Spatial Planning for Protected Areas to with the Reference to Climate Change

Yongyut Trisurat
Faculty of Forestry, Kasetsart University
Bangkok, Thailand

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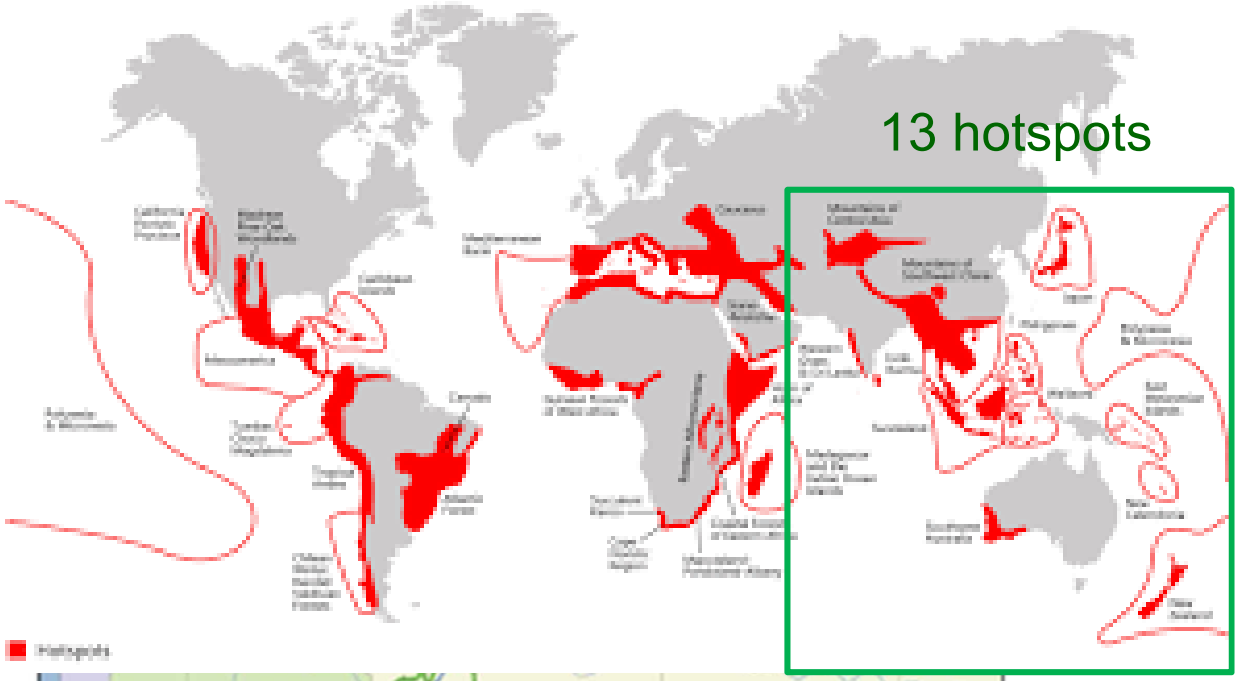


Asia-Pacific Region

- Changing demography (4.5 B; 56% of world pop.)
- Rich in biodiversity but inefficient uses of resources
- Increasing vulnerability to the impacts of climate change and extreme events

Yahara et al. (n.d.)

Lower Mekong Basin

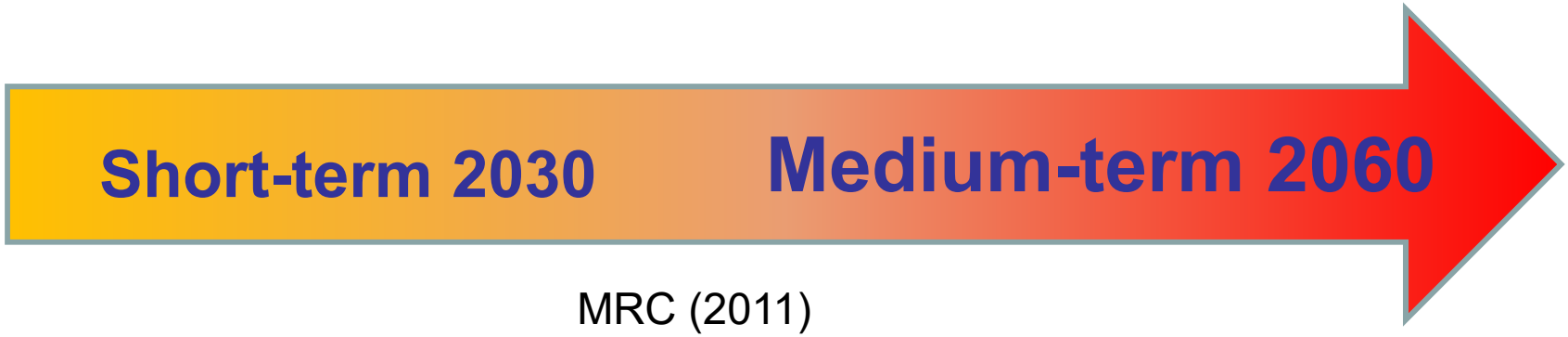
- 21st largest river basin
- 795,000 km^2:
  - Upper (24%)
  - LMB (76%)
- Population 61 M
- Rich biodiversity

