

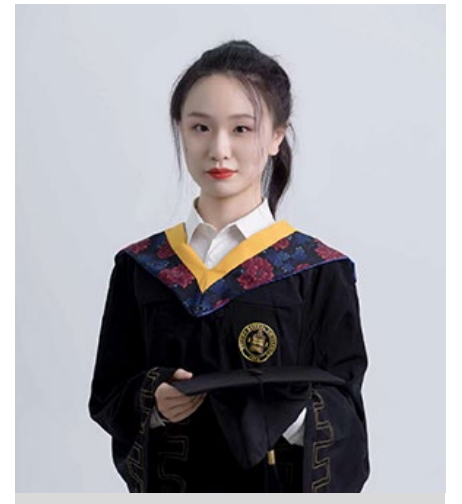
Cascading Governance: How Assessment Reshape Governmental Decision-making and Environmental Impacts in watershed



Xiaomeng Wu

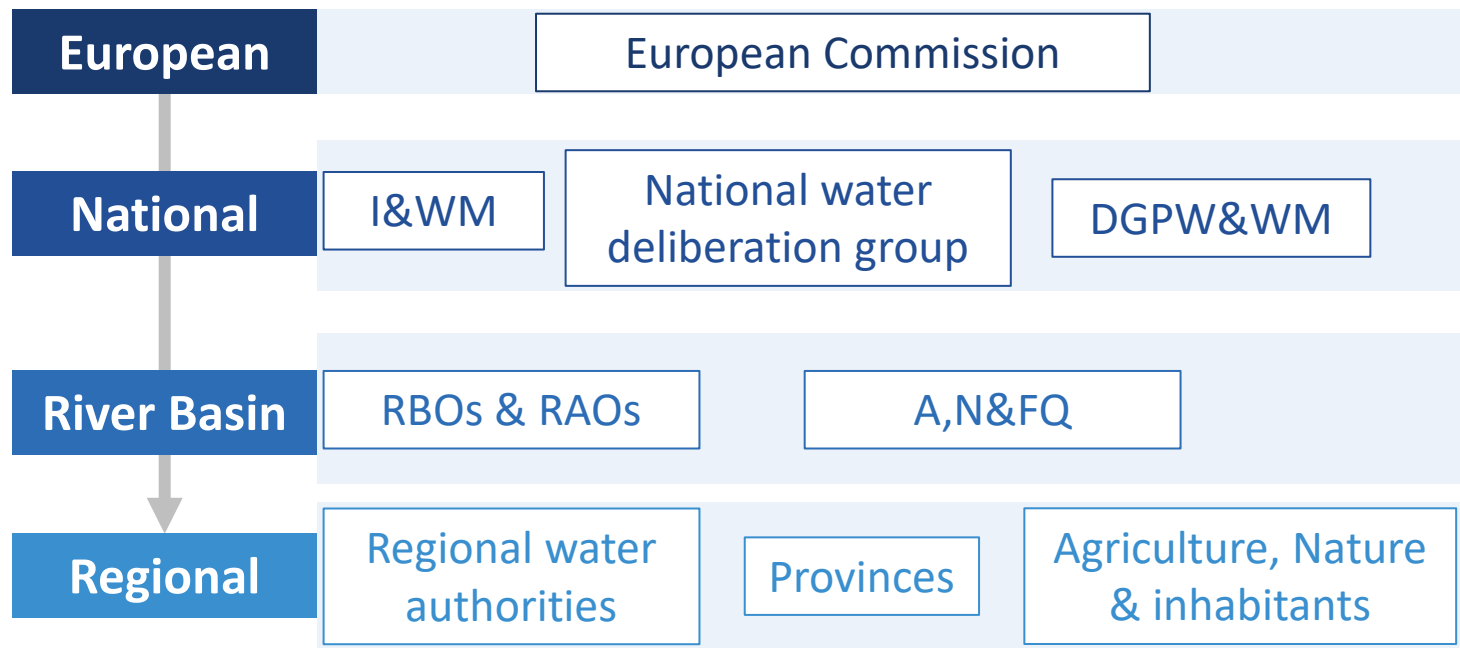
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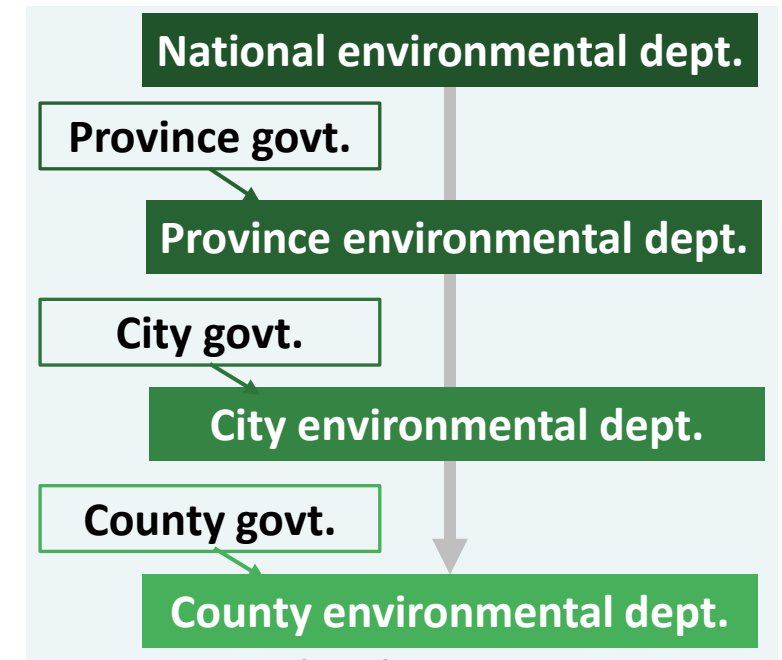


1. Introduction

- **Beyond individual stakeholders: who participate in the environmental governance?**
 - Hierarchical Governance: Multiple levels of govts. make decisions through interaction.
 - Misinformation through interaction: Govts. may not always implement the best environmental governance practices.



Hierarchical governance under Water Framework Directives, Europe



Hierarchical governance in environmental protection, China

1. Introduction

● Beyond the Public Good: Why do governments implement environmental governance?

- Political Rationality: The govt. maximizes its expected utility in governance practices.
- Internal Motivation: Raise environmental quality & lessen political risks.
- External Constraints: Objectives & assessments drive the govt's practices.

