but still needs...
  - ❄ Cultural diversity, religion, art, sport, entertainment, dignity, fulfillment of intellectual curiosity, increase of SWB, ...
- ◆ "Ideal pursuit," over the era of "problem solving"
- ◆ Goals inspires and stimulates intents for actions
  - ❄ Targets and indicators are mainly for governments and international organizations, and private sectors and CSOs should define and propose suitable ones of their own.
  - ❄ How hydrologic researches can contribute to achieve SDGs?
    - Which target? Which indicator?



# Supplementary materials

## ADAP-T

Advancing  
co-Design of  
integrated  
strategies with  
AdaPtation to  
climate change  
in Thailand  
**2016-2021**



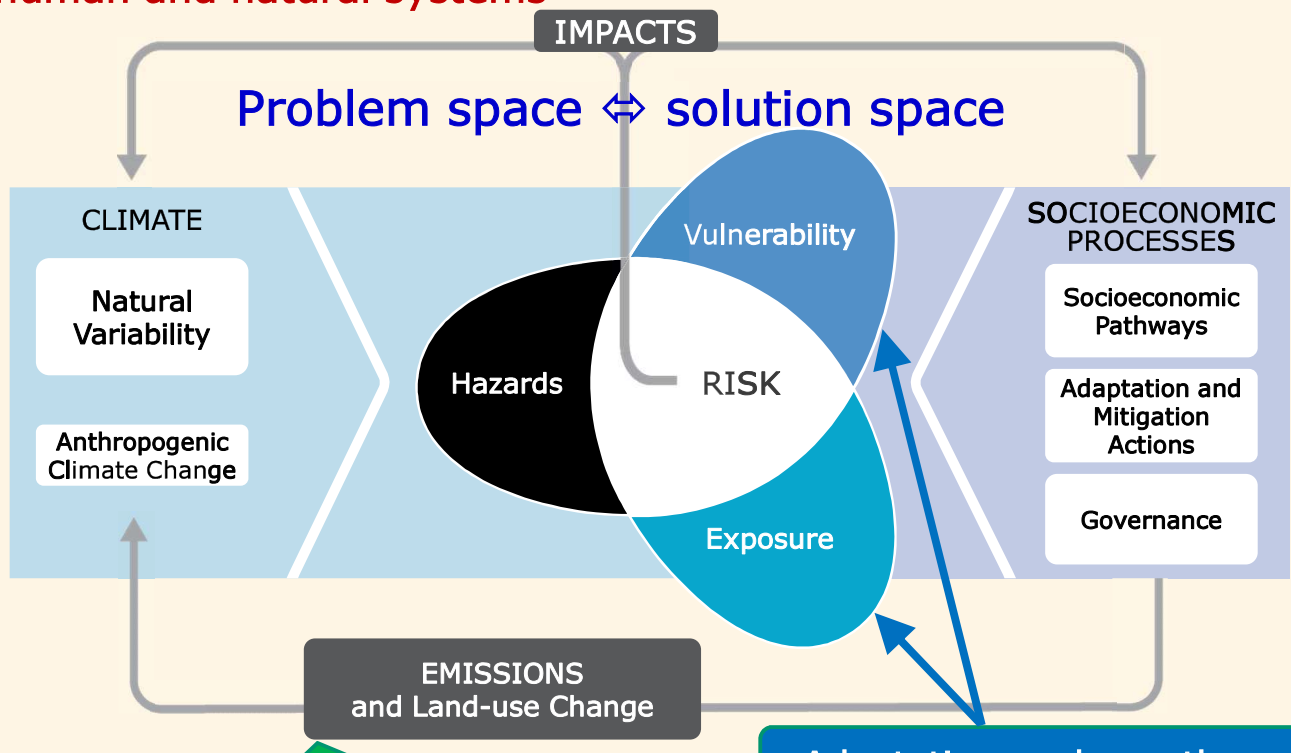


# “Climate change is a challenge in managing risk” —IPCC AR5 WGII—

- ◆ Global annual economic losses for additional temperature increases of  $\sim 2^{\circ}\text{C}$  are between **0.2 and 2.0% of income**
- ◆ **Co-benefits, synergies, and trade-offs** exist between mitigation and adaptation and **among different adaptation responses**
- ◆ **Available strategies and actions** can increase resilience across a range of possible future climate while helping to improve **human health, livelihoods, social and economic well-being and environmental quality**

March 30, 2014, Yokohama, Japan

- ◆ Risk of climate-related impacts results from the interaction of climate-related hazards with the vulnerability and exposure of human and natural systems



AR5

Mitigation works on this.