Climate

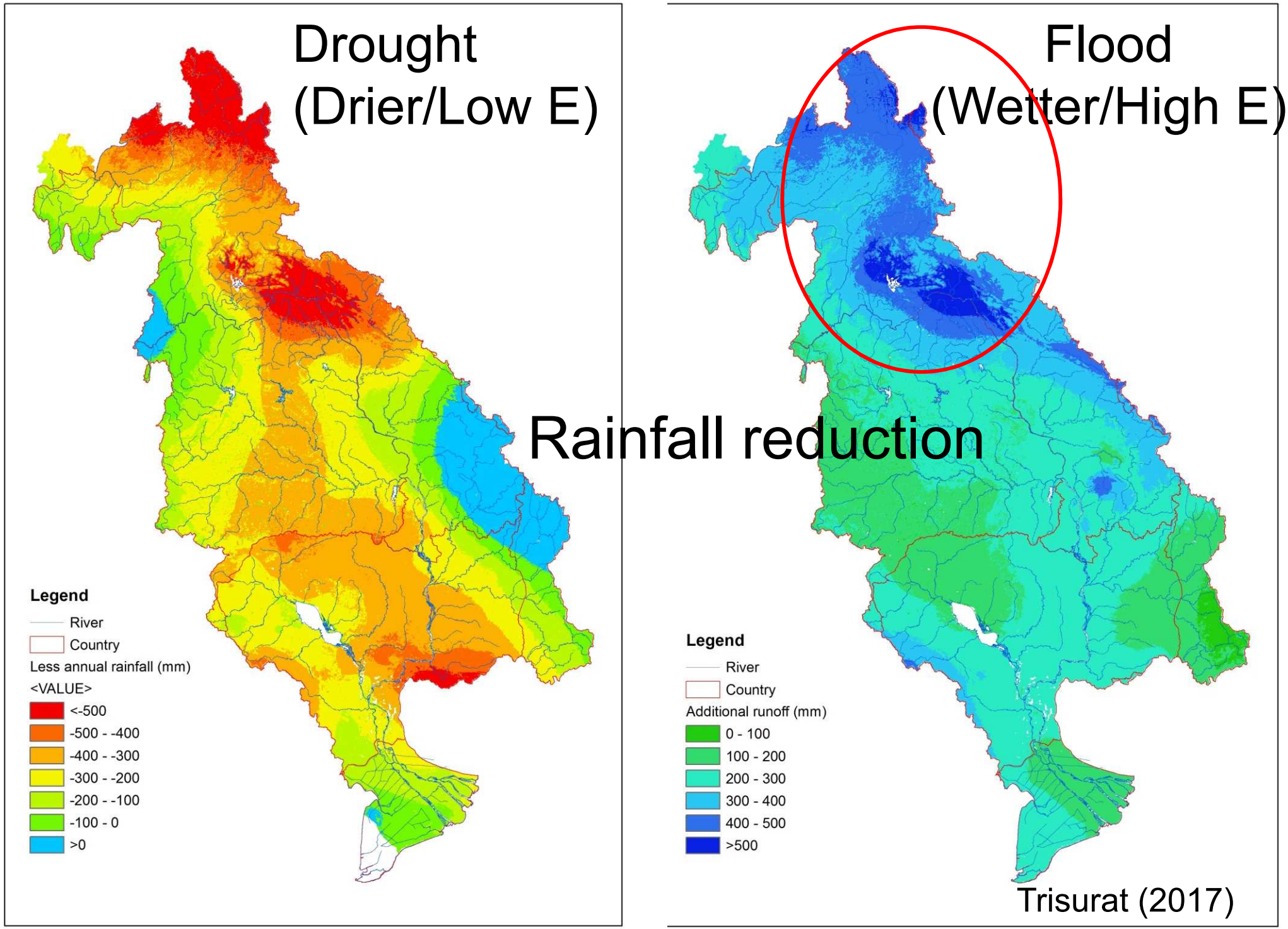
Baseline: 1986-2005 (1,675 mm; 25.2 °C)

Future: SimCLIM database + emission scenarios

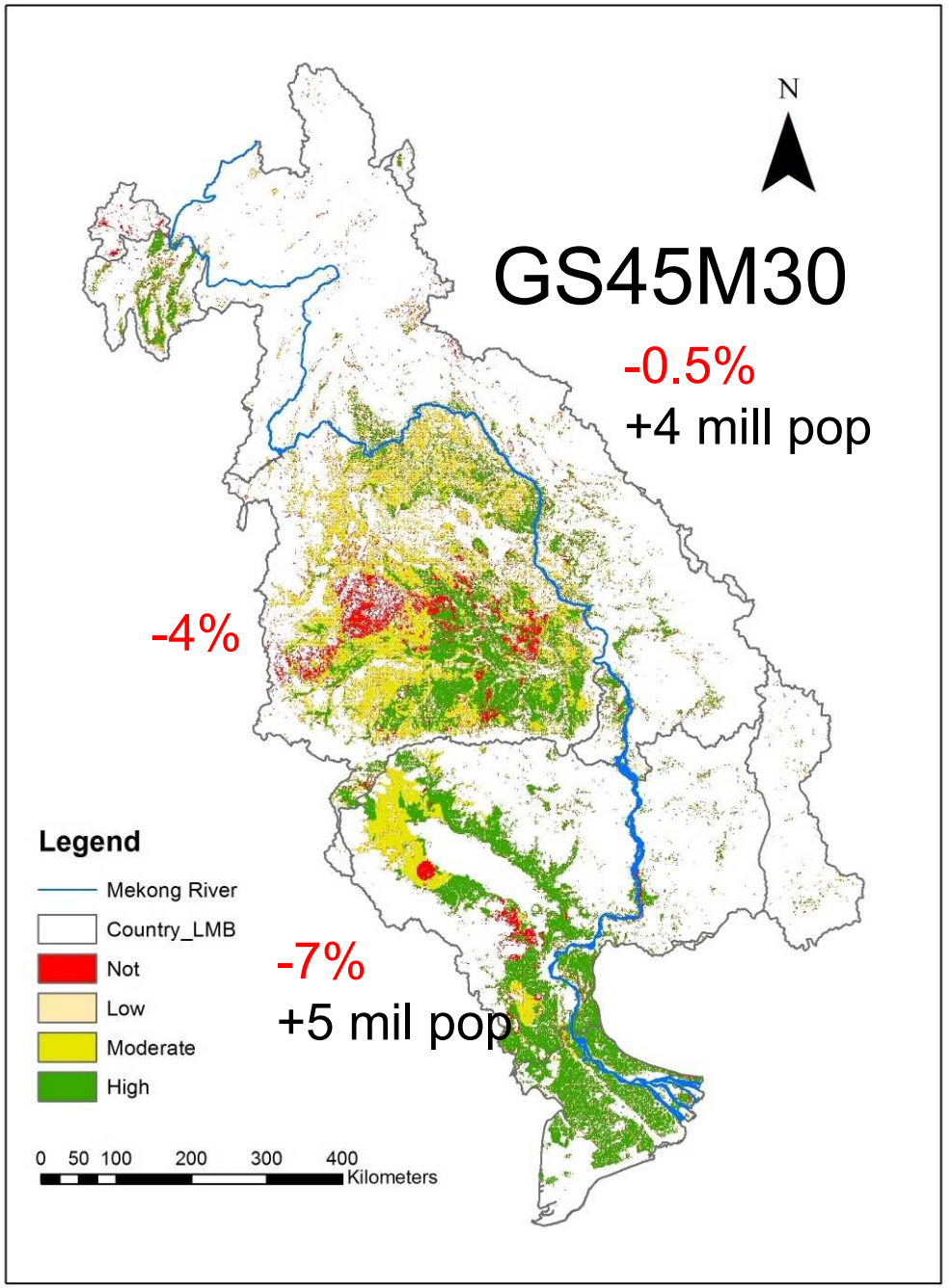
		Emission scenario		
		Low emissions (RCP2.6)	Medium emissions (RCP4.5)	High emissions (RCP8.5)
GCM climate	Drier Overall (GS)	1,680 25.6	1,587 26.7	1,454 28.3
	Increased seasonality	1742 25.5	1,794 26.5	1,882 28.0
	Wetter overall (GF)	1,742 25.5	1,835 26.7	1,968 28.2