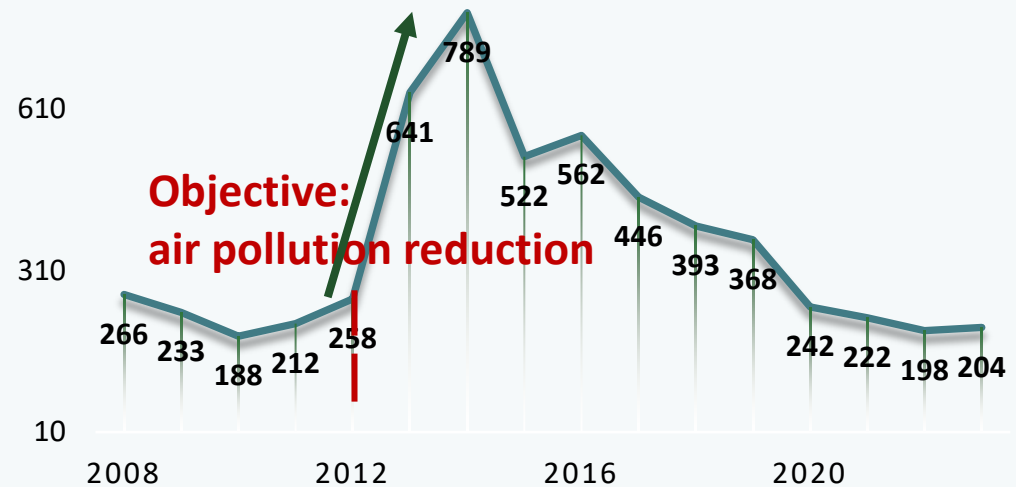
Investment on wastewater treatment in EU

20 (€ billion)



Investment on air pollution control in China

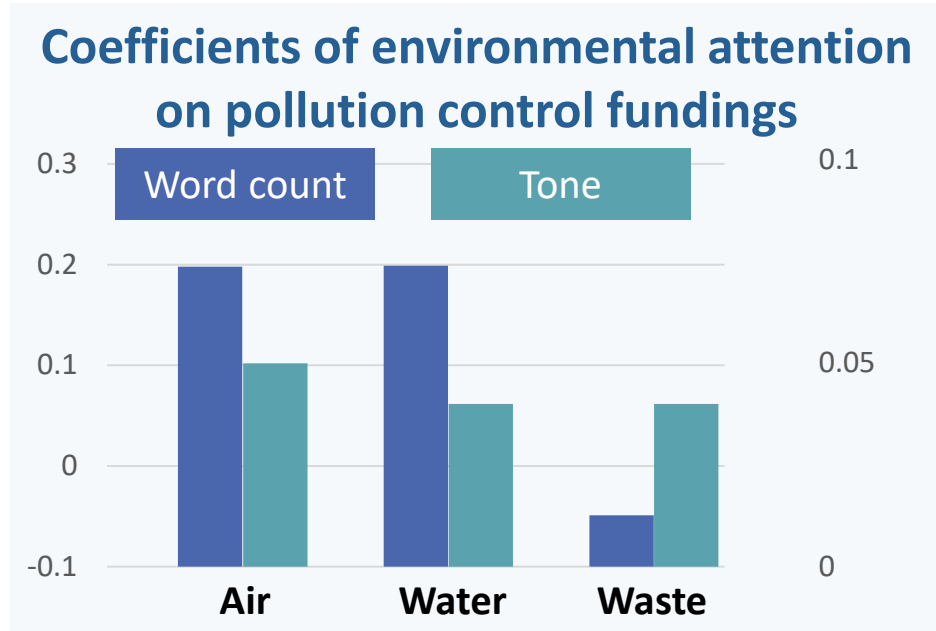
910 (CNY billion)



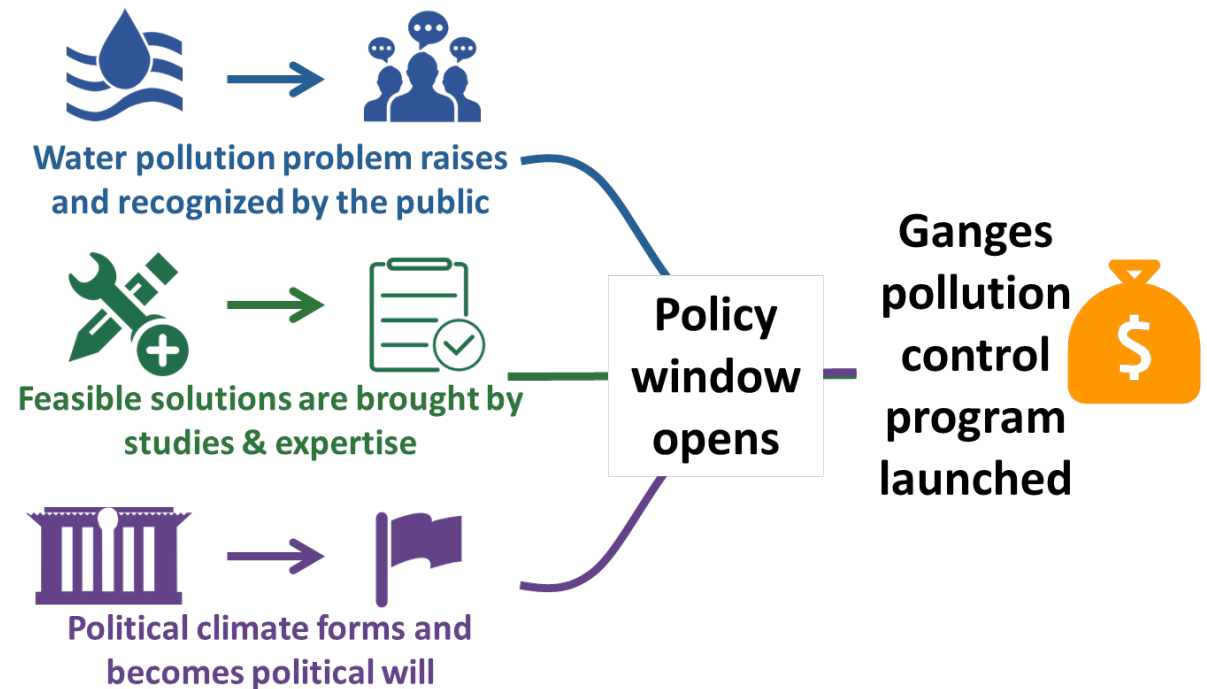
1. Introduction

● Beyond Fundings: What resources do governments invest in environmental issues?

- Attention is a scarce governance resource – advance of environmental fundings.
- Funding allocation relies on economic efficiency & problem orientation, plus attention.



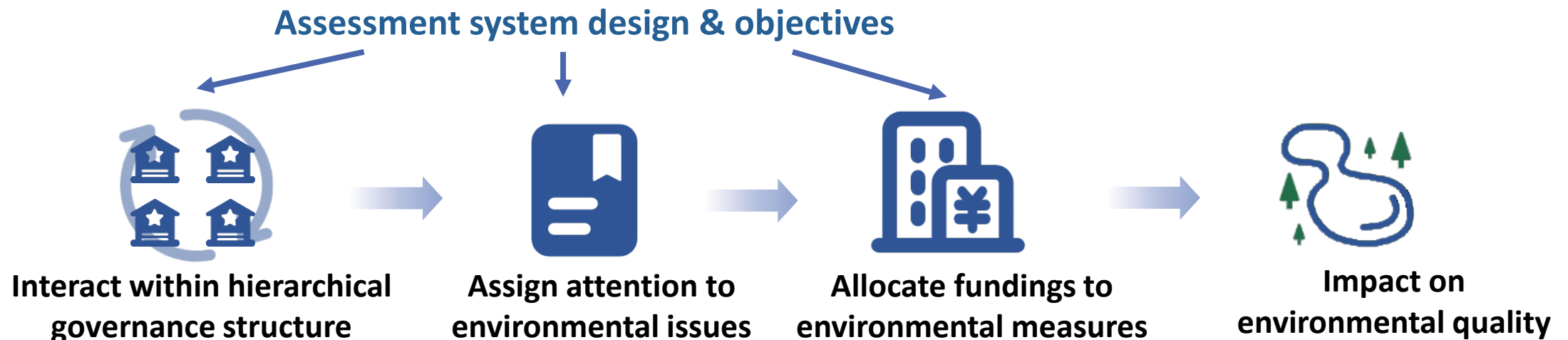
How ganges river pollution control got fundings



1. Introduction

● Unfold the cascading governance: Assessment-Attention-Funding-Impacts

- Quantifying the attention and funding on environmental governance.
- Clarifying key processes/factors in multi-level governmental decision-making.
- Identifying optimal assessment system designs for achieving environmental objectives.

