

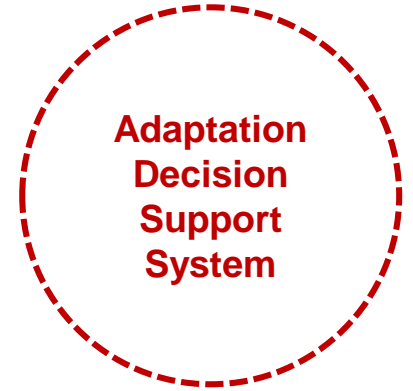