MRC (2011)


Drought
(Drier/Low E)
Flood
(Wetter/High E)
Rainfall reduction
Legend
River
Country
Less annual rainfall (mm)
<VALUE>
<-500
-500 - -400
-400 - -300
-300 - -200
-200 - -100
-100 - 0
>0
Legend
River
Country
Additional runoff (mm)
0 - 100
100 - 200
200 - 300
300 - 400
400 - 500
>500
Trisurat (2017)

Implications: Food security



Trisurat et al. (2018)

GOAL 15: PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

Aichi Biodiversity Targets: 2020 zero loss; 2050 – increase

IPCC AR6 WGII Chapter 2:

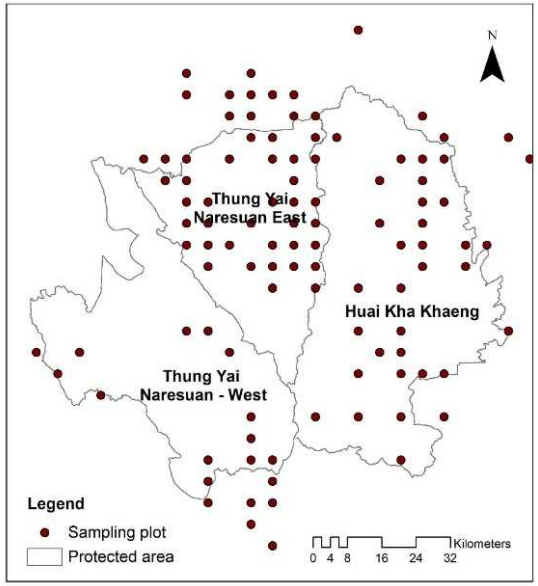
Terrestrial and freshwater ecosystems and their services

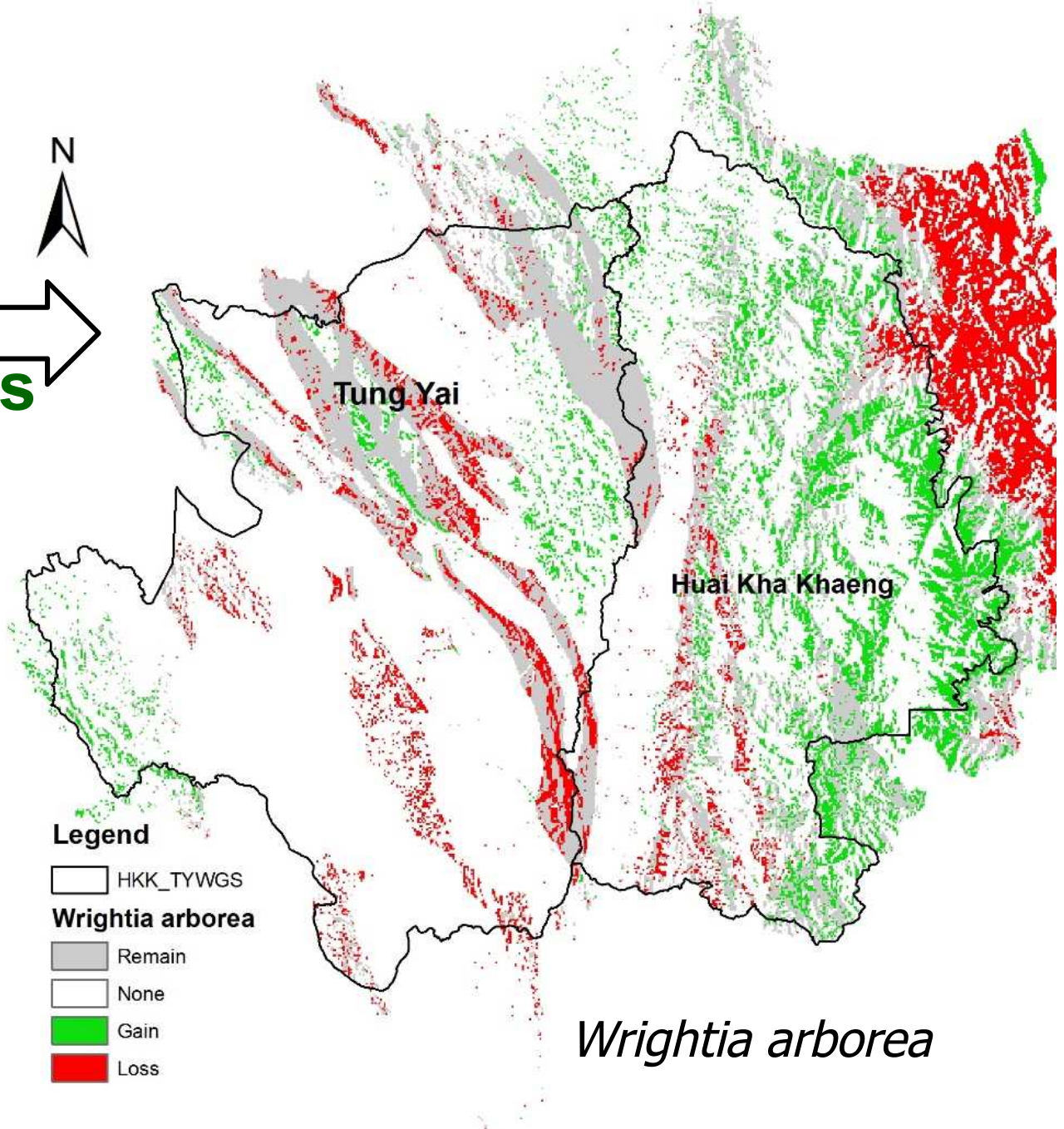
- **Historical trends** and paleontological aspects of climate change impacts
- Projected hazards and exposure and extreme events at temp. & spatial scales
- **Projected impacts: species, ecosystem structure and biodiversity**, emergence of novel communities, process rates, functions, and the implication
- **Vulnerability and resilience, enablers and limits to natural and planned adaptation, and maladaptation**
- Assessing risks, opportunities, costs, and trade-offs including consideration of **scenarios and impacts of adaptation and mitigation responses**
- **Etc.**