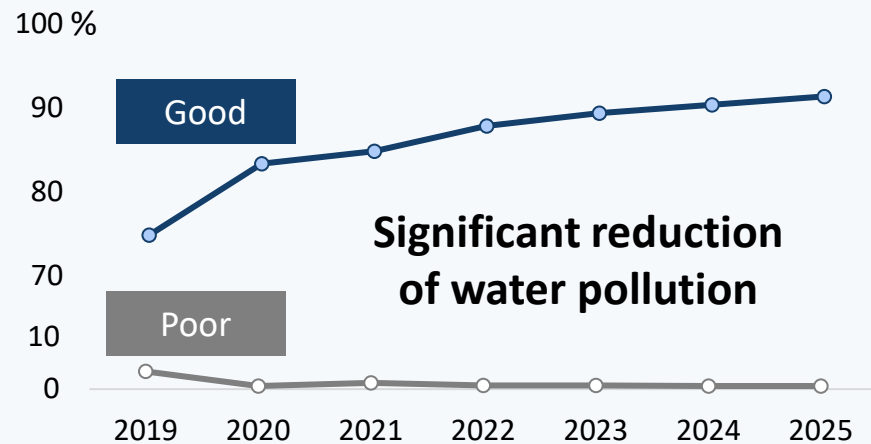


2. Case

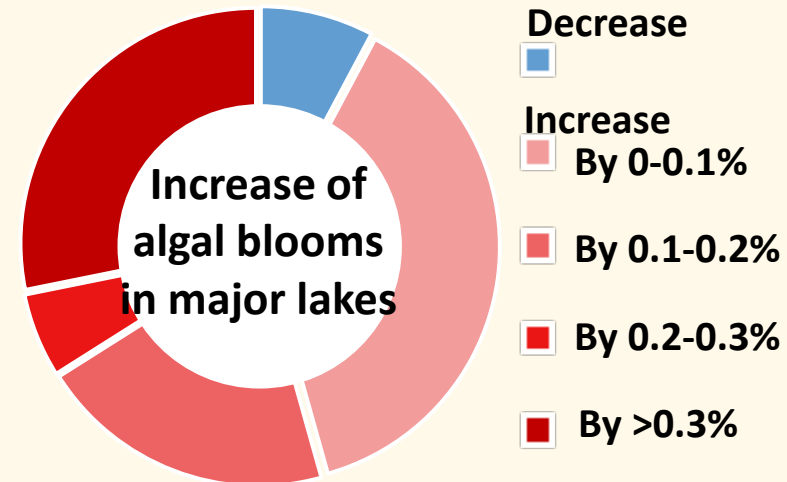
● Assessment objectives shift: water pollution controlling→ecological quality improving

- Focus on pollutant reduction objectives: physical/chemical indicators have improved.
- Disregard ecological conservation: ecological quality did not improve simultaneously.
- Shifts in objectives necessitate transformation in assessment systems.

Proportion of waterbodies with good / poor quality



Changes of algal blooms on lakes in 2003-2020



2. Case

- **Misinformation constrains the effectiveness of assessment system.**

- Some superior directives go ineffective when inferior govt. implements.
- Some implementations are strategically fake.
- Some information are concealed.

Insufficient communication



A city delayed the demolition of buildings in ecological conservation zones, though required by its superior.

Words rather than action



A city executed <10% of river conservation budget while claiming substantial attention.

Intentional misinformation

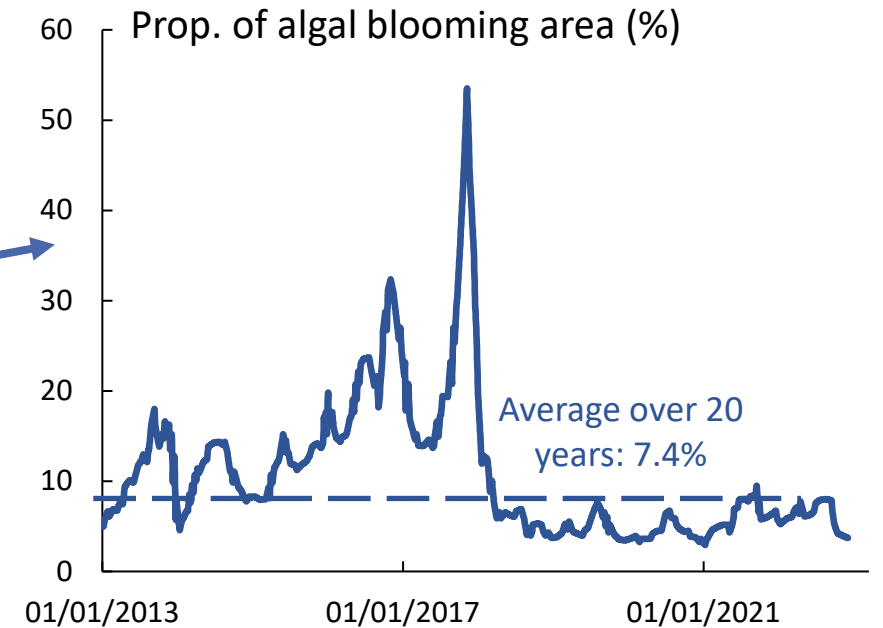
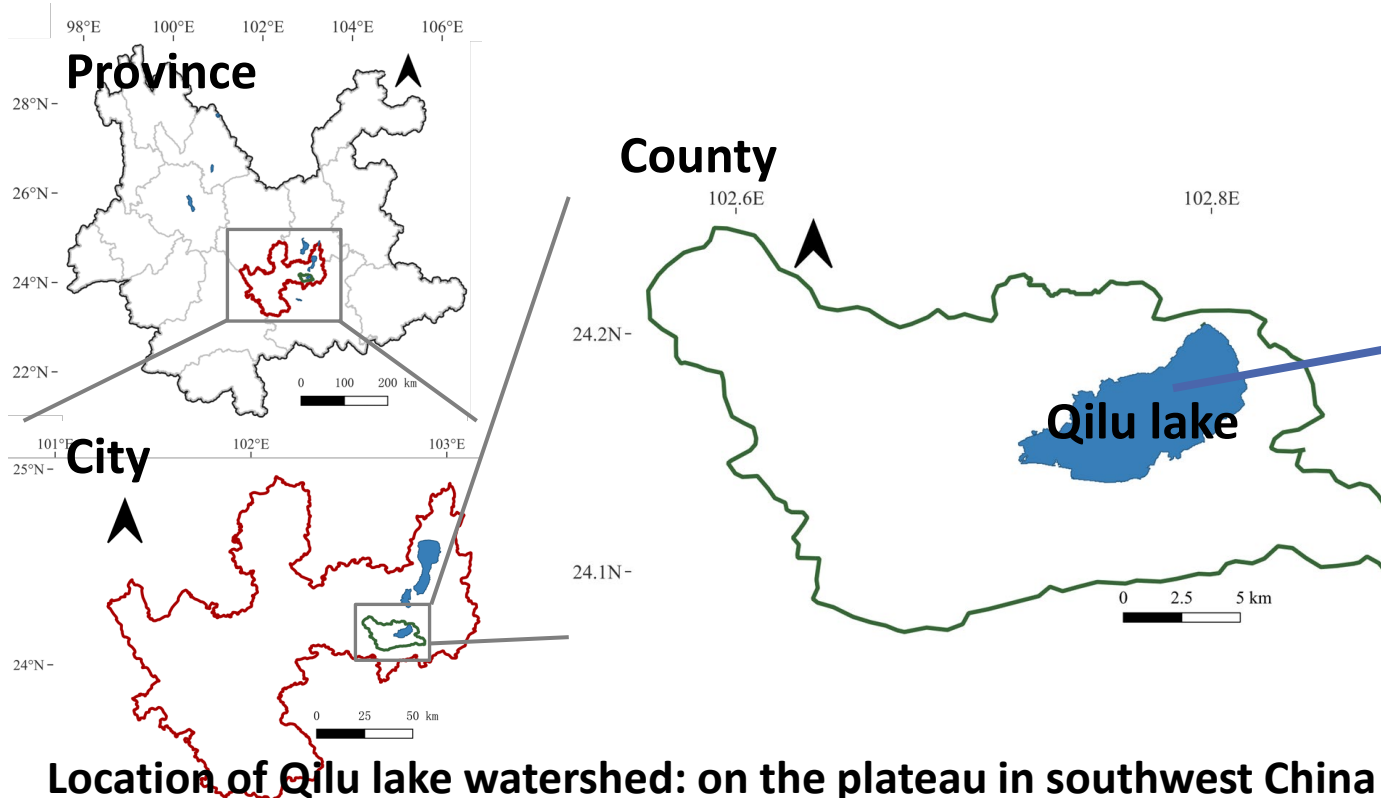