Adaptation works on these.

ipcc  
INTERGOVERNMENTAL PANEL ON climate change

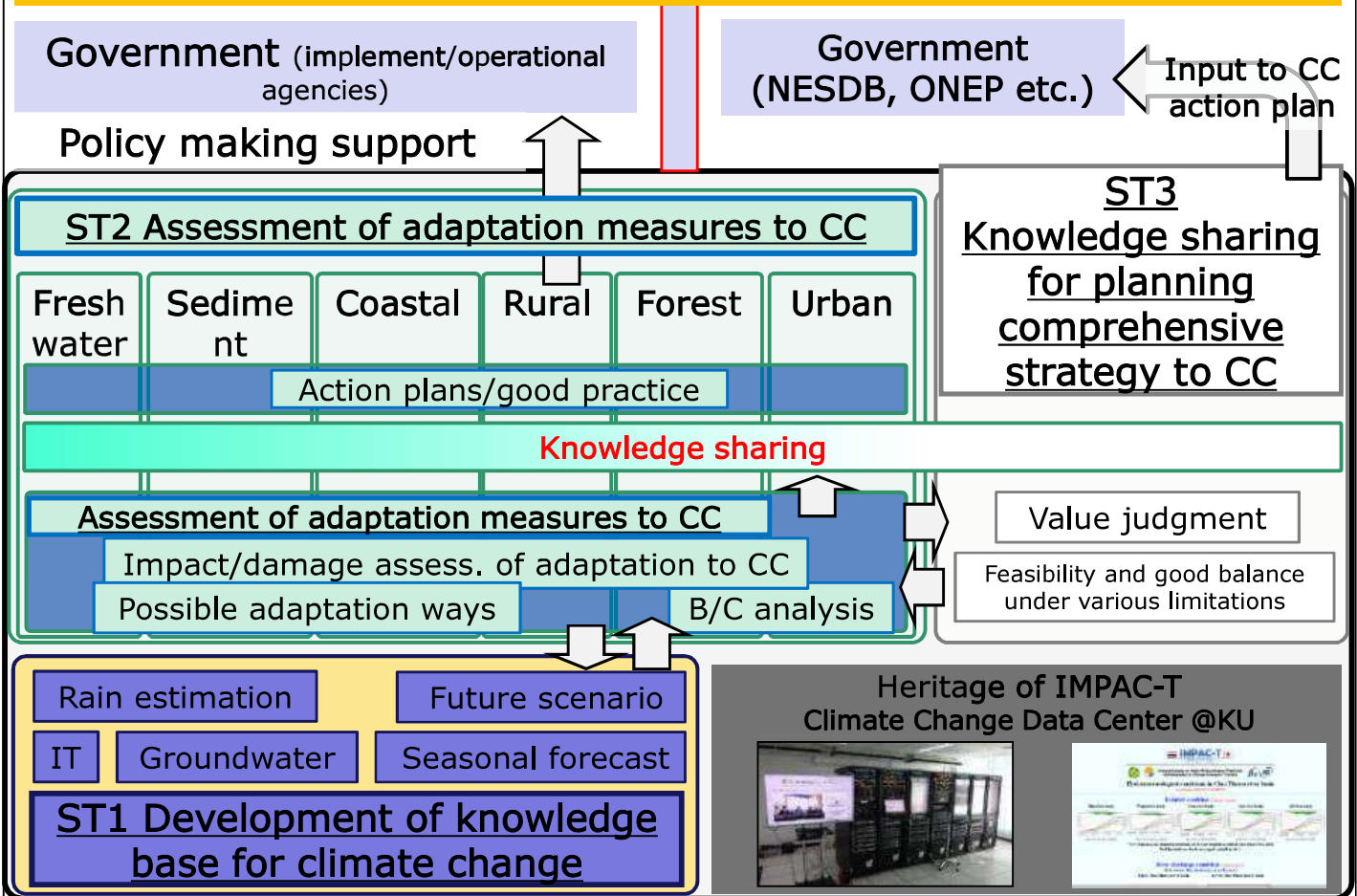






# Development of resilient and sustainable solutions for CC

Advancing co-design of integrated strategies with adaptation to CC in Thailand

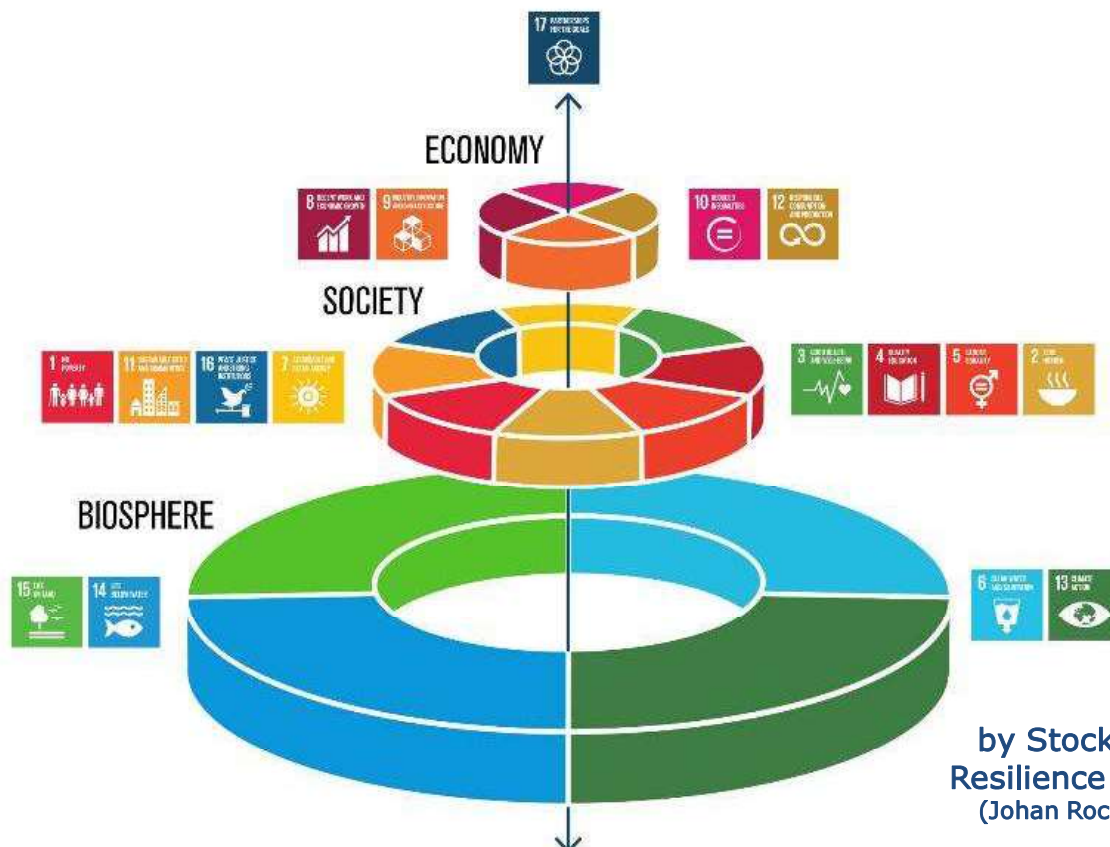


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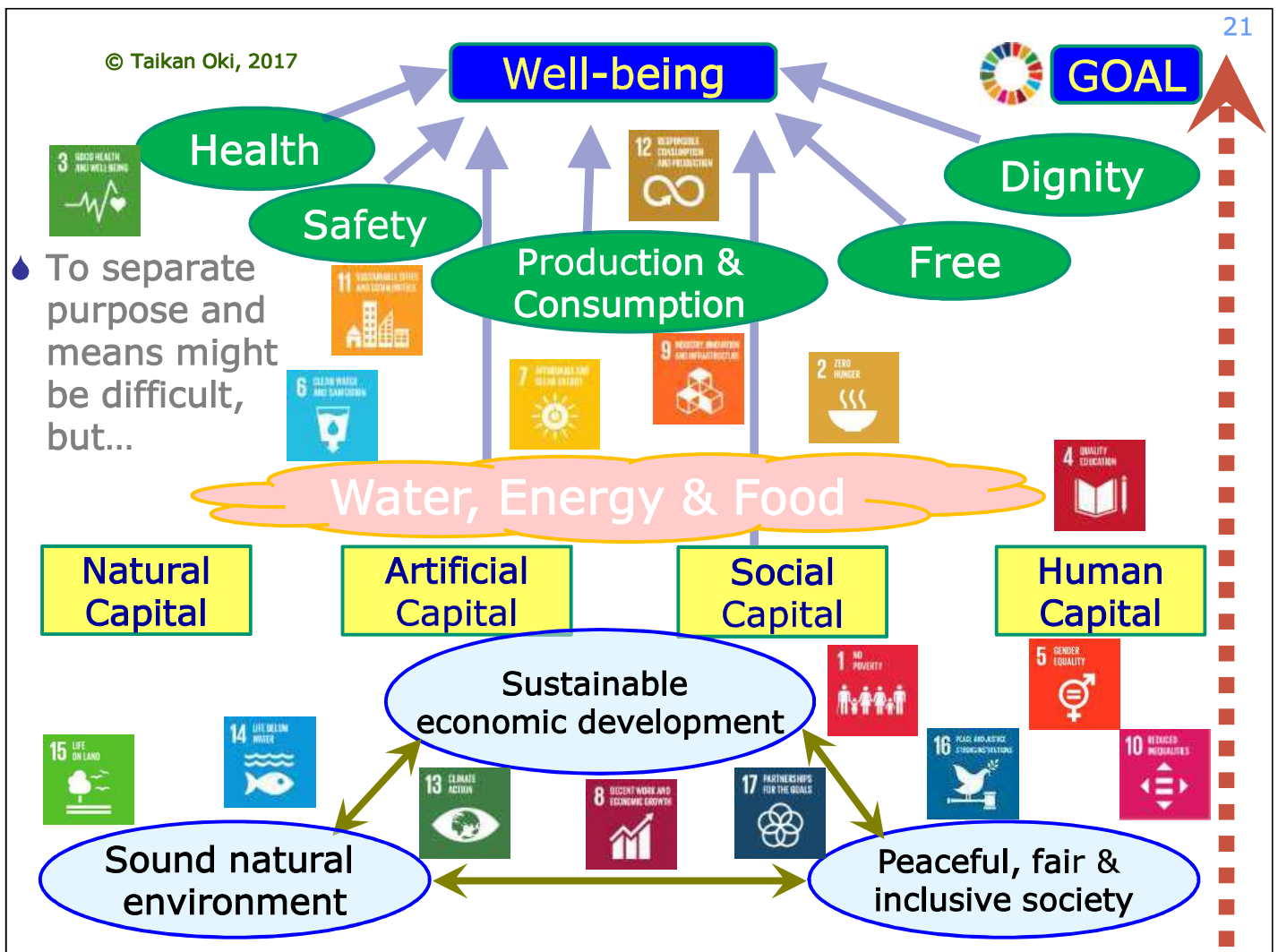


## Natural Environment supports society and economy?!



<http://www.stockholmresilience.org/images/18.36c25848153d54bdba33ec9b/1465905797608/sdgs-food-azote.jpg>





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# Deliverables

- Technical development for adaptation**
  - Enhanced earth observation systems
  - Improved seasonal forecast → Early warning system
- Manual for co-design of integrated strategies with adaptation**
  - B/C of adaptation and good practice in major sectors
  - Methodology for well-balanced adaptation portfolio
- Research & Development center in SE Asia**