In-situ observation & SDM

SDMs

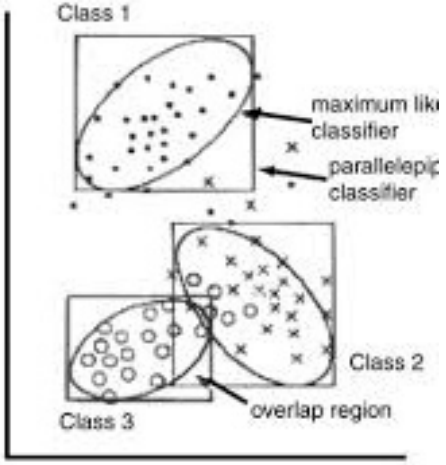
A uniform fixed grid

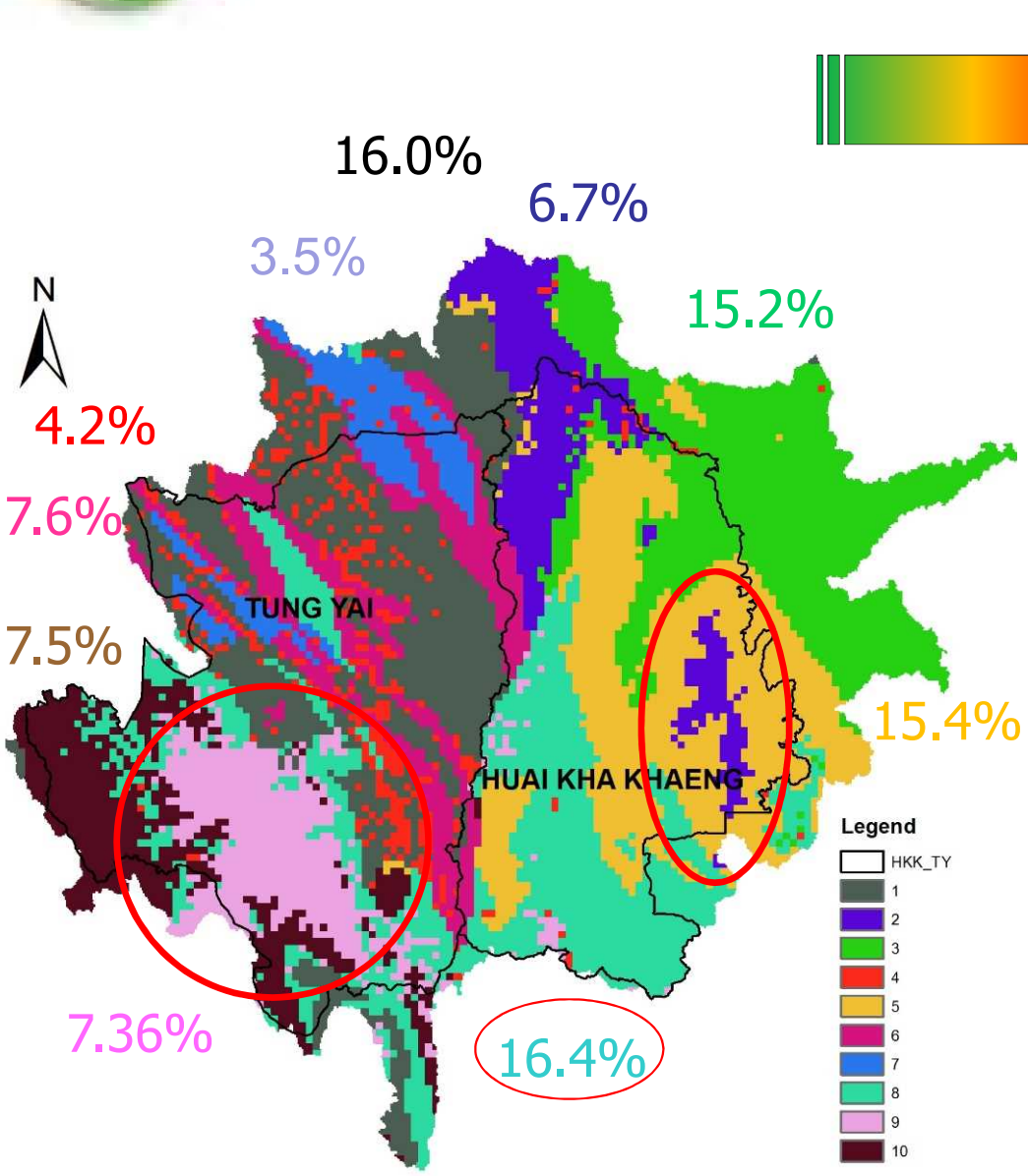


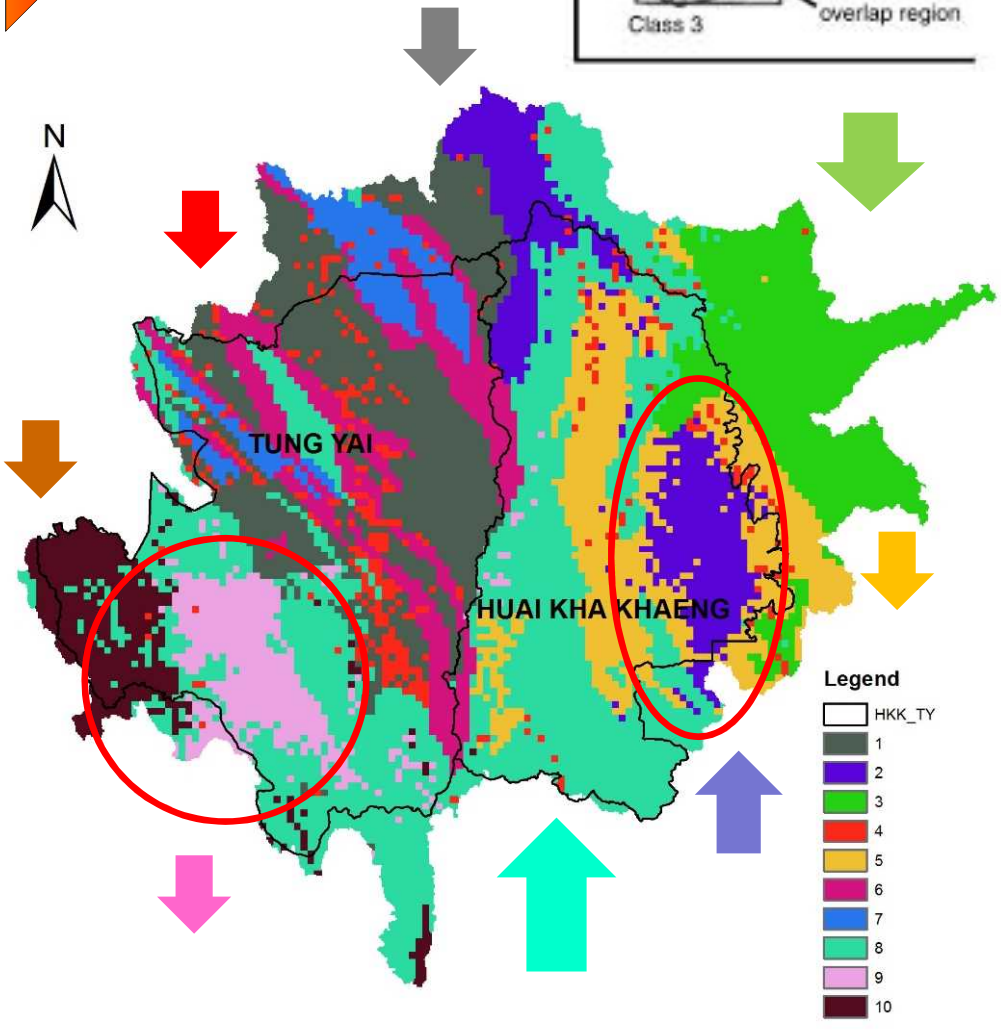


Wrightia arborea