A county implemented illegal interference on monitoring station for fake water quality improvement.

2. Case

● Case area: watershed governance in Qilu Lake, Yunnan Province, China.

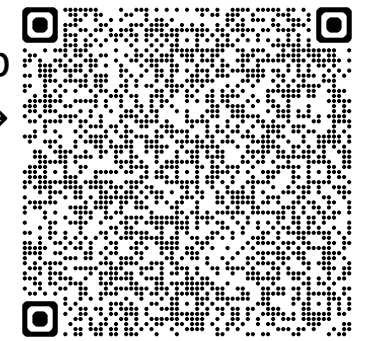
- Under the pressure of ecological objectives: substantial problem with deficient resources.
- Focal positions in multi-level governments: province, city, and county.



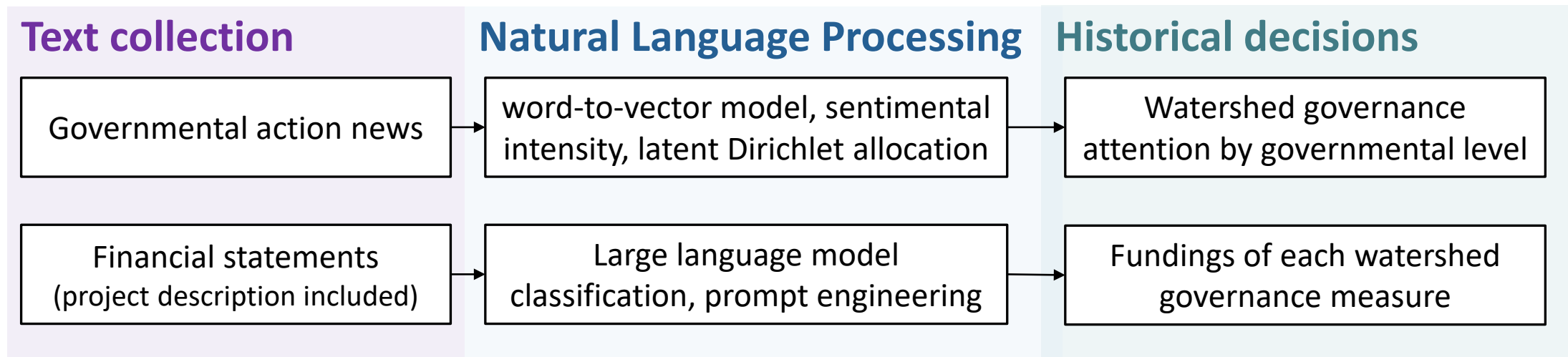
Prop. of algal blooming area in Qilu Lake, 2013-2024

3. Methods & Results

Refer to the paper with the same authorship
for detailed methodology on this part →



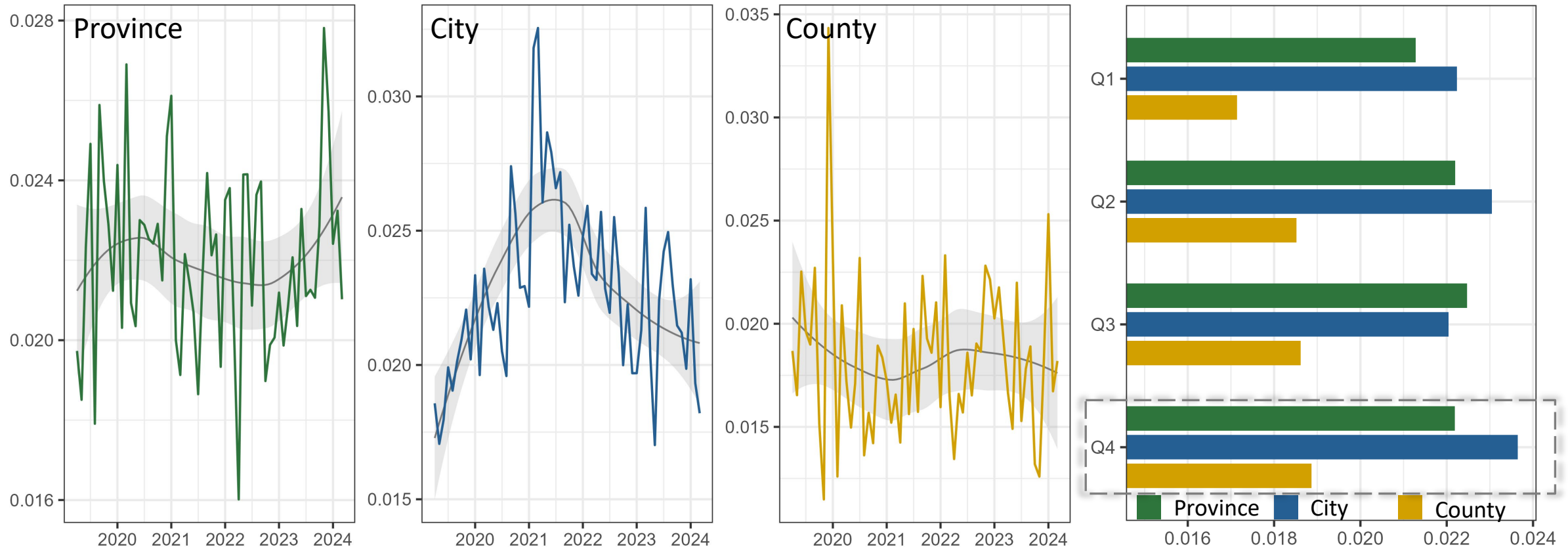
- **Simulate the process: governmental attention → funding allocation → environmental impacts to reveal the effects of the assessment system.**
- Natural Language Processing: extract attention/funding from administrative documents.
- Gaming model: multi-level governments adjust their attention along with other's signals.
- Measures assessment: rank measures according to economic, political, problem priority.
- Scenario assessment: evaluate diverse assessment system designs for comparison.



