A rapid vulnerability assessment method for designing national strategies and plans of adaptation to climate change and climate variability

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Outline:

- Introduction
- Conceptual approach
- The method
- Conclusion

Introduction:
How vulnerable is Indonesia to climate change?

- Indonesia is a large archipelago

17,000 islands

1.9 million km^2 of land area

4,800 km from West to East

The economy is largely **depends on natural resources** (agriculture, forestry and fishery)

Introduction:
How vulnerable is Indonesia to climate change?

- Indonesia is a large archipelago
- No one knows exactly how vulnerable the country, because still plenty of resources → vulnerability assessment is required
- A national plan of adaptation needs to be prepared
  - To be incorporated into the national development plan
- A rapid vulnerability assessment method is required to get the general picture of country's vulnerability and adaptive capacity in general

Conceptual Approach of the Method

- The objective is to facilitate the vulnerability assessments and identification of adaptation strategies or measures

  We collect the list of adaptation measures from: previous studies, lessons learned (from other countries), and dialogues

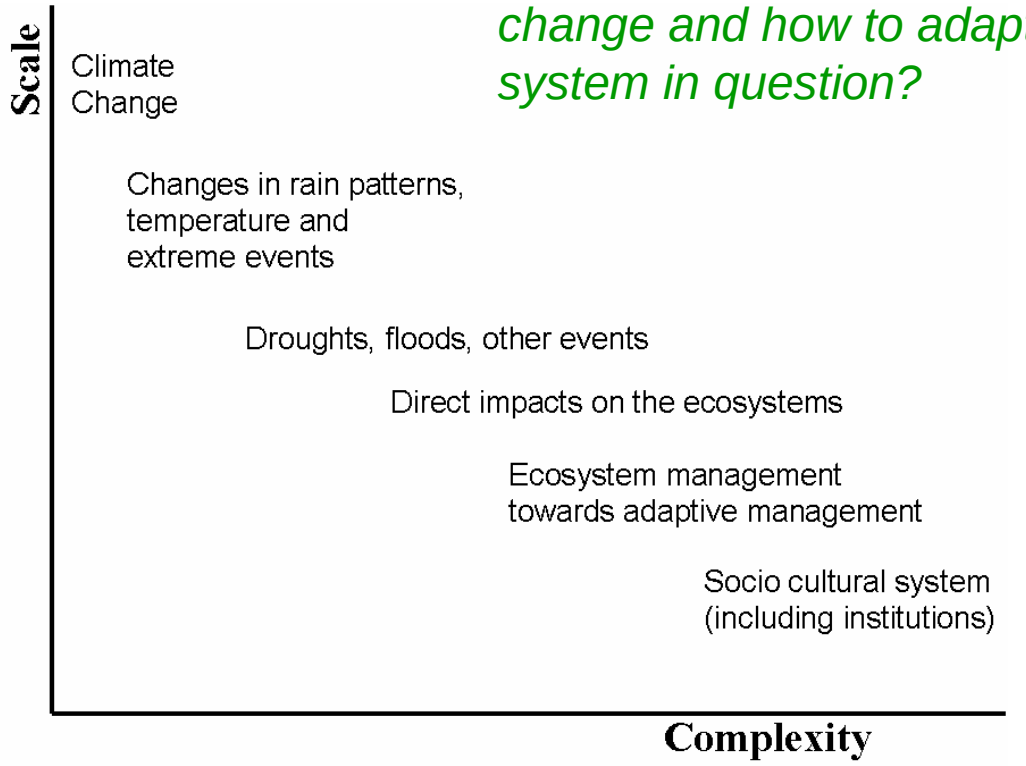
Conceptual Approach of the Method

- Principles:
  - **National goals (and sectoral development goals)**
    - As a motivation for all adaptation actions
    - "Top-down" fashion rather than "bottom-up"
  - **Definition of Vulnerability**
    - Vulnerability = Risks (potential Impacts) – Implemented adaptation [IPCC 2002]
    - Vulnerability = *f* (Exposure, Sensitivity, Adaptive capacity) [Turner et al. 2003; Metzger et al. 2006]
  - **Dialogues – multi-level and cross-sector stakeholders**
    - Enrichment through cross fertilization of both "bottom-up" and "top-down" approaches
    - Mainstreaming

Conceptual Approach of the Method

- Dialogues as a learning process – we often have miscommunications:
  - Level of adaptations?