Ecosystem shifts







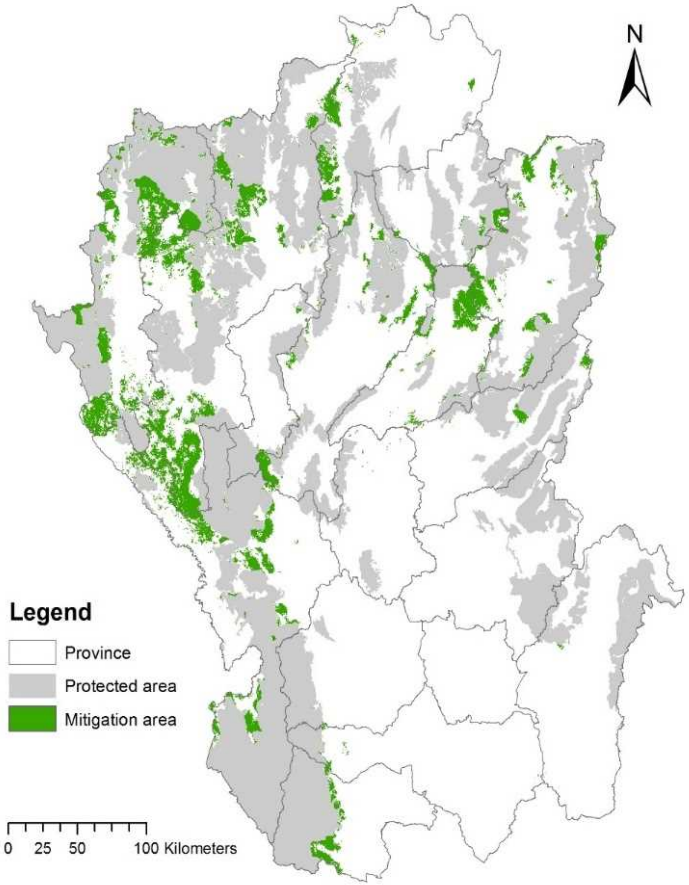
Baseline

Future CC

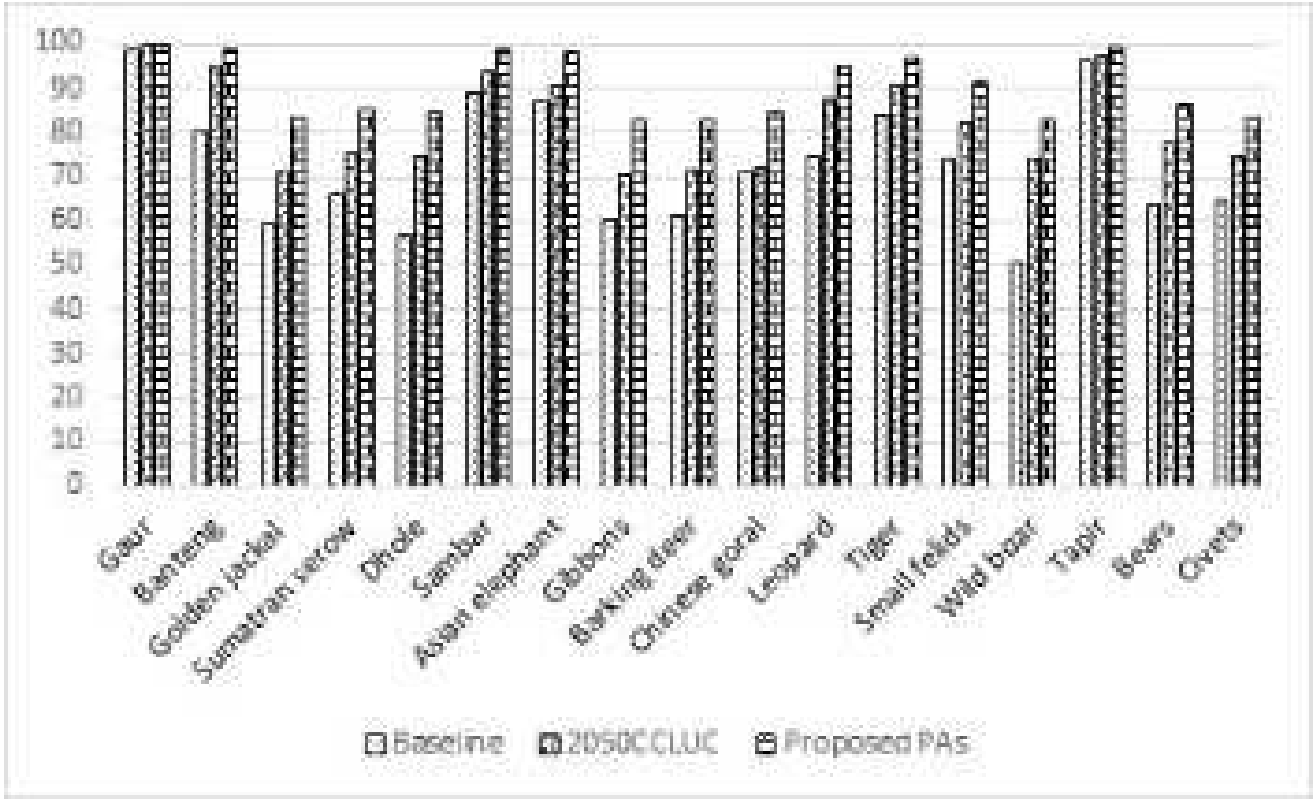
Trisurat et al (prep)

Resilience and planned adaptation

How much is enough?