  - Contribution for refinement of National Adaptation Plan in Thailand, IPCC AR6, ...
- Capacity development of young researchers**
  - As lecturer of Climate Change International Technology and Training Center (CITC)

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2015

- Climate Change Master Plan 2015-2050
- Adaptation, Mitigation and Capacity Building

2018

- Approval of National Adaptation Plan

2018-  
2021

- NAP Implementation Process

- Countermeasures to climate change is led by government.
- However, there are lack of information on gaps and needs of local level\*.
- Local research and studies are needed\*.

\*Kollawat Sakhakara(2015): Thailand's Climate Change Adaptation Progress, [https://unfccc.int/files/adaptation/application/pdf/thailand\\_summary\\_cca.pdf](https://unfccc.int/files/adaptation/application/pdf/thailand_summary_cca.pdf).

\*Natthanich Asvapoositkul(2014): Thailand's Climate Change Policies, [http://www-gio.nies.go.jp/wgia/wg12/pdf/0\\_3\\_ONEP\\_N.pdf](http://www-gio.nies.go.jp/wgia/wg12/pdf/0_3_ONEP_N.pdf).



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## Research framework

### 💧 Impact assessment of adaptation to CC

#### ❄ CC projections and impact/damage assessment

- in major four sectors: freshwater, coastal, sediment, and rural

#### ❄ Options of adaptation

- early warning system based on seasonal forecast (for reservoir operation)
- infrastructure (e.g., Sabo dam)
- land use planning (e.g., forest management, retention area), ...

#### ❄ Cost & benefit (B/C) of adaptation in major sectors

### 💧 Methodology for well-balanced adaptation portfolio

#### ❄ Meta analysis considering financial and other metrics

### 💧 Co-design for the good practice

- ❄ Support policy making for national master plans, integrated with adaptation by various stakeholders, such as central & local governments, citizens, researchers, ...

- ❄ ➔ Good practice/prototyping of adaptation to climate change, to be further refined and disseminated in neighboring states