

Assessing Climate Change Vulnerability and Adaptation (V&A)



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- Introduction to climate change vulnerability and adaptation (V&A)
 - What is climate change vulnerability and adaptation
 - Dynamic of risk – vulnerability – adaptation
- Assessing climate change vulnerability and adaptation (V&A)
 - Frame of thought
 - Multiple aspects of adaptation
 - Breaking dilemma in climate change V&A assessment
 - Ecosystem-based Adaptation (EbA) vs Community-based Adaptation (CbA) and integrated approach

Part 1: Introduction to climate change vulnerability and adaptation (V&A)

- What is climate change vulnerability and adaptation
- Dynamic of risk – vulnerability – adaptation



Introduction to climate change vulnerability and adaptation (V&A)

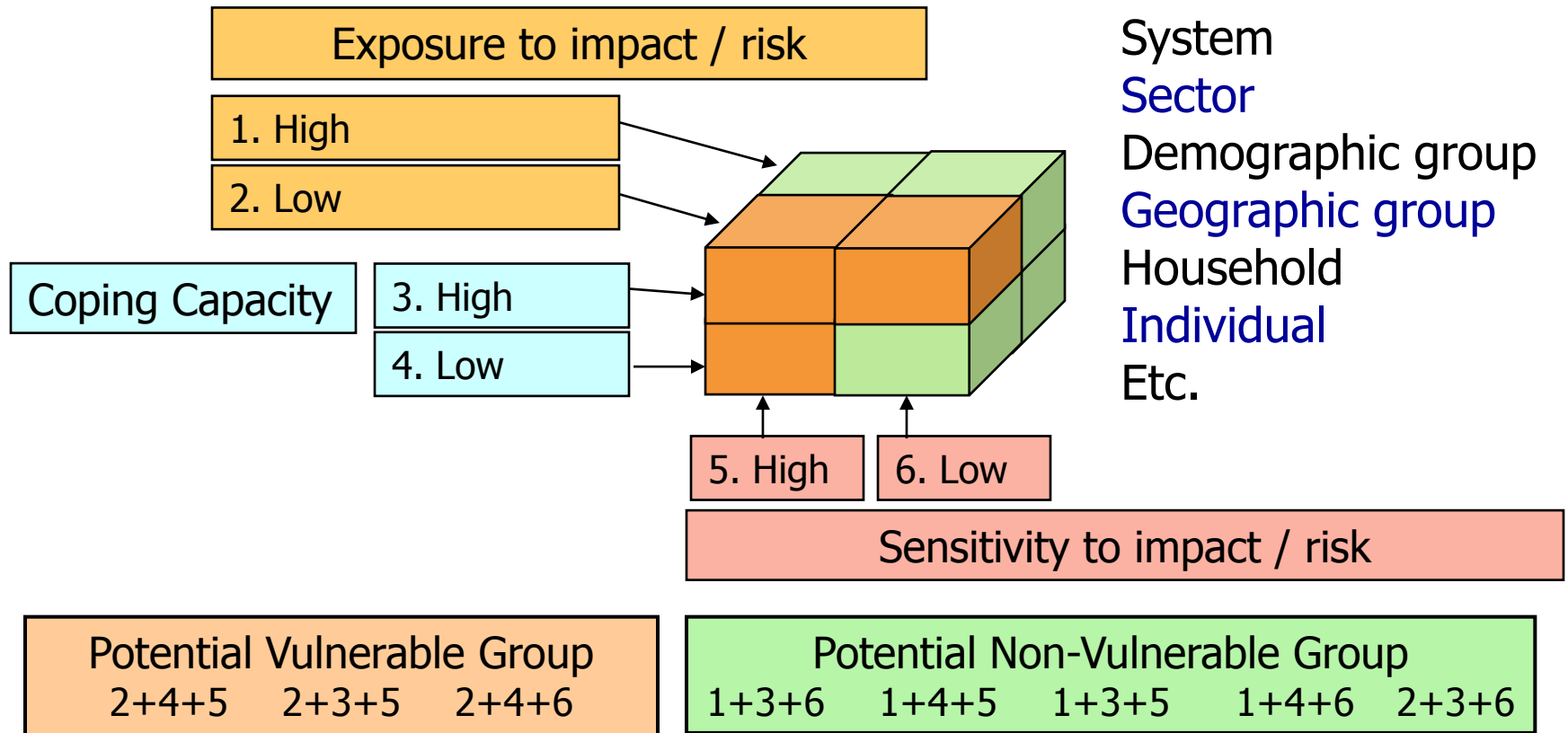
What is vulnerability?

- Vulnerability describes how individual or system is affected by specific hazard beyond the capacity they can cope with.
- Vulnerability assessment refers to the practice of identifying the factors causing vulnerability, sometimes to quantify the vulnerability for comparative purposes.

Introduction to climate change vulnerability and adaptation (V&A)

How do we determine vulnerability

Vulnerability is function of (exposure, sensitivity, coping capacity) to impact/risk from climate change



Introduction to climate change vulnerability and adaptation (V&A)

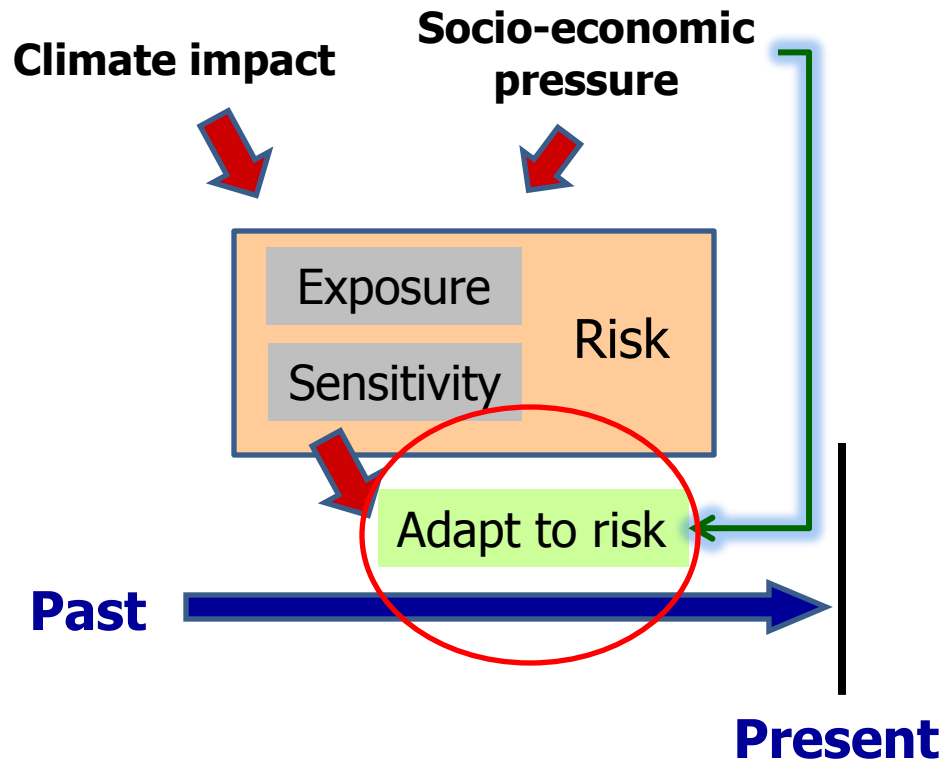
What is adaptation?

- Adaptation is the process of adjusting to new conditions, stresses and natural hazards that result from climate change.
- In the specific context of climate change, adapting means adjusting to a new set of climatic attributes, either new and unfamiliar from those already existing, or changed parameters of existing attributes.

Introduction to climate change vulnerability and adaptation (V&A)

Dynamic of risk – vulnerability – adaptation

In most cases, risk and how people adapt to risk are result of socio-economic change over the years. With or without climate change, people could be more vulnerable.



Introduction to climate change vulnerability and adaptation (V&A)

Changing exposure to climate risk

Case study at Lao-oi District, Kalasin Province - Thailand

New farming practice - Won't fight with flood – change to dry season rice – no more flood risk on farming practice / but will change to exposure to risk from drought and heat risk

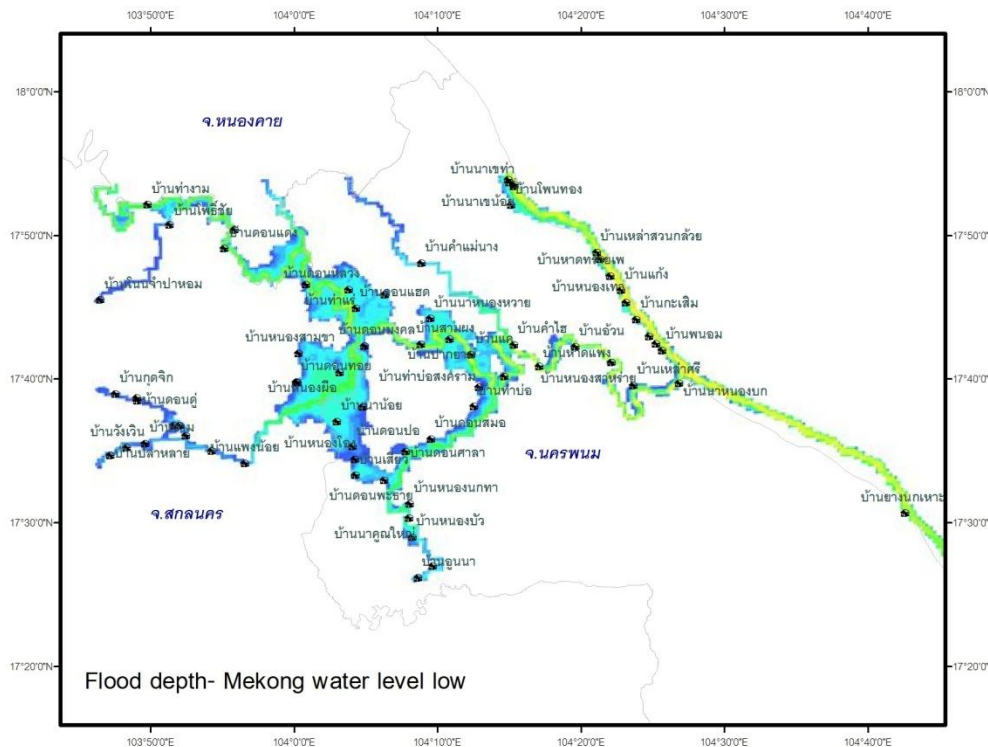


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Changing exposure to climate risk

Case study at lower Songkram River basin - Thailand

Due to population growth and other economic force, there has been more settlements in the floor risk prone in lower Songkram River basin, expose themselves to flood risk