3. Methods & Results

● Governmental attention on watershed governance:

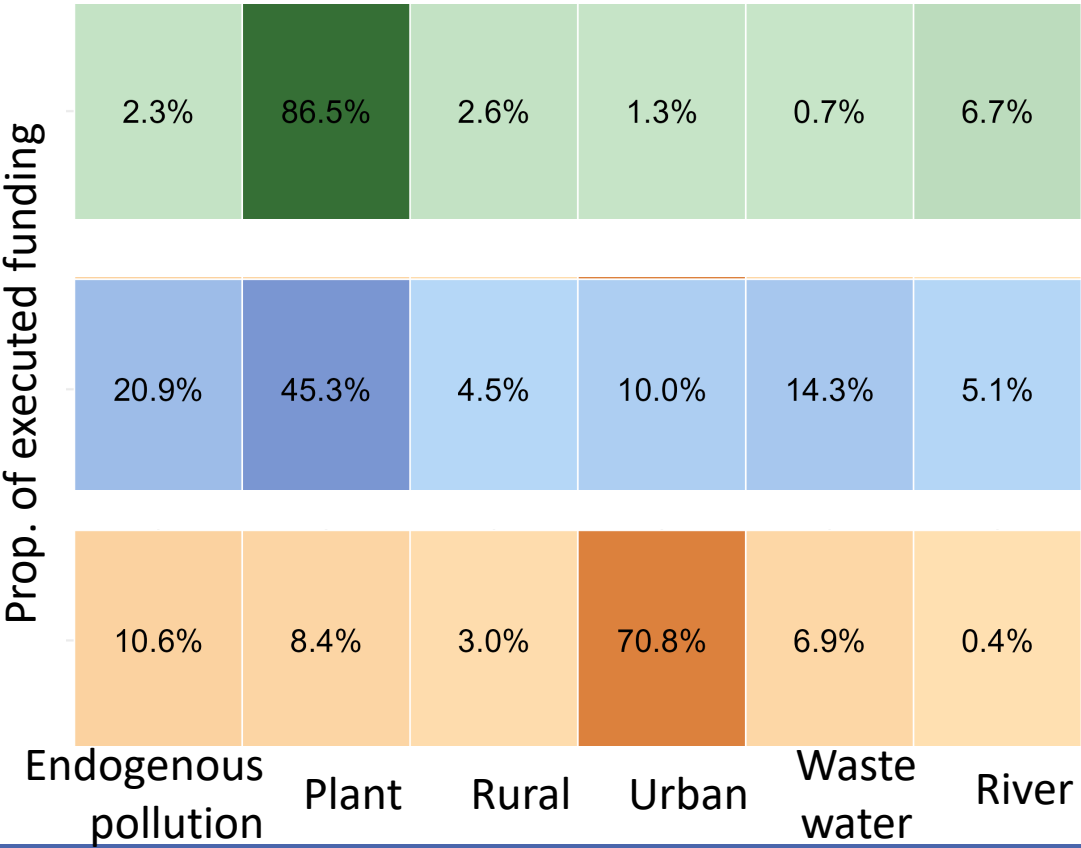
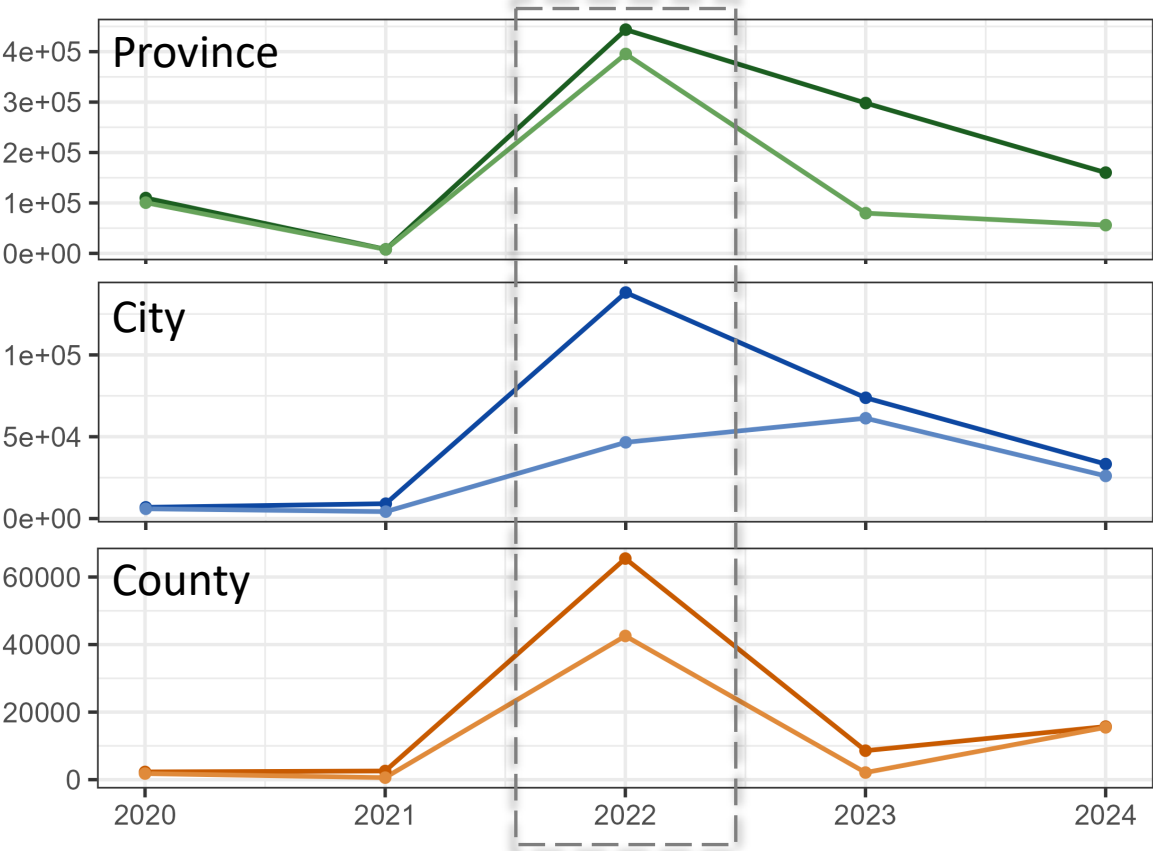
- Monthly fluctuations: Attention of 3 levels varies dramatically, lacking steady input.
- Peak in the 4th quarter: Strategical increase cues pressure from annual evaluation.