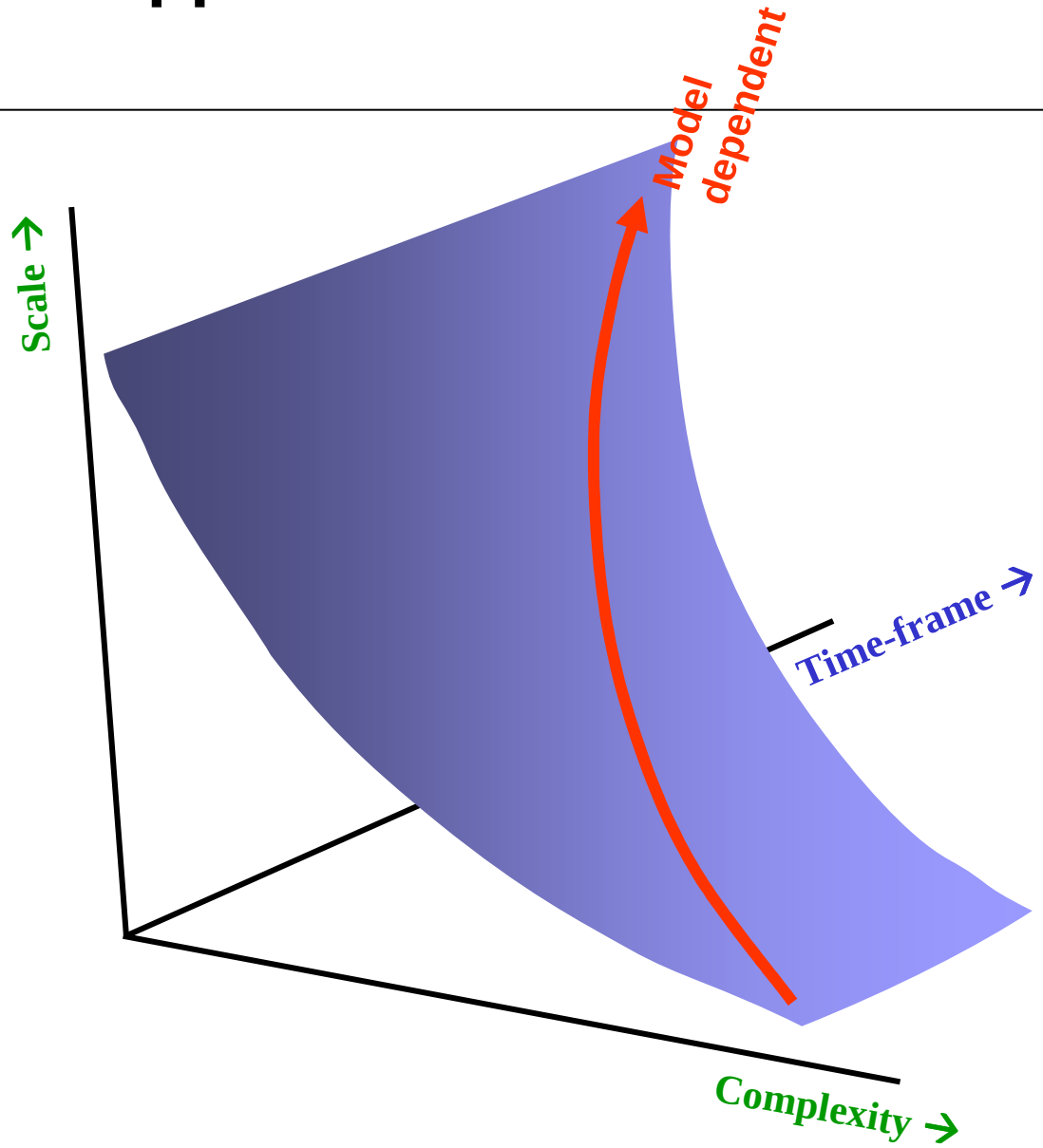
The complexity – do we need models to explain links between climate change and how to adapt with the system in question?



Conceptual Approach of the Method

- Dialogues as a learning process – we often have miscommunications:
  - Level of adaptations?
    - Do we need climate scenarios?
      - How to avoid/ reduce investment lost due to uncertainty?
    - Disaster Risk Reduction = Adaptations?

Conceptual Approach of the Model



The Proposed Method

Forestry sector

Sector related	Goal of sector	Exposure based on climate scenarios	Sensitivity (and threats)	Identified adaptation measures to cope with		Mobilisation of National Adaptive capacity (current trend)			Vulnerability (unweighted scores)
				Short-term (current climate variability & extreme)	Long-term climate scenarios	Resource mobilisation (financial & human, including research)	Institutional organizations and regulations	Additional inflow capital investment	
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- **Goal of sector**
- **Exposure: climate scenarios**
- **Sensitivity: how the system is affected by the exposure – threats and likely impacts**
- **Identified adaptation measures to cope with current climate variability and extreme (short-term), and the long-term climate scenarios**
- **Adaptive capacity is the capacity of the country to mobilise its resources, (financial & human resources, institutional organisations & regulations, adding on capital resources / investments), which is assessed based on current trend**
- **Vulnerability**

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The Proposed Method

Forestry sector

Sector related	Goal of sector	Exposure based on climate scenarios	Sensitivity (and threats)	Identified adaptation measures to cope with		Mobilisation of National Adaptive capacity (current trend)			Vulnerability (unweighted scores)
				Short-term (current climate variability & extreme)	Long-term climate scenarios	Resource mobilisation (financial & human, including research)	Institutional organizations and regulations	Additional inflow capital investment	
Forest / forestry	Sustainable use of forests and their ecosystem services	Higher temperature and extreme dry (El Nino)	Drier forests lead to vegetation (forest) fires	• Law enforcement to suppress fires •Fire mitigation •Support sustainable forest management •Restoration and conservation of peatland •Improve fire response & management		0 + ? 0 ?	0 + + + +	0 ? ? 0 0	5 / 24
					•Effective law implementation and enforcement •Alternative livelihood •Improve land/ water management	0 0 0	0 0 0	0 0 ?	
			Drier climate lead to fragmented/ patchy forests		• Repair through selective planting	0	0	0	0 / 3