Representative of large mammals

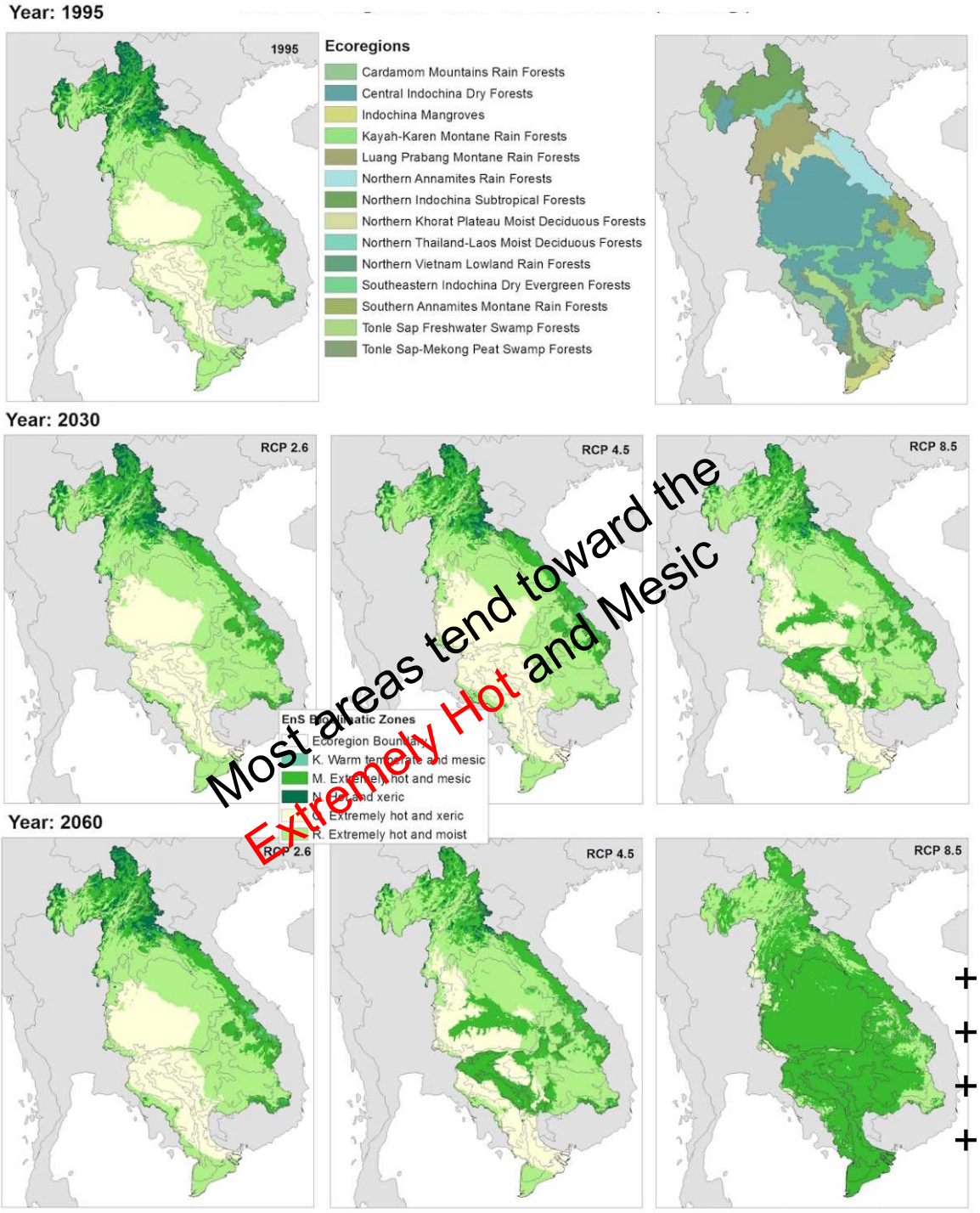


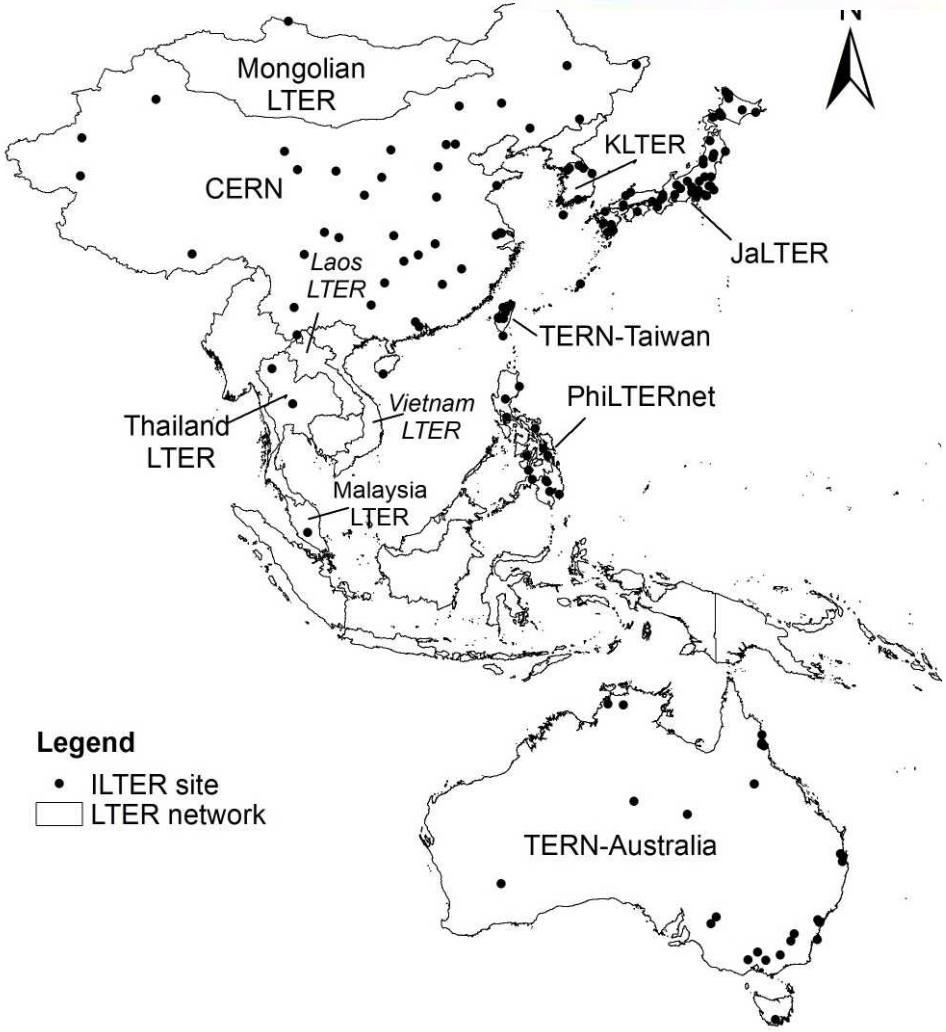
baseline 73%; LUCC 2050 82%; mitigation 90%

+ 3% from current plan

Trisurat et al (prep)

Bioclimatic zones





+ **Occurrence data (e.g., in-situ obs.)**
+ which spp. need priority for protection
+ SDM & validation
+ existing **protected areas** & adaptation

Conclusions

- CC indicates a **prolonged period of impacts** on ecosystems, biodiversity, and ESs.
- Asia-Pacific and LMB regions are rich of biodiversity but are vulnerable to climate change
- Current management and **conservation efforts will be affected**, as ecological conditions may change beyond limits
- **In-situ observation** data and spatial planning at temporal and landscape scales are **VERY ESSENTIAL.**