3. Methods & Results

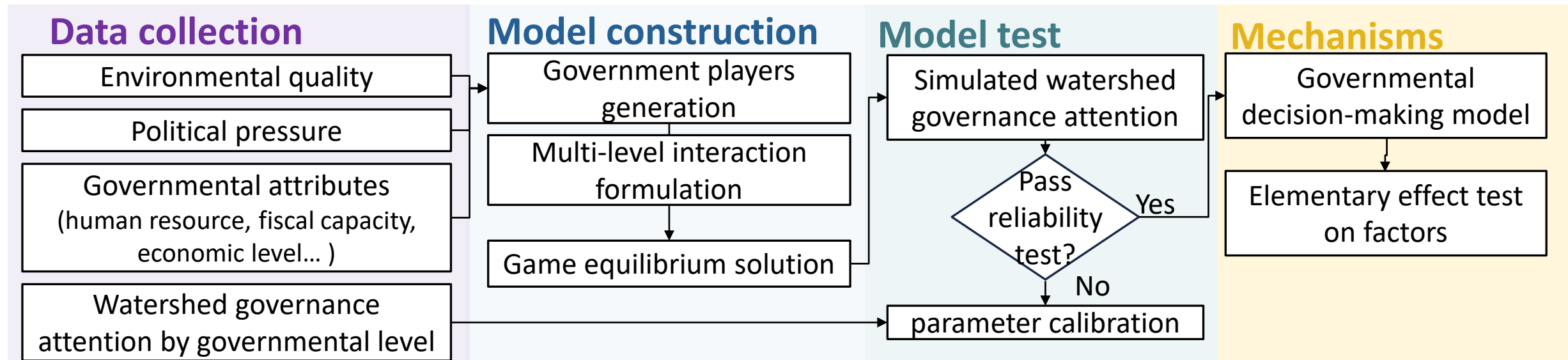
- **Governmental funding on watershed governance:**

- Budgets of all three levels heightened in 2022: potential interaction among govts.
- Plant & urban pollution control paths receive the most funding: difference among govts.



3. Methods & Results

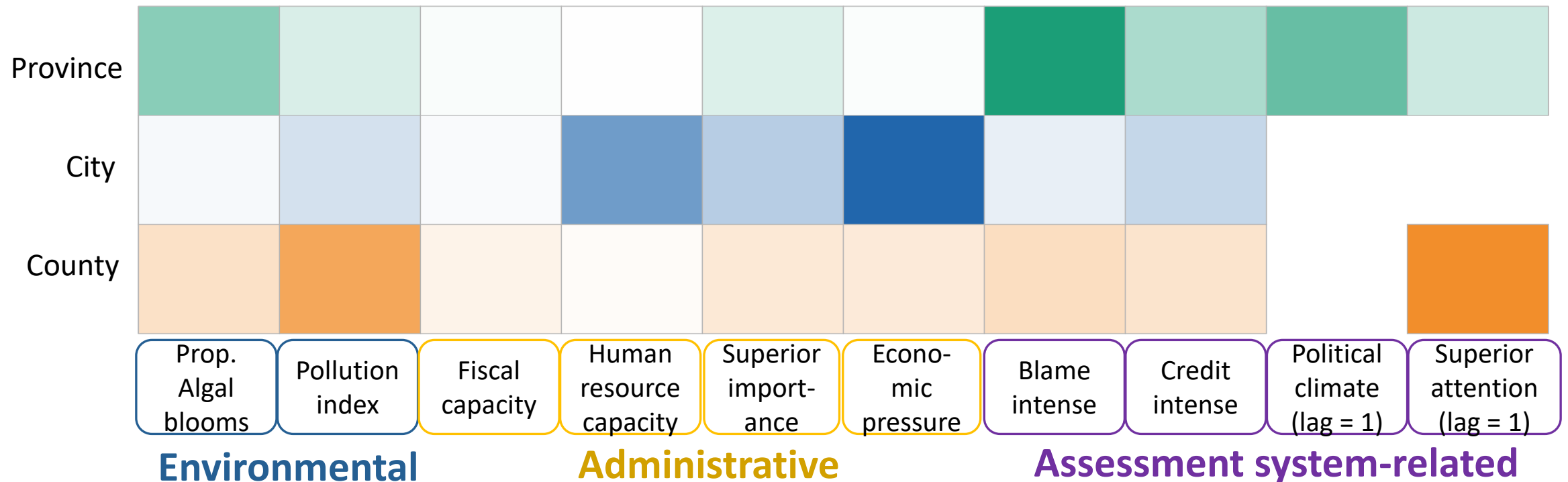
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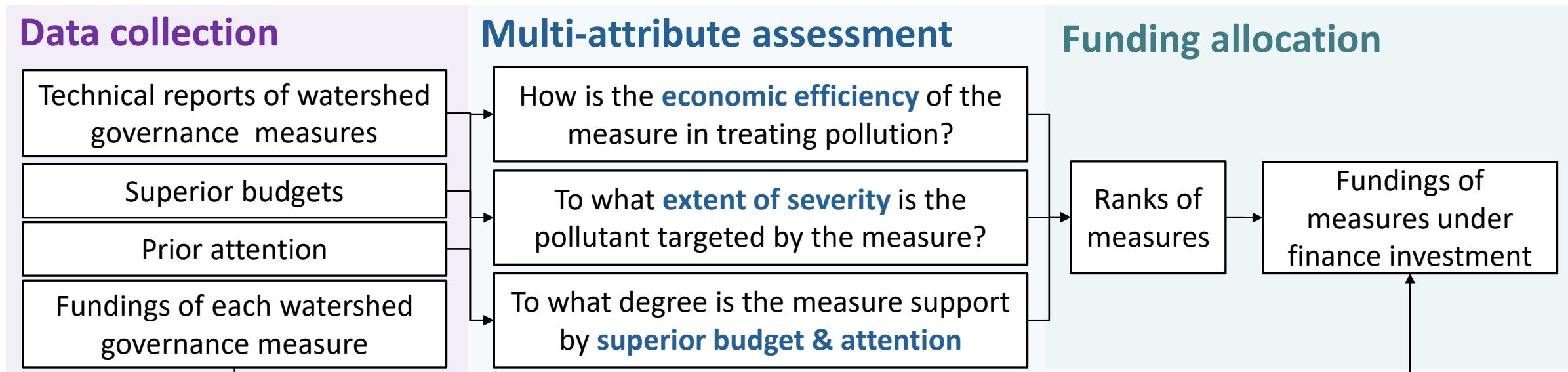
● Key factors in governmental interaction:

- Environmental quality & assessment system contribute to attention in province & county.
- Administrative factors contribute to attention in city, especially economic pressure.
- Superior's attention shows lagged effects (1 month).