Table 1.a. Assessment of vulnerability in the forestry sector (0 = no improvement has taken place, + = improvement has taken place, ? = improvement may have taken place)

The Proposed Method

Agriculture sector

Sector related	Goal of sector	Exposure based on climate scenarios	Sensitivity (and threats)	Identified adaptation measures to cope with		Mobilisation of National Adaptive capacity (current trend)			Vulnerability (unweighted scores)
				Short-term (current climate variability & extreme)	Long-term climate scenarios	Resource mobilisation (financial & human, including research)	Institutional organizations and regulations	Additional inflow capital investment	
Agiculture	Self-sufficient food production	Higher temperature and shifted seasonal variation, with no or slightly change of annual precipitation	Drier land and shifted rainy season lead to lower crop production and shifted planting time	•Adjust planting time		+	?	+	2 / 33
					•Use superior species resistance to climate stress •Improve market system •Food diversification •Control over land runoff •Improve infiltration to soil •Water efficient irrigation (drip and spray) •Technological improvement for planting in altered/ different environment	0 0 0 0 0 0 0	0 ? 0 0 0 0 0	0 0 0 0 0 0 0	
		Higher temperature and shorter rainy season but with more intense rains	Drier land especially during dry season leads to lower crop production, shorter growing time and higher soil erosion		•AS ABOVE, plus •Selection of fast growing crop species •Control upland erosion (using agroforestry system) •Mulch stubble and straw	0 0 0	0 0 0	0 0 0	

Table 1.b. Assessment of vulnerability in the agriculture sector
(0 = no improvement has been taken, + = improvement has taken place, ? = improvement may have taken place)

The Proposed Method

Health sector

Sector related	Goal of sector	Exposure based on climate scenarios	Sensitivity (and threats)	Identified adaptation measures to cope with		Mobilisation of National Adaptive capacity (current trend)			Vulnerability (unweighted scores)
				Short-term (current climate variability & extreme)	Long-term climate scenarios	Resource mobilisation (financial & human, including research)	Institutional organizations and regulations	Additional inflow capital investment	
Health	Improved quality of life (?)	Higher temperature	Hotter and drier environment and more moisturized air during the rainy and seasonal transition lead to increase population of insects borne diseases (eg. malaria, dengue, diarrhea), and dusts related diseases (respiratory infections)	•Increase awareness through public education on climate related diseases including the preventive actions •Integrated vector control (IVC) to reduce insects population •Air pollution control		+ ?	+ +	? ?	3 / 9
					•Early warning system •	?	0	0	

Table 1.c. Assessment of vulnerability in the health sector
(0 = no improvement has been taken, + = improvement has taken place, ? = improvement may have taken place)

The Proposed Method

Social welfare – Landslides

Sector related	Goal of sector	Exposure based on climate scenarios	Sensitivity (and threats)	Identified adaptation measures to cope with		Mobilisation of National Adaptive capacity (current trend)			Vulnerability (unweighted scores)
				Short-term (current climate variability & extreme)	Long-term climate scenarios	Resource mobilisation (financial & human, including research)	Institutional organizations and regulations	Additional inflow capital investment	
Social welfare	No loss of lives due to land movements	Longer dry season and higher rain intensity	Drier land during the dry season may develop cracks in the soil and with more intense rain will increase the susceptibility to land movements	•Early warning system •Reforestation/ tree planting •Educate the people on the risks of land movement		+ ? +	? ? ?	0 0 0	2 / 15
					•Improve community based disaster risk reduction •Improve disaster management (relief, recovery and rehabilitation)	? ?	0 ?	0 ?	

Table 1.d. Assessment of vulnerability in the social welfare sector
(0 = no improvement has been taken, + = improvement has taken place, ? = improvement may have taken place)

The Proposed Method

What the tables tell us

- Based on the vulnerability scores, all are vulnerable to climate change
- Supports of national resources on adaptation are still lacking (especially for the long-term adaptation measures)
- The national capacity to mobilise its resources is still not yet optimally used

The Proposed Method

What the tables tell us

- Lack of awareness / knowledge (of policymakers and sector managers) on climate change could be the cause of weak implementation of adaptation
- A possibility to avoid the climate exposure is not yet explored
- Several cross-sectors adaptation measures have been identified (laws, social-welfare, land management for forest fires; water and land management, and agriculture for food production)

Conclusions

- The proposed method is able to facilitate the vulnerability assessments and identification of adaptation strategies or measures
- The method is potentially adoptable to provincial and district levels (but will require adjustments or redefinition of AC)

Thank you