Adaptation Measures

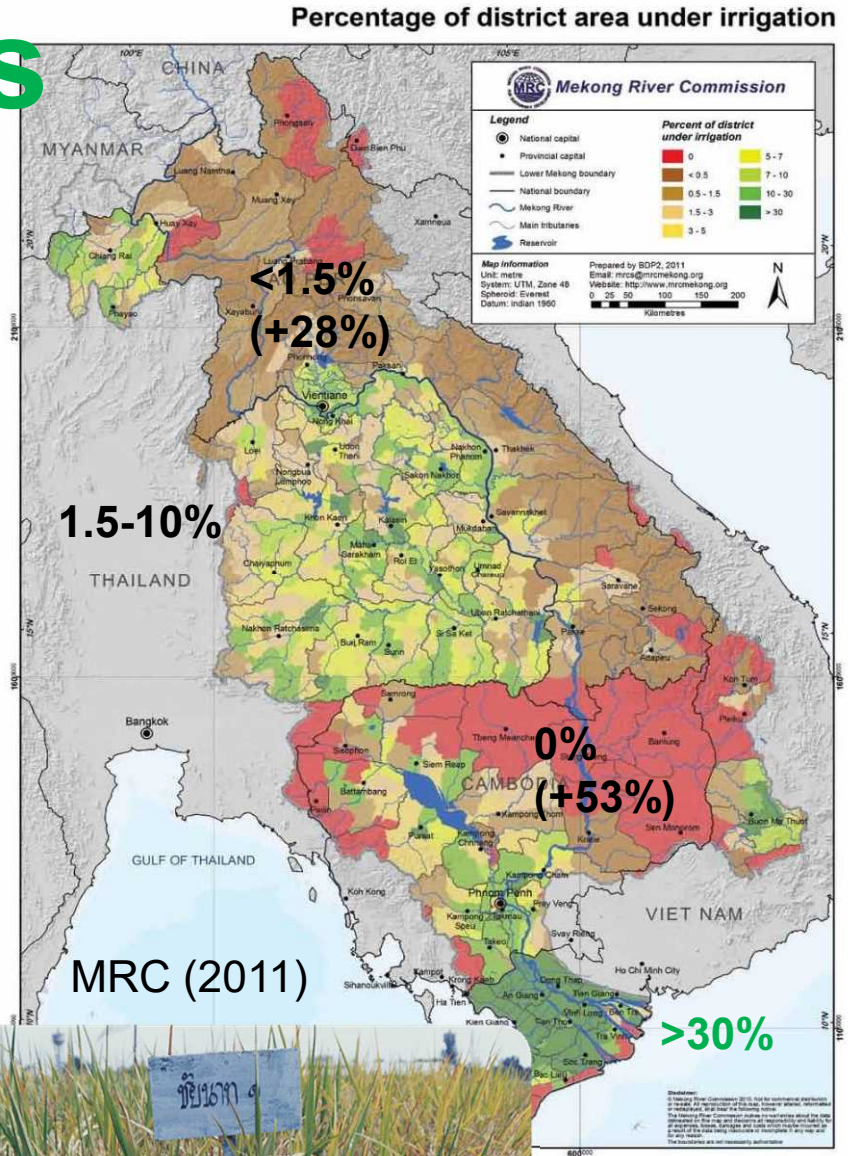
Irrigation projects (4 to 6 mil ha)

- Not feasible across the LMB (soil & topo)

Changing planting calendar

Drought or flood tolerance varieties

Alternative crops



GOAL 13: TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

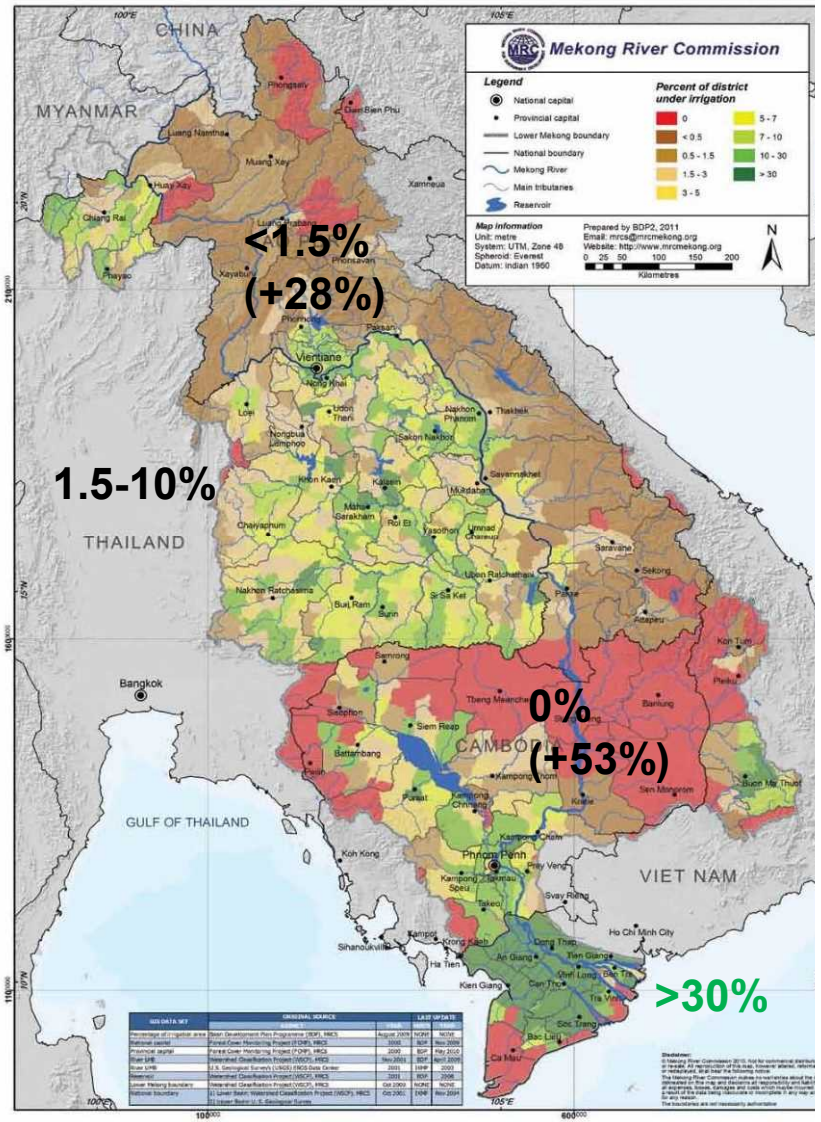
SUSTAINABLE DEVELOPMENT GOALS

Sustainable Development Targets

13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
13.2	Integrate climate change measures into national policies, strategies and planning

70-80% of local livelihood

Percentage of district area under irrigatio



Irrigation projects (4 to 6 mil ha)?

MRC (2011)