3. Methods

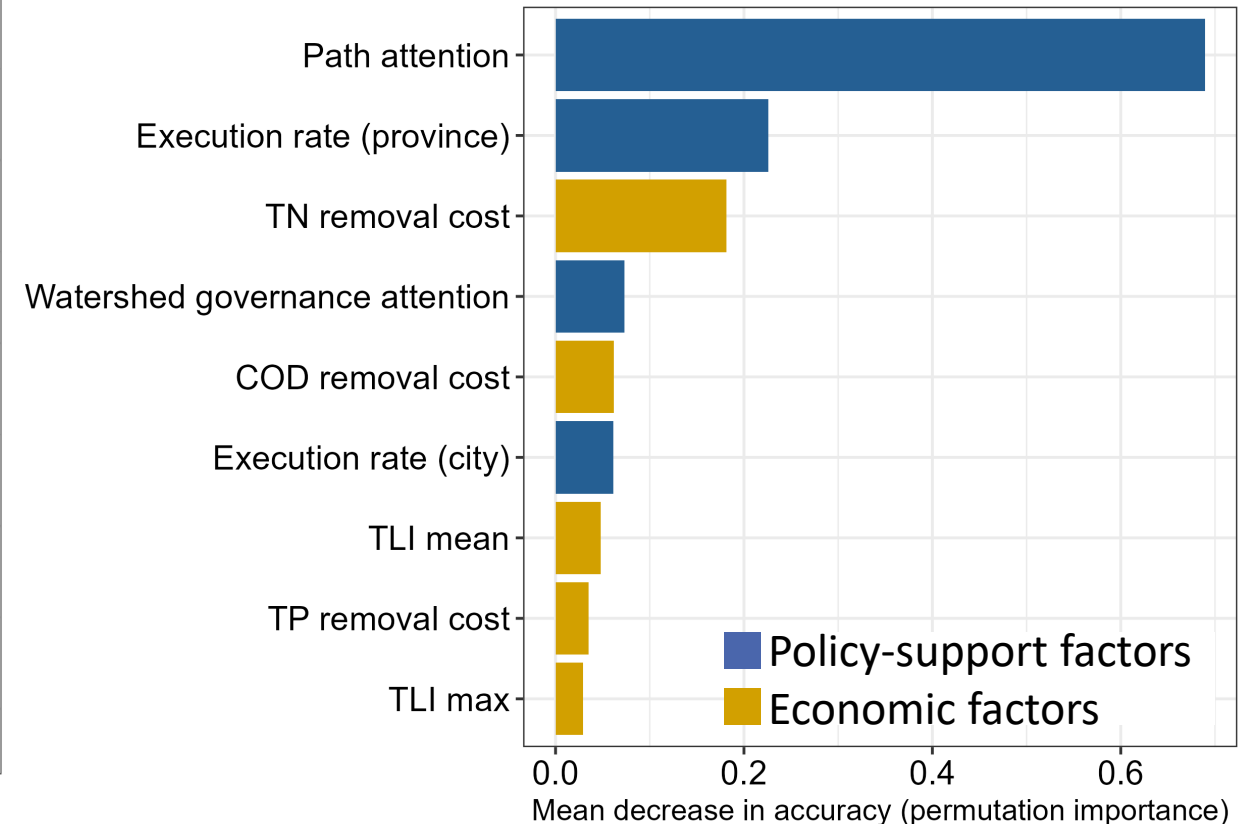
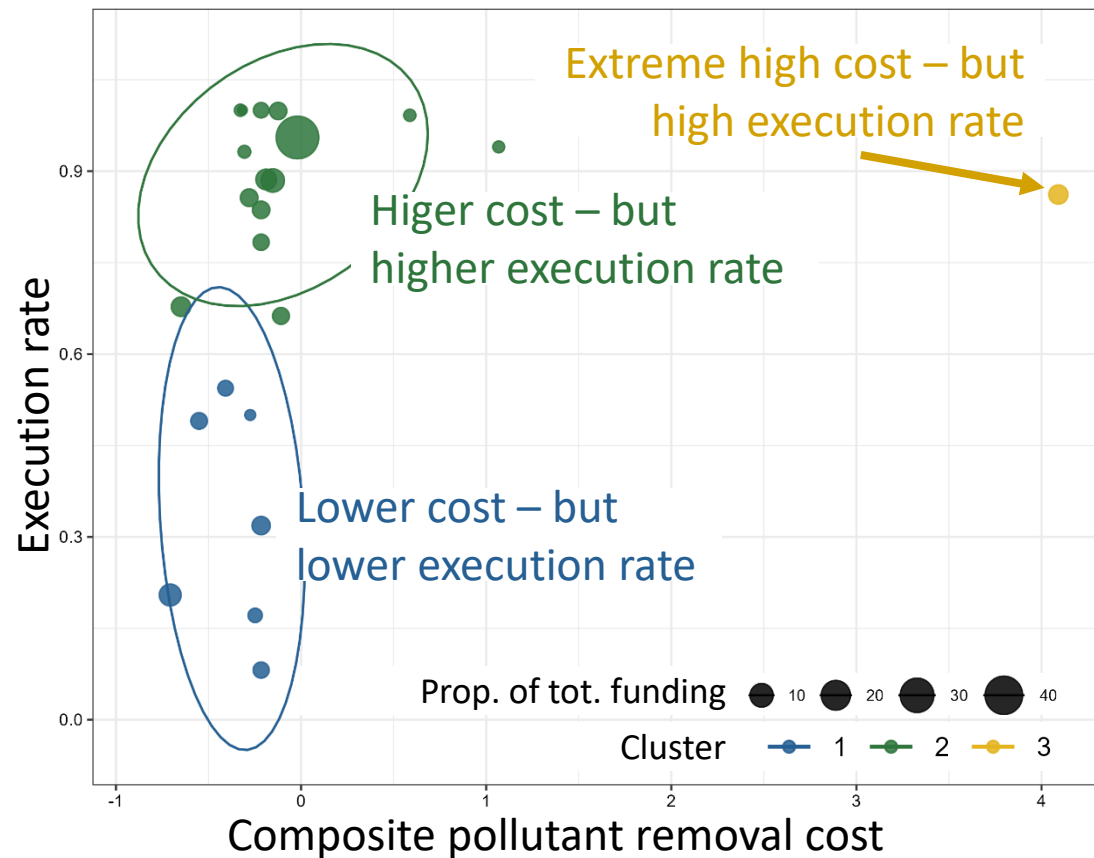
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3. Methods & Results

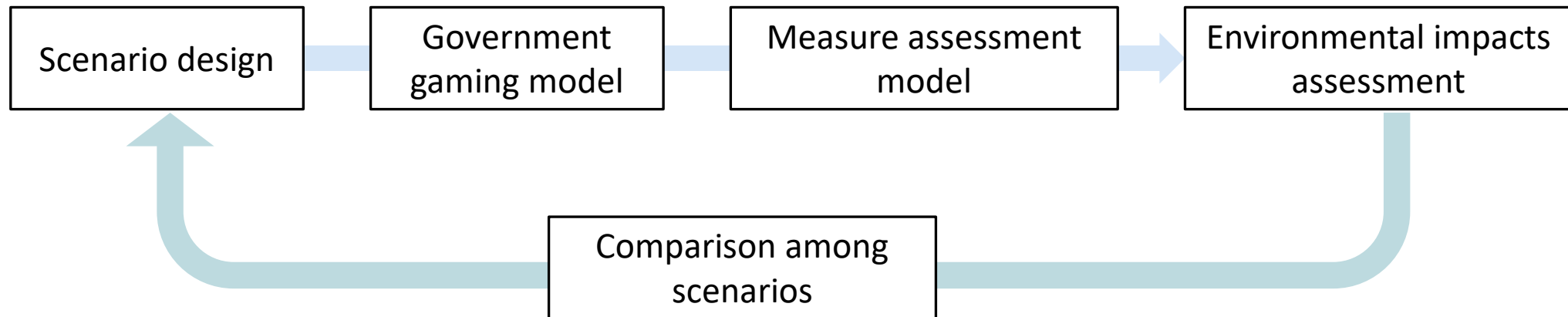
● Funding allocation on measures beyond cost-benefit analysis:

- Economic efficiency can hardly determine the funding allocation on measures.
- Measures efficient economically and supported by policies gains higher fundings.