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Changing sensitivity to climate risk

Case study at Huay Sam Mor, Chaiyapoom Province - Thailand

Local rice variety, flood resistance variety. But with low yield and diminishing market demand, farmer decided to adopt less flood tolerance rice variety, thus be more sensitive to flood risk

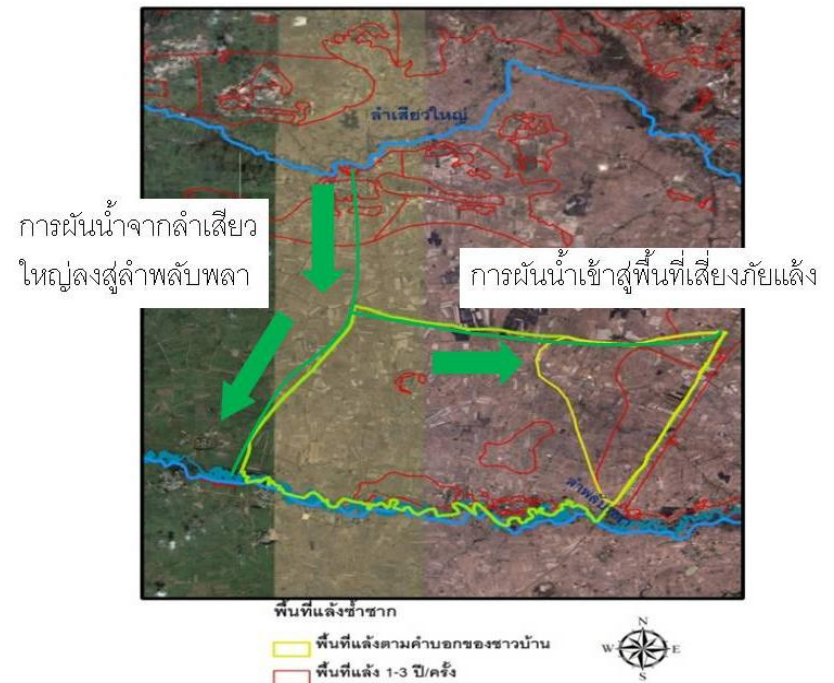


Introduction to climate change vulnerability and adaptation (V&A)

Changing coping capacity to climate risk

Case study at Tung Luong, Roi-et Province - Thailand

Using water supply diverted from other river stream to cope with drought risk in rice farming has become limited option due to change in water allocation policy across administrative units and change in social structure.



Part 2: Assessing climate change vulnerability and adaptation (V&A)

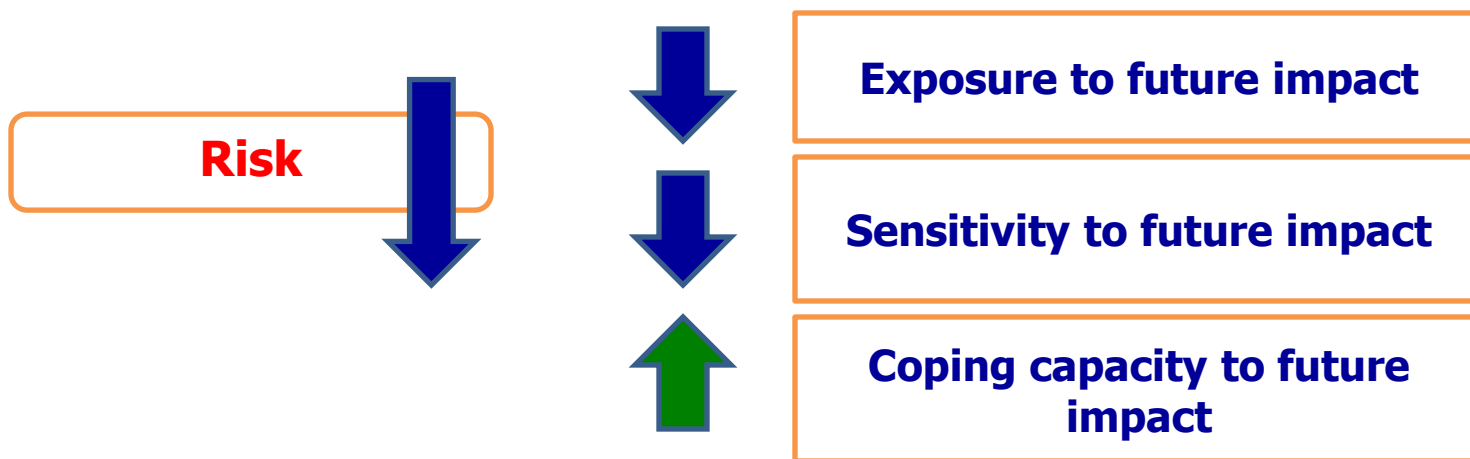
- Frame of thought – Climate change V&A
- Putting climate change adaptation into context
- Breaking dilemma in climate change V&A assessment
- Ecosystem-based Adaptation (EbA) vs Community-based Adaptation (CbA) and integrated approach



Assessing climate change vulnerability and adaptation (V&A)

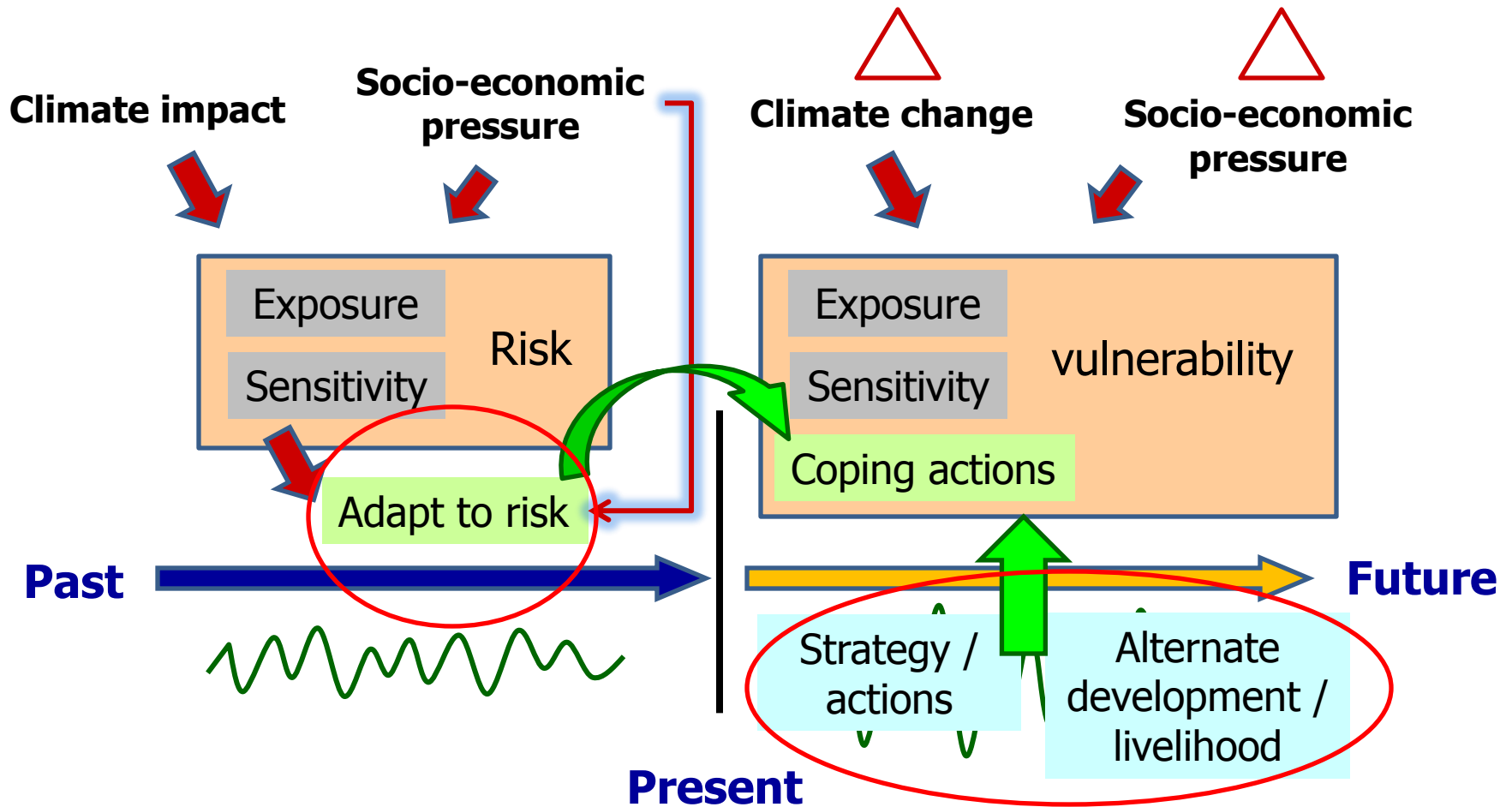
Frame of thought – Climate change V&A

- Risk, vulnerability and adaptation is place, time-specific
 - Must be considered under specific context – who & to what?
 - Understanding vulnerability will lead to adaptation
 - Target of adaptation – build capacity which aims at more resilience to future changes – better capacity to manage risk