3. Methods & Results

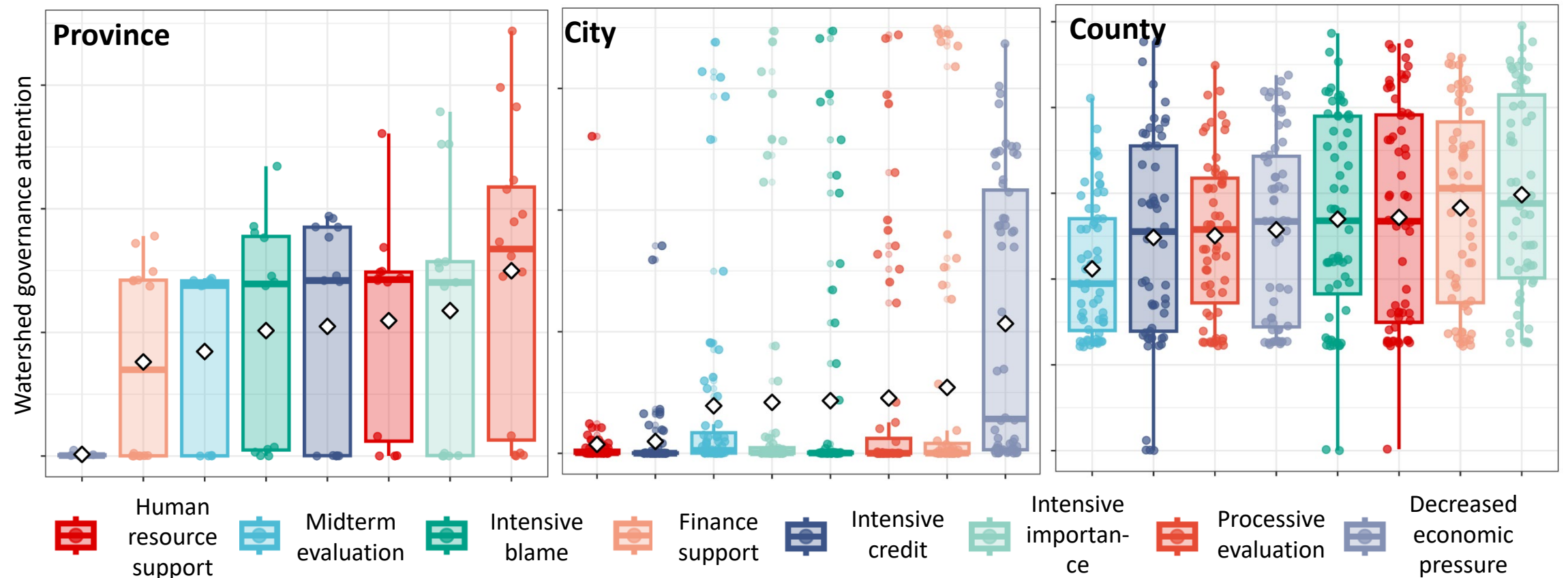
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3. Methods & Results

- Differentiated assessment system design for multiple levels:

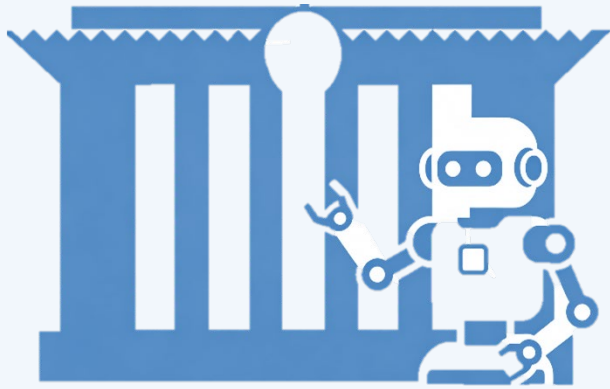
- Decreased economic pressure scenario → attention improve on city level.
- Intensive importance → attention improve on county level.



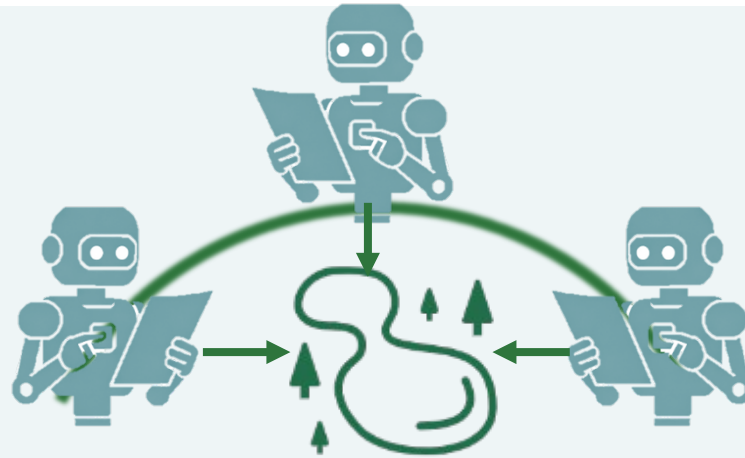
4. Conclusion and suggestions

- **Key factors for governmental attention include environmental quality, human resources, fiscal resources:** provide administrative or fiscal incentives to encourage higher governmental attention input.
- **Governmental attention & superior budget contributes more than economic efficiency:** the weight of economic efficiency should be stressed during superior budget making and local government attention allocation.
- **Higher attention (thus more funding & better environmental quality) is achieved under optimal scenarios:** take gradual evaluation, fiscal support & lessening economic assessment in assessment system design.

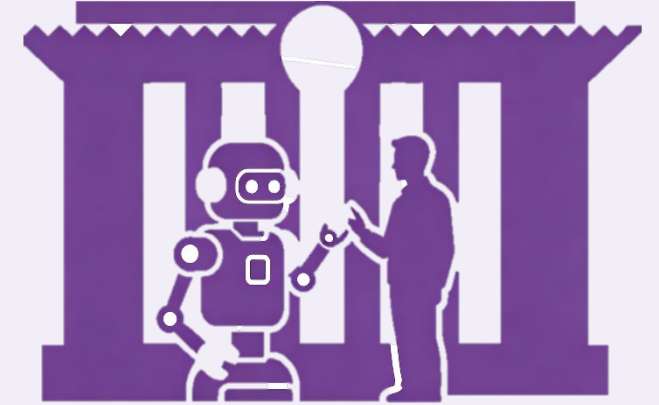
5. Outlook: AI Agent for environmental governance



- **AI Agent as governmental actors:** Moving beyond individual simulation to organization simulation with a different set of decision-making logic.



- **AI Agent for pre-policy assessment:** Linking multi-level governmental agents to forecast their reaction to a policy to-be-release, avoiding risks of mal-implementation.



- **AI Agent for governance integrity:** Delegating specific decision-making tasks to honest-by-design AI agents to eliminate human bias and oversights.



Let's continue the conversation!

Message me your questions or comments in the IAIA26 app.

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