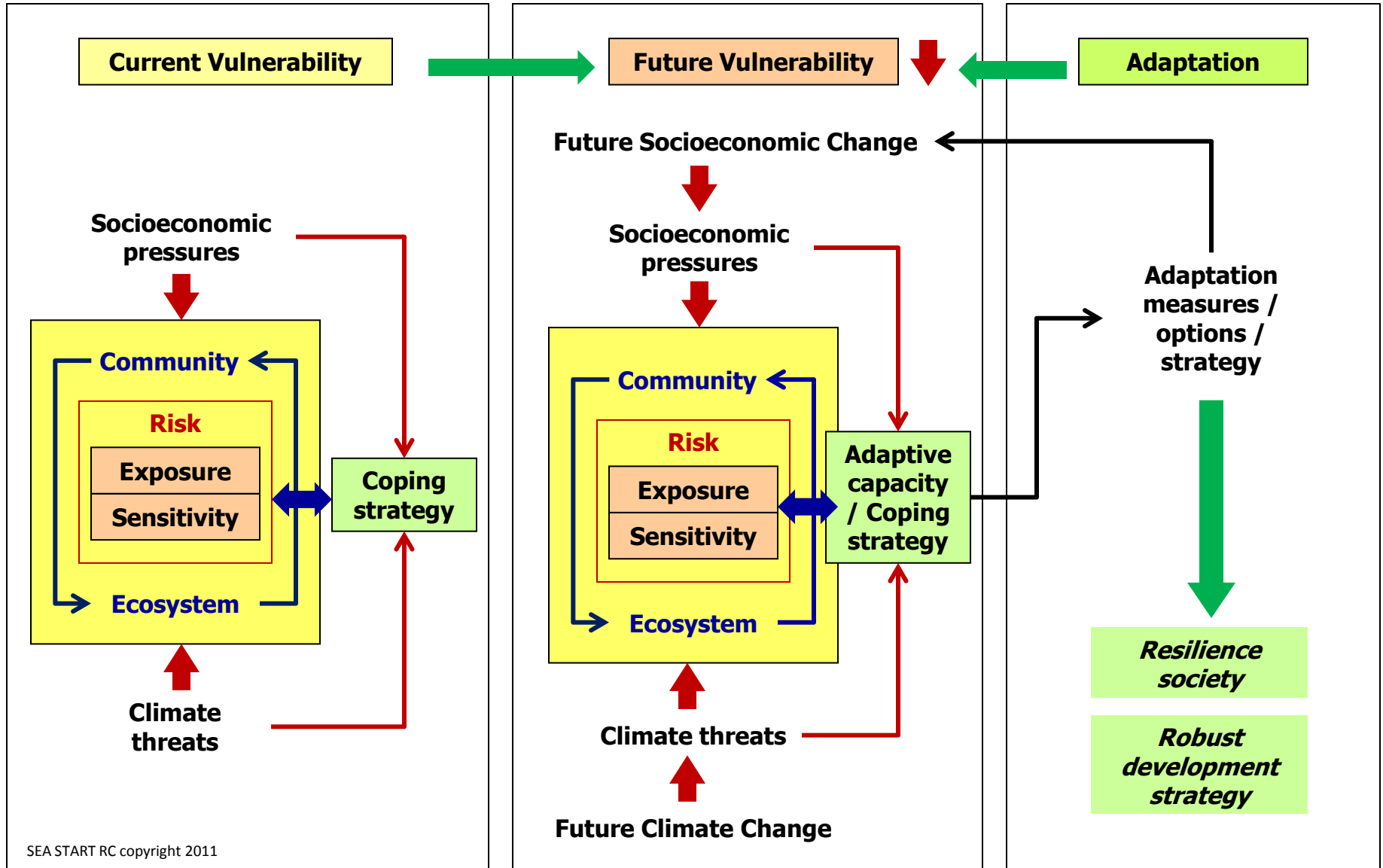


Assessing climate change vulnerability and adaptation (V&A)

Frame of thought – Climate change V&A



Assessing climate change vulnerability and adaptation (V&A)



Assessing climate change vulnerability and adaptation (V&A)

Multiple aspects of climate change adaptation:

- Climate change adaptation is long-term development strategic planning
- Various aspects of climate change adaptations

Multiple levels of adaptation:

Household / Community / Provincial / National / Regional

Multiple approaches of adaptation:

Individual / Collective

Multiple methods of adaptation:

Engineering – technical solution / Social – livelihood – economic aspect / Institutional aspect/ etc.

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Examples of climate change adaptation – community level

Bangladesh:

- Community-based practice to survive in changing ecosystem condition – permanent flood (water logging)
- Adaptation at individual and household level – changing ways of life



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Examples of climate change adaptation – community level & national financial system

Nepal:

- Micro-finance mechanism through special insurance scheme to cope with increasing flash-flood
- Adaptation through institutional arrangement



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Examples of climate change adaptation – multi-level awareness raising

Mongolia:

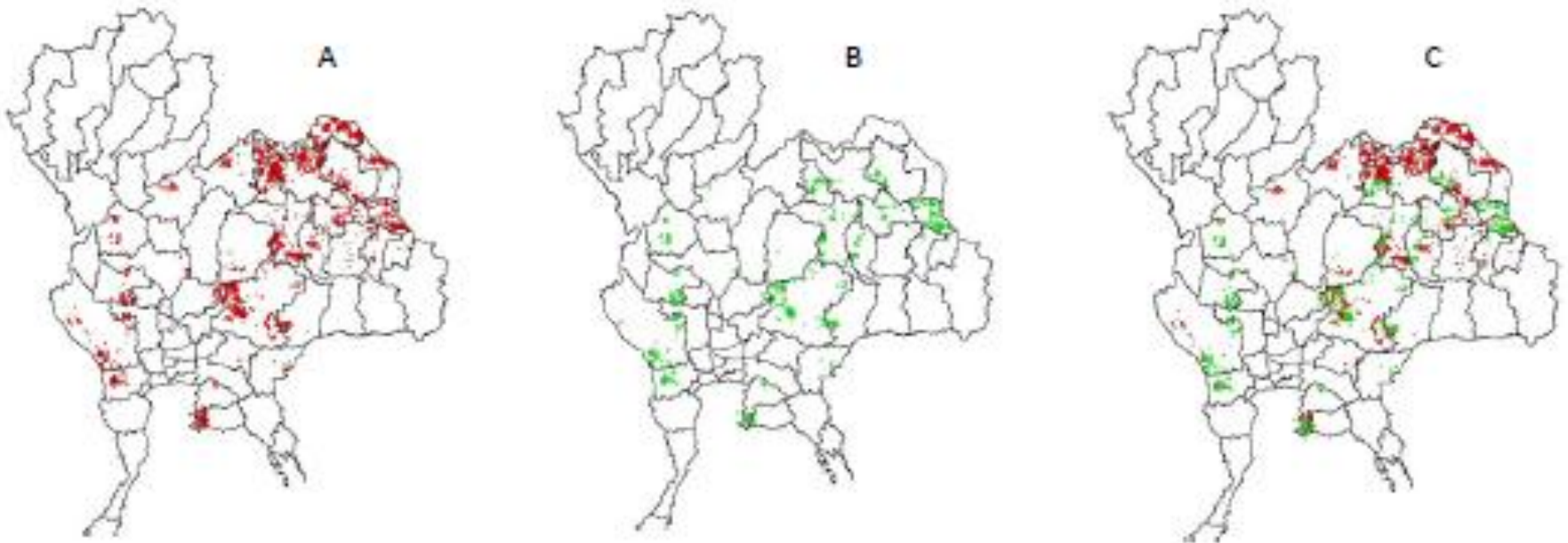
- Risk communication at multiple levels
- To build common awareness that leads to policy framework to climate change adaptation
- Adaptation planning through local participatory



Well in the winter-spring pasture of the Ihburd herders' group

Assessing climate change vulnerability and adaptation (V&A)

Examples of climate change adaptation: System & Sector-based / Agricultural system – Cassava sub-system



Thailand:

Hot spot – risk area for cassava production in future based on analysis of impact of climate change on cassava productivity in the future

Assessing climate change vulnerability and adaptation (V&A)

Adaptation – target at system and sector
Case study in Kalasin Province, Thailand



Change crop management technique – reduce plantation size with higher yield – reduce exposure to drought and flood risk

Part 2: Assessing climate change vulnerability and adaptation (V&A)

- Breaking dilemma in climate change V&A assessment



Breaking dilemma in climate change adaptation planning

The dilemma

Breaking dilemma in climate change adaptation planning

The dilemma:

If the projection of climate change is only a plausible future, how can we plan/justify action needed for adaptation?

But how can we be so certain about what will happen in the future

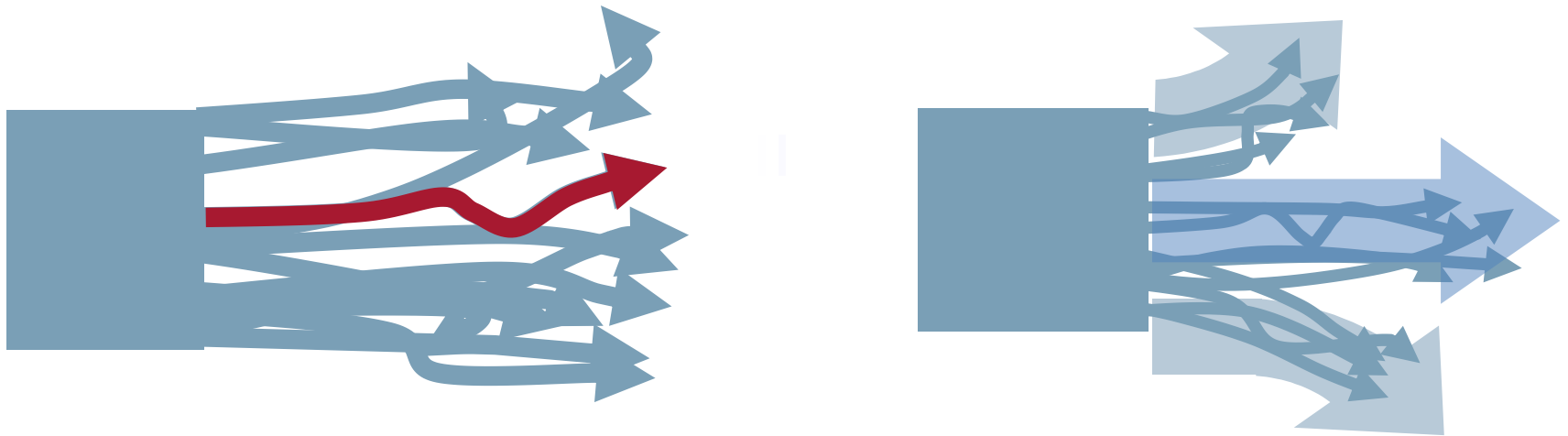
Breaking dilemma in climate change adaptation planning

The uncertainty

Breaking dilemma in climate change adaptation planning

Can we really tell the future?

Life is full of uncertainties – future can be unfolded in many plausible ways



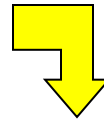
Scenario:

a description of possible actions or events in the future

Breaking dilemma in climate change adaptation planning

Change of mindset

“What will happen to us?”



“What will we do if this or that will happen?”

Manage uncertainty by different frame of thought, not to formulate
certainty out of uncertainty

Bare in mind: Climate is not the only factor that is changing
Change in socio-economic condition is much more dynamic
When think of climate change – remind ourselves of different context

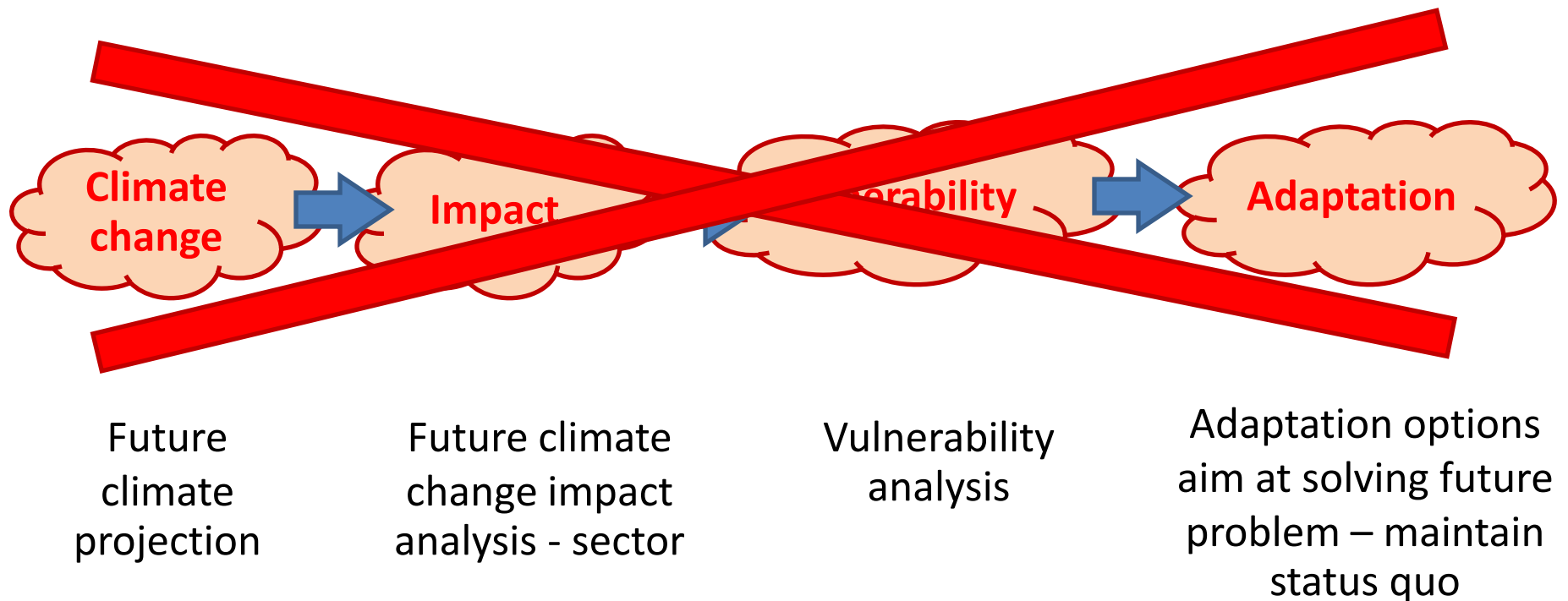
Breaking dilemma in climate change adaptation planning

The way forward

Breaking dilemma in climate change adaptation planning

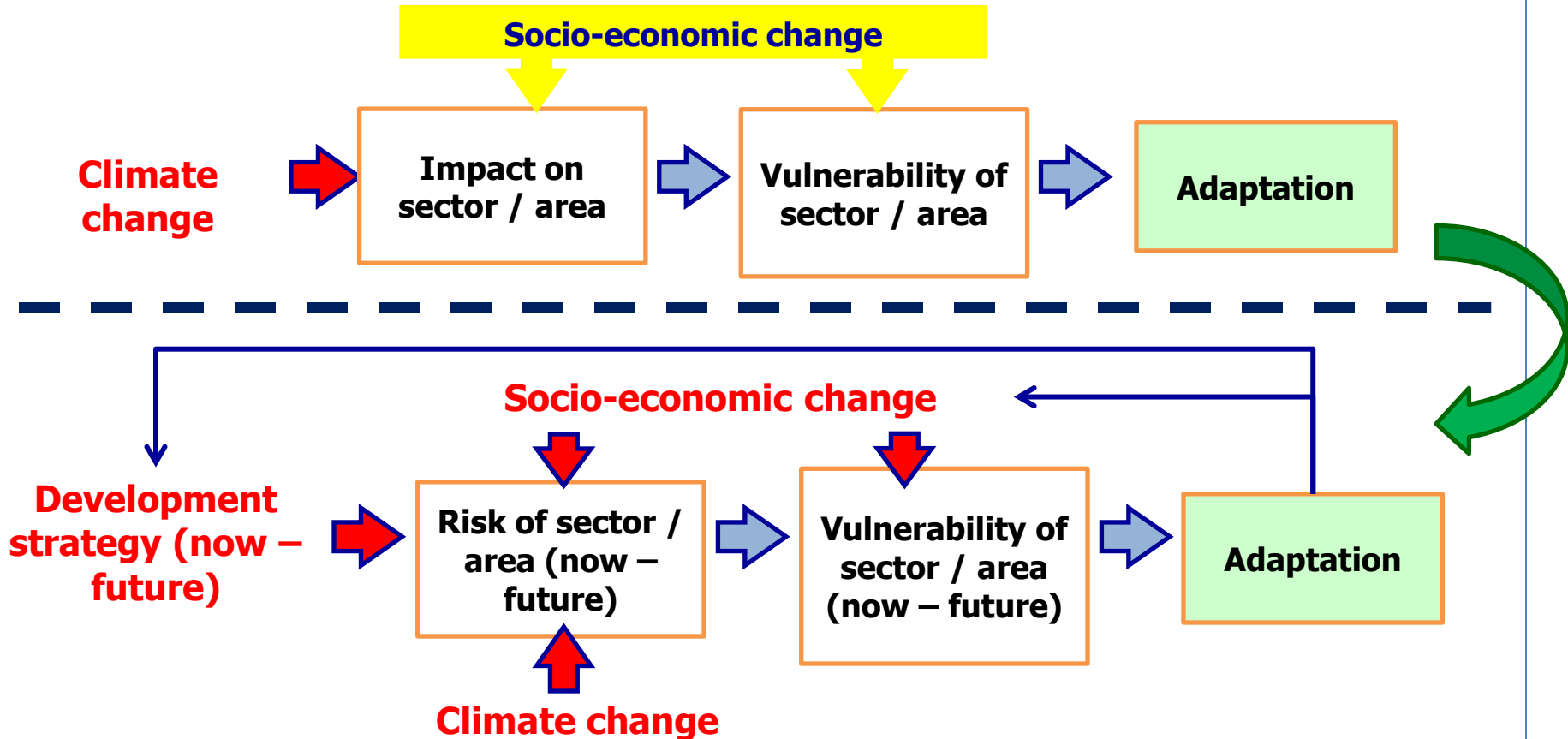
The way forward:

Paradigm shift in climate change adaptation planning



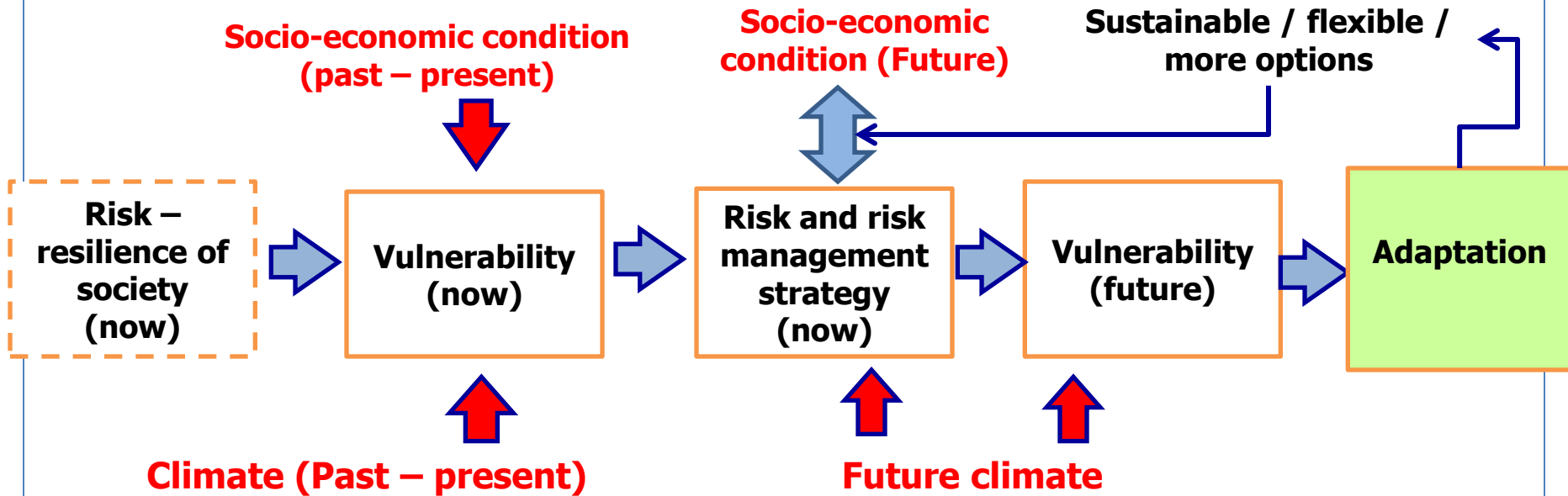
Breaking dilemma in climate change adaptation planning

Alternative approach: from impact-based to risk-based assessment



Breaking dilemma in climate change adaptation planning

Alternative approach: Area-based / Community-based approach



Breaking dilemma in climate change adaptation planning

The stories

Breaking dilemma in climate change adaptation planning

Climate change adaptation in reality

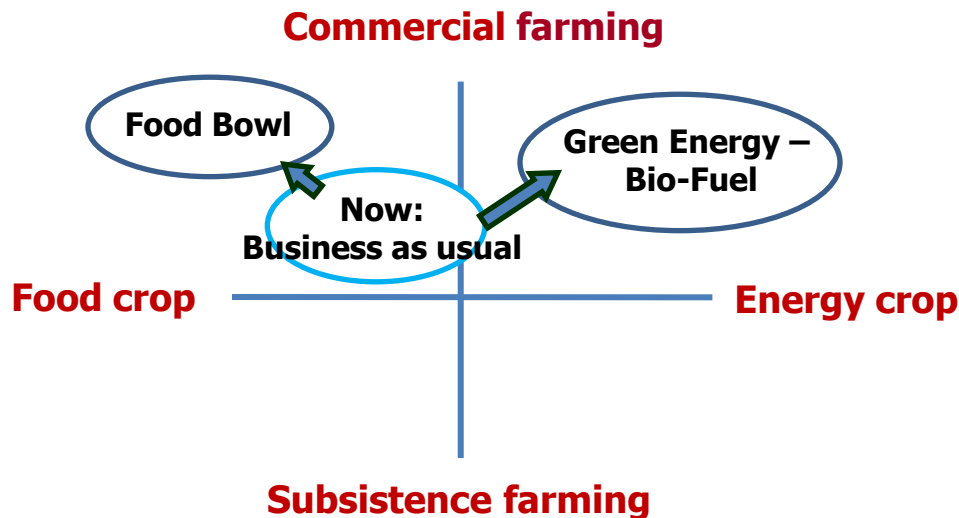
- Put climate change concern into context – matter of scale
- Aims at increasing robustness – resilience, rather than trying to fix problem of the future
- Linkage between present and future
- Mainstream climate change into current strategy

Story 1: Strategy on future crop production in Chi-Mun river basin, Thailand
Story 2: Climate risk management strategy of Lao-oi district, Thailand

Breaking dilemma in climate change adaptation planning

Story 1: Strategy on future crop production in Chi-Mun river basin

Different development directions bring different context to think about climate change adaptation



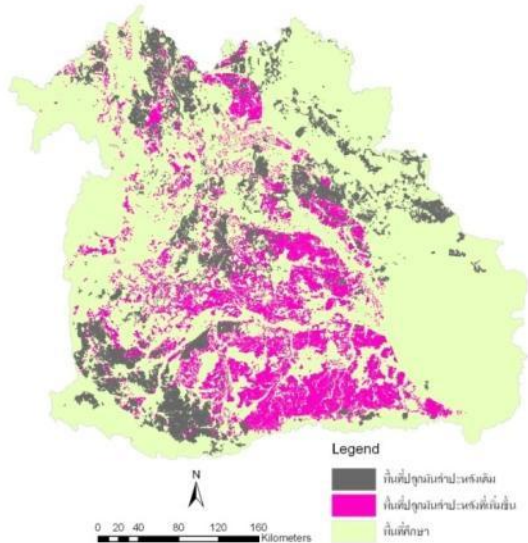
	Future scenario	
	Food Bowl	Green Energy - Biofuel
Wet season / Rainfed rice	↓	↓
Dry Season / Irrigated rice	↑	↑
Sugarcane	→	↑
Cassava	→	↑
Other crops	↓	↓

Breaking dilemma in climate change adaptation planning

Different crop production area – scenarios of the future

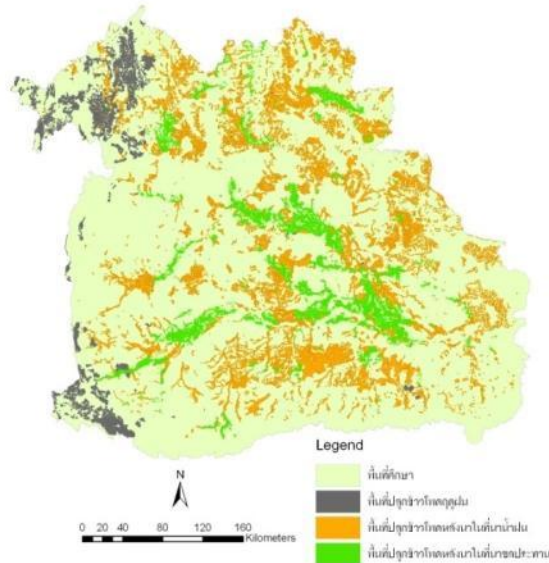
Cassava

S3: พื้นที่ปลูกมันสำปะหลังที่เพิ่มขึ้นจากแนวทางการผลิตพืชพลังงาน



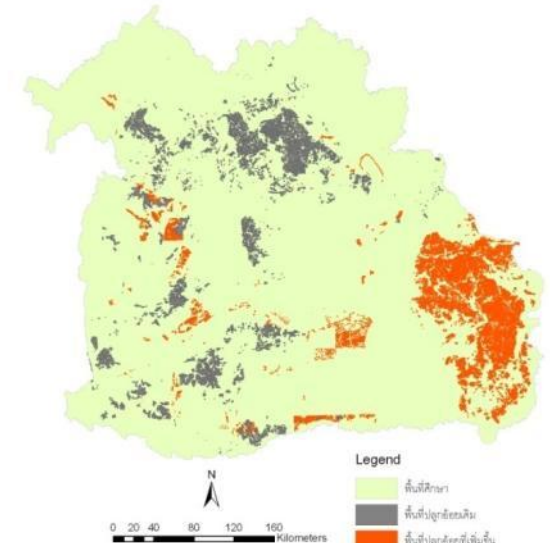
Maize

S3: พื้นที่ปลูกข้าวโพดฤดูฝน และในพื้นที่นาหลังการเก็บเกี่ยวข้าว ตามแนวทางการผลิตพืชพลังงาน ในระยะยาว



Sugar cane

S3: พื้นที่ปลูกอ้อยที่เพิ่มขึ้นจากแนวทางการผลิตพืชพลังงาน



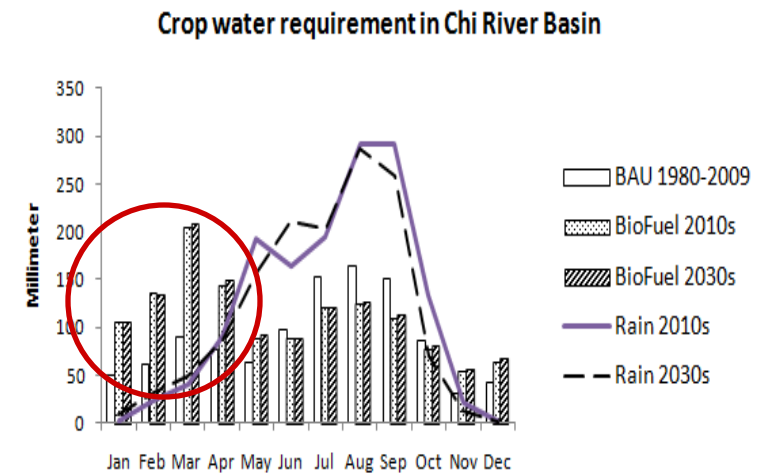
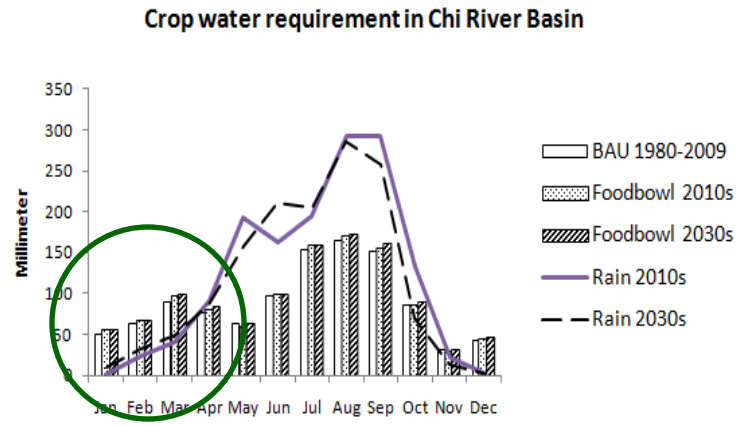
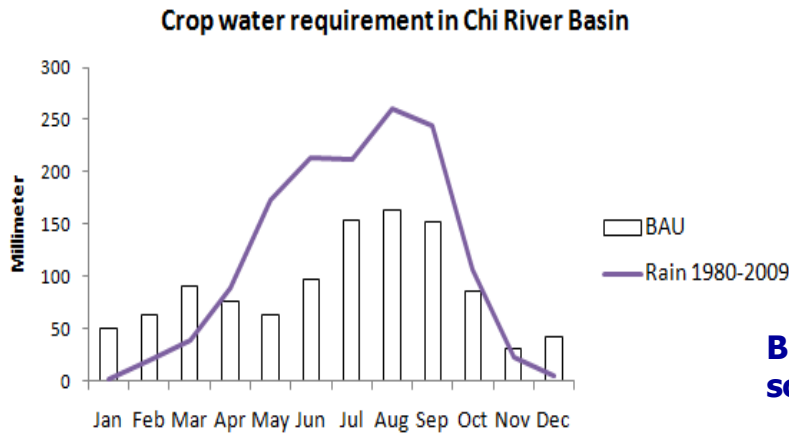
Breaking dilemma in climate change adaptation planning

Different cropping pattern in the future make different water demand

Food-bowl scenario



Bio-fuel scenario

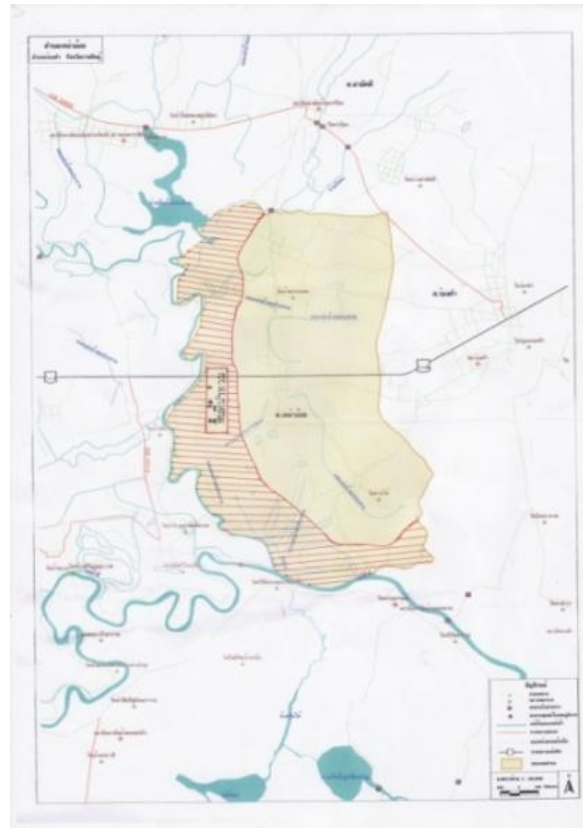
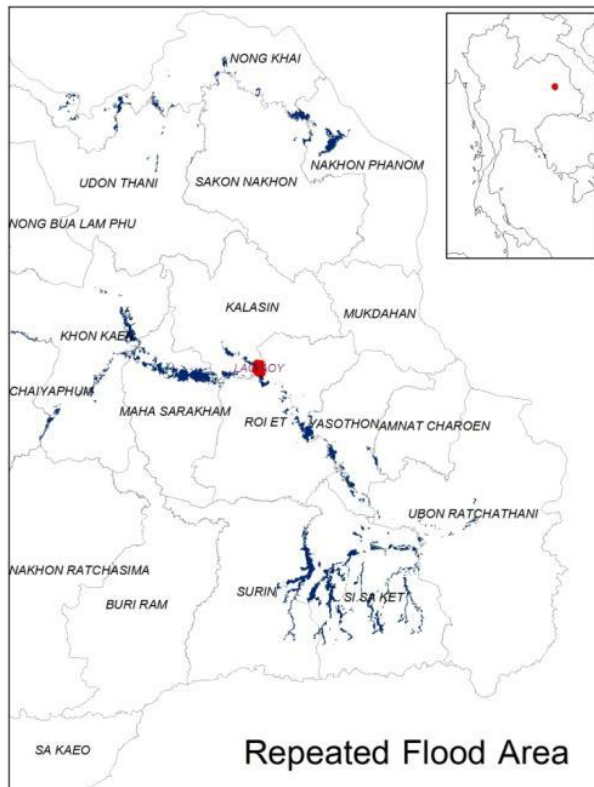


Adaptation challenge: How to provide water supply for agriculture? Is it feasible? Does it justify investment?

Breaking dilemma in climate change adaptation planning

Story 2 – Climate risk management strategy of Lao-oi district, Thailand

Climate risk management strategy will put community into different context – different risk profile

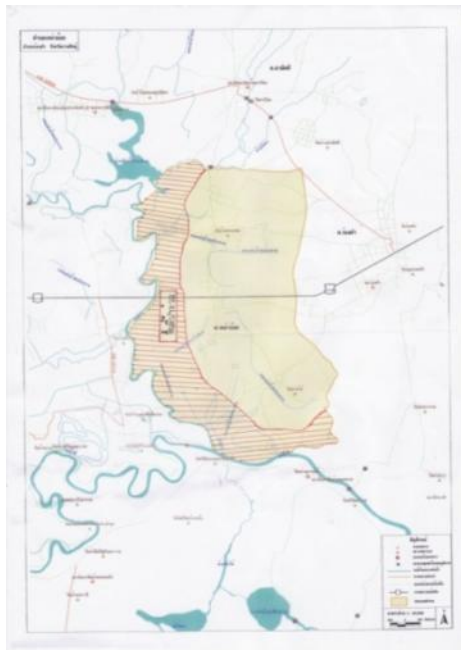


Breaking dilemma in climate change adaptation planning

Current context: wet-season rice / community is located along river

Climate risk – farmer vulnerability

- **Exposure:** Flood before harvest / 7-8 times in a decade
- **Sensitivity:** Rice has low tolerance to flood
- **Coping capacity:** Dry season rice – partially / government compensation / seasonal migration



Breaking dilemma in climate change adaptation planning

Strategy to cope with current climate risk

New farming practice - Won't fight with flood – change to dry season rice – use water from main river through pumping station and underground pipe system



Path leads to dead end?

Breaking dilemma in climate change adaptation planning

Strategic move to cope with current climate risk leads to different context and different risk & vulnerability profile

Future context: Dry-season rice practice

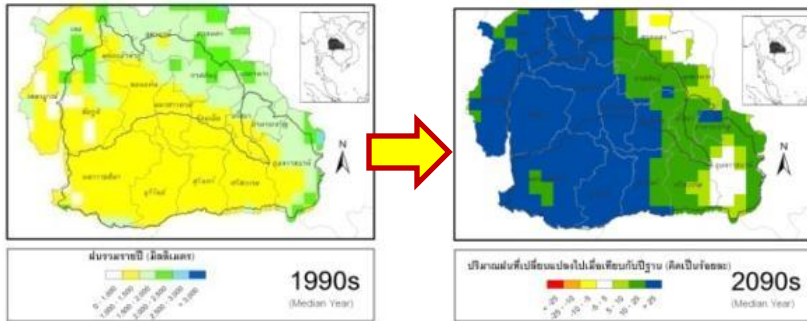
- **Exposure:** Drought / heat
- **Sensitivity:** Rice has low tolerance to drought / heat
- **Coping capacity:** Limited – single source of water supply



Breaking dilemma in climate change adaptation planning

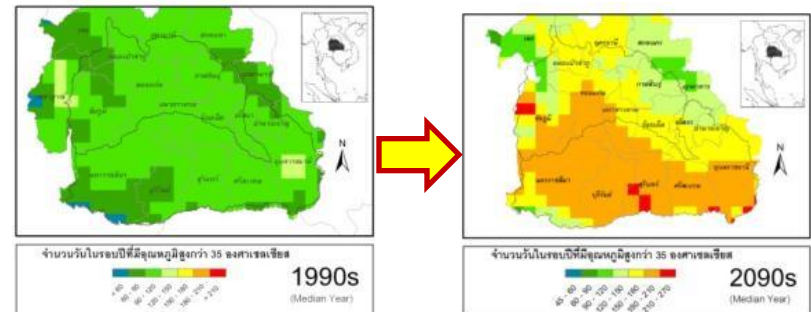
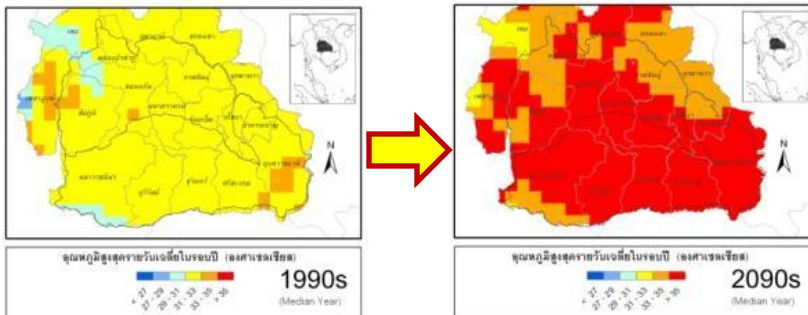
Will such strategy leads to new problem – wasteful investment?

Warmer and longer summertime – reduced river flow whilst crop water demand could be higher to compensate higher evapotranspiration



Increase rainfall in rainy season suggests higher flood risk
 Strategy heading toward right direction

But current response to climate risk may not sustain under warmer and longer summertime in the future



Breaking dilemma in climate change adaptation planning

Adaptation: alternative in strategy implementation

Alternate source of water resource – harvest water during flood season for dry season agriculture



Breaking dilemma in climate change adaptation planning

Case study: Climate change adaptation by alternative livelihood
Agriculture community at Krabi Province (southern region, Thailand)



Breaking dilemma in climate change adaptation planning

Current context: Subsistence & semi-commercial rice farming, facing saltwater intrusion once ever few year from strong monsoon / storm

- **Exposure:** community locate near seashore
- **Sensitivity:** once get seawater into rice field, low yield for a few years
- **Coping capacity:** dyke system / practice off-farm labor / government support - subsidize



Breaking dilemma in climate change adaptation planning

Future context: Maintain subsistence & semi-commercial rice farming

- **Exposure:** higher expose to saltwater intrusion from stronger monsoon + more frequent storm
- **Sensitivity:** once get seawater into rice field, low yield for a few years
- **Coping capacity:** dyke system / practice off-farm labor / government support – subsidize
- More vulnerable as higher risk, unless increase coping capacity as adaptation – improve dyke system to reduce exposure to climate impact / more government support / etc.

Adaptation by reducing exposure to climate impact
– improve dyke system



Breaking dilemma in climate change adaptation planning

Future context: Alternative livelihood – change from rice farming to aquaculture – raise crab instead of rice farming

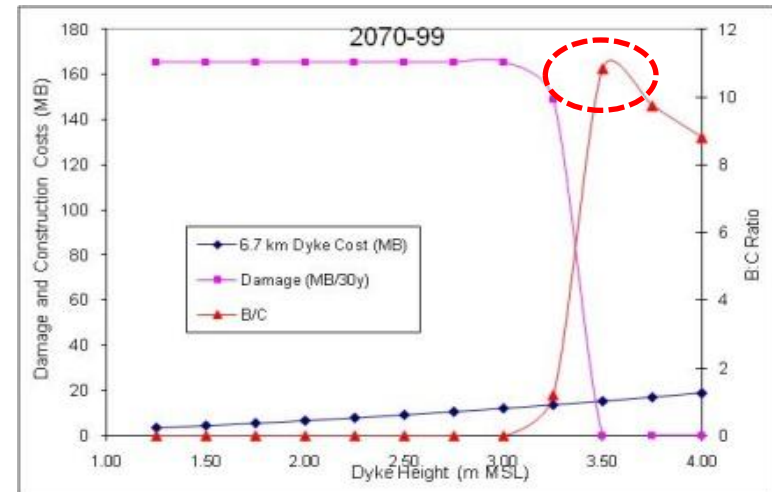
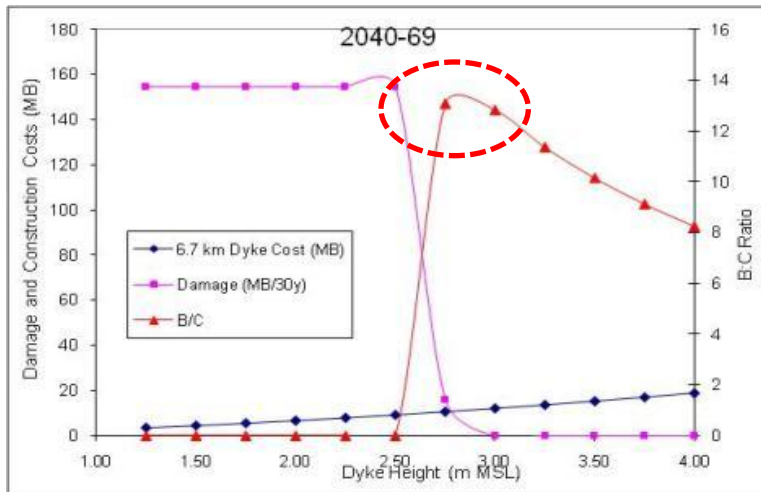
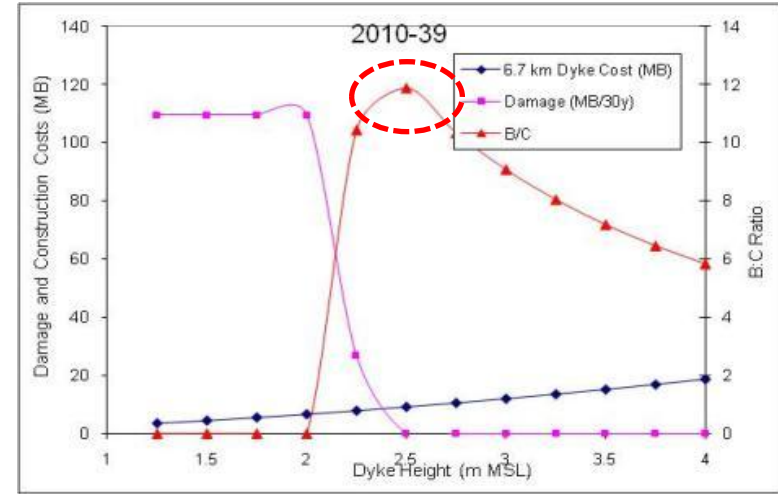
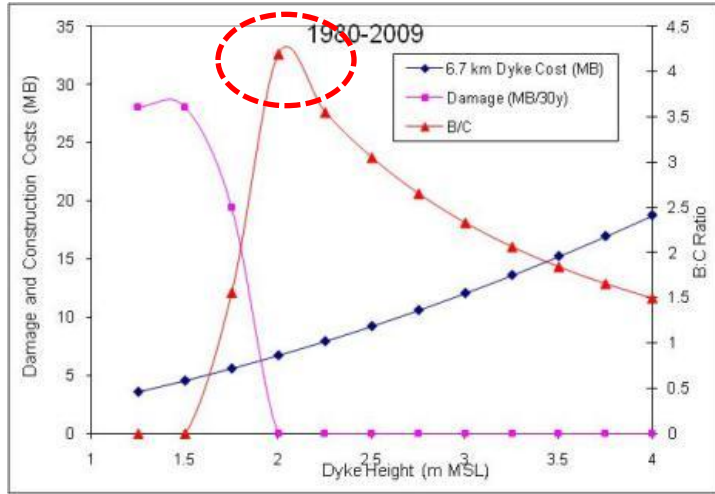
- **Exposure:** Same level
- **Sensitivity:** low - none, crab can live with saltwater
- **Coping capacity:** pond
- Less vulnerable to climate change impact, but need investment to mobilize this strategy

Adaptation by reducing
sensitivity to climate impact
– change livelihood



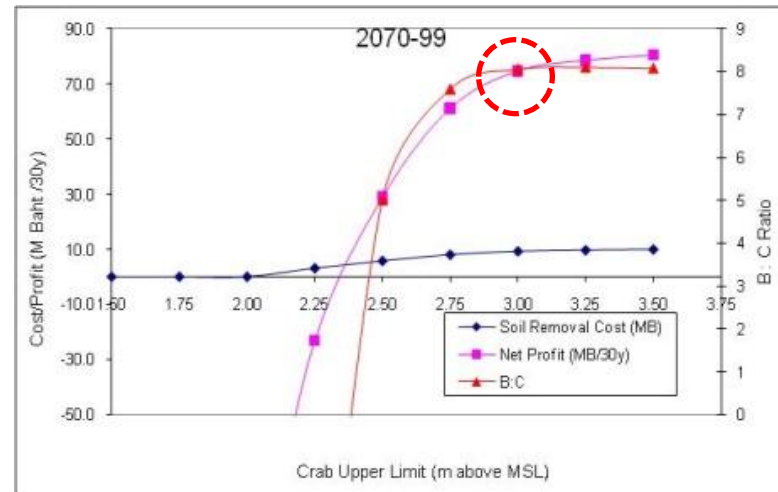
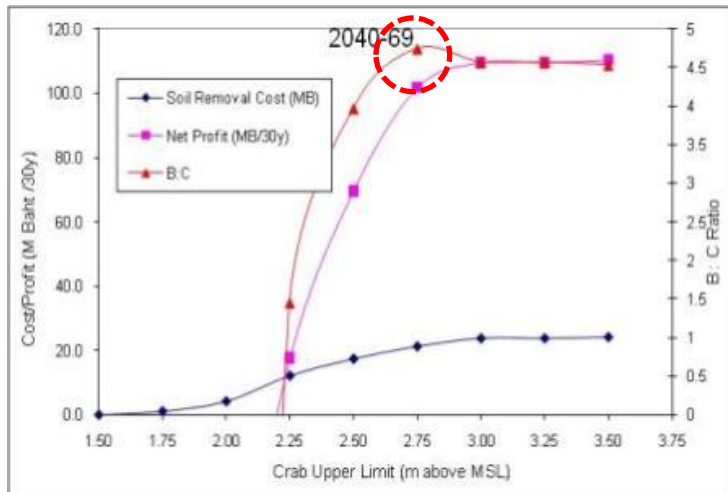
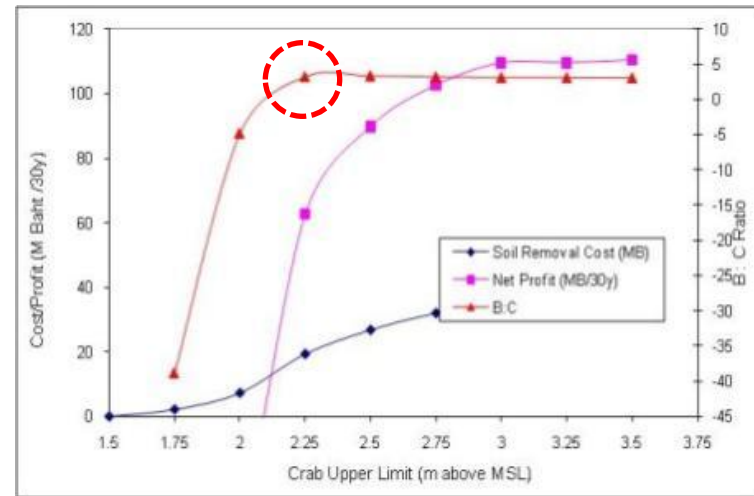
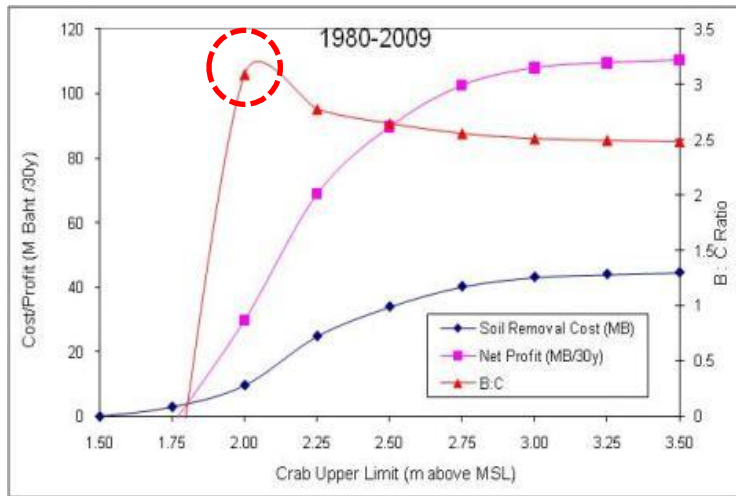
Breaking dilemma in climate change adaptation planning

Cost-benefit analysis: dyke improvement



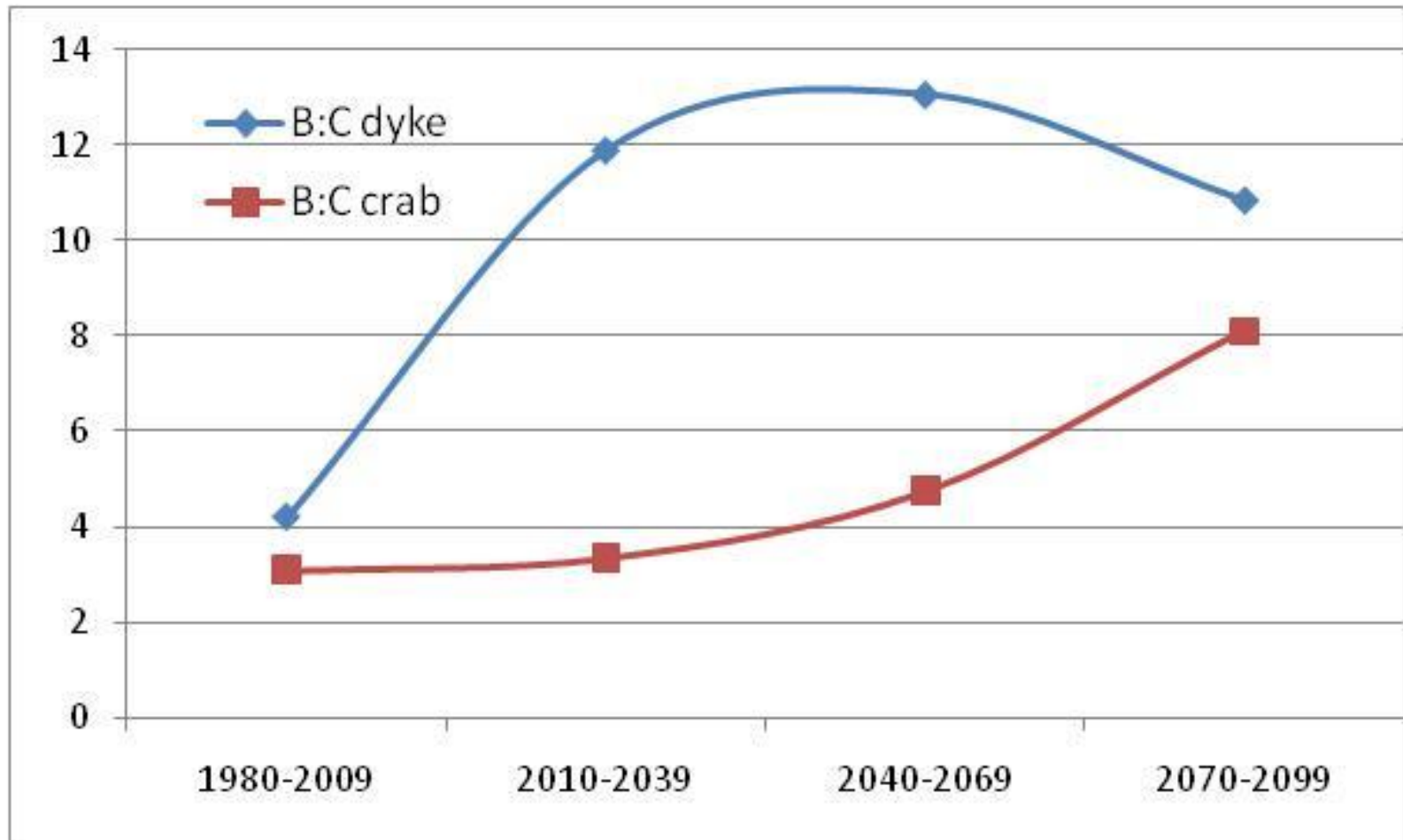
Breaking dilemma in climate change adaptation planning

Cost-benefit analysis: crab pond



Breaking dilemma in climate change adaptation planning

Cost-benefit analysis: comparison dyke option vs crab pond option



Breaking dilemma in climate change adaptation planning

Reminder:

- Scenario-based study and uncertainty >> shifting from impact-based assessment approach
- Context specific and holistic view >> putting climate change into context – climate change is not an isolate issue
- Adaptation in reality >> Strategy VS action / linking present and future / the smaller the unit of analysis – the stronger linkage with the present

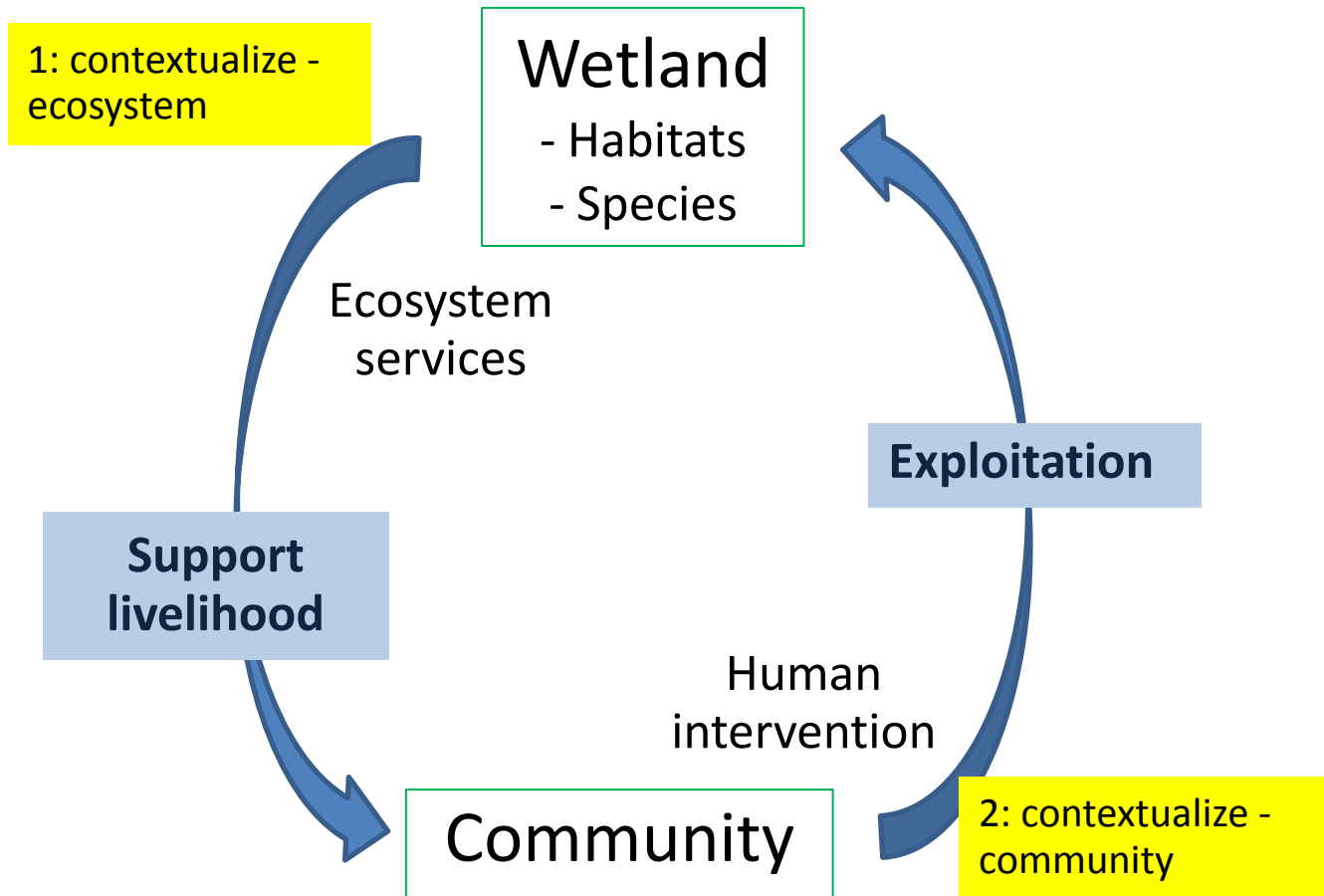
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Ecosystem-based Adaptation (EbA) VS Community-based Adaptation (CbA) and integrated approach

Ecosystem & community in steady state

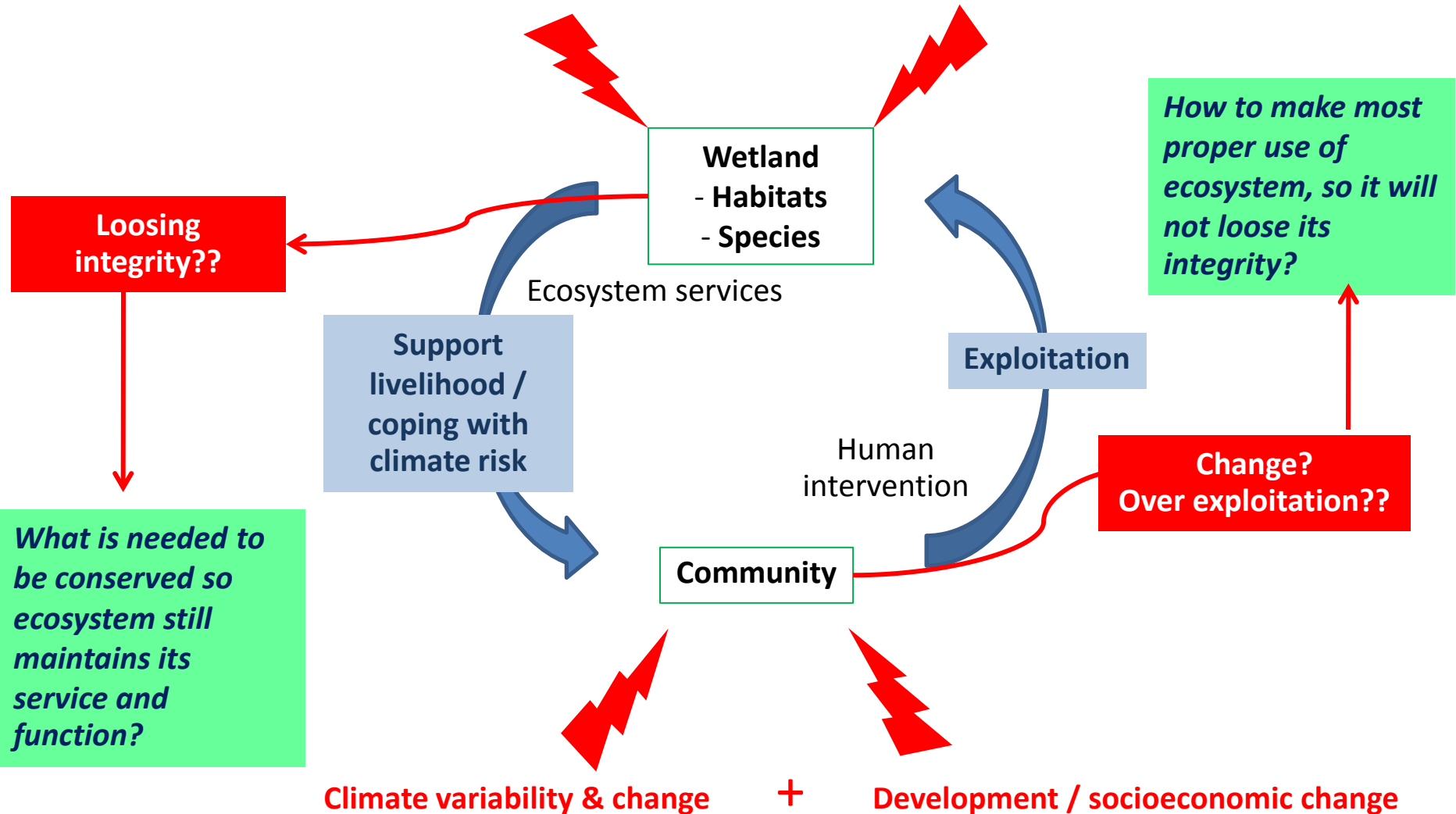


Ecosystem & community under pressures

Climate variability & change

+

Development / socioeconomic change



Climate variability & change

+

Development / socioeconomic change

Climate variability & change

+

Development / socioeconomic change

6: Understanding pressure from climate impact

7: Understanding pressure from other changes

8: Assess how ecosystem maintain integrity and provide service to support community under pressures

9: How to make most proper use of ecosystem, so it will not loose its integrity?

Wetland
-Habitat
-Species

Loosing integrity??

Ecosystem services

Support livelihood / coping with climate risk

Exploitation

Change?
Over exploitation??

Human intervention

5: Assess how community change the way they rely on ecosystem services under pressures

10: What is needed to be conserved so ecosystem still maintains its service and function?

Community

3: Understanding pressure from climate impact

4: Understanding pressure from other changes

Climate variability & change

+

Development / socioeconomic change

Assessing Climate Change Vulnerability and Adaptation (V&A)

Conclusion

Although there are many possible approaches, some of the typical steps in adaptation planning include:

1. Building knowledge on adaptation
2. Assessing impacts of climate change
3. Assessing vulnerability/ adaptive capacity
4. Identifying adaptation options/ designing adaptation measures
5. Implementing measures
6. Monitoring and evaluating effectiveness

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Final words

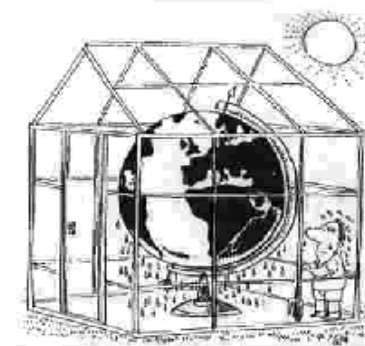
- Climate change adaptation could be initiated at any level in the society / system / sector
- Cross-cutting issue among many agencies – actors, from national government to individual
- Not just about policy making, but about every member in the society
- Not just about how to think about new action, but altering today's plan to sustain under climate change in the future

**Climate change – not only about environmental issue,
but new condition for our future planning**

Assessing Climate Change Vulnerability and Adaptation (V&A)

Reminder: To avoid confusion – keep climate change adaptation in context

- Issues about time
 - Timing of adaptation
- Issues about scale
 - Different levels of adaptation
- Issues about method
 - Different methods of adaptation
 - Examples of broad range of climate change adaptation
- Reminder: developing strategy and planning for climate change adaptation for the future
 - Holistic view on society under future threats
 - Visioning for the future: a critical component of climate change adaptation



Thank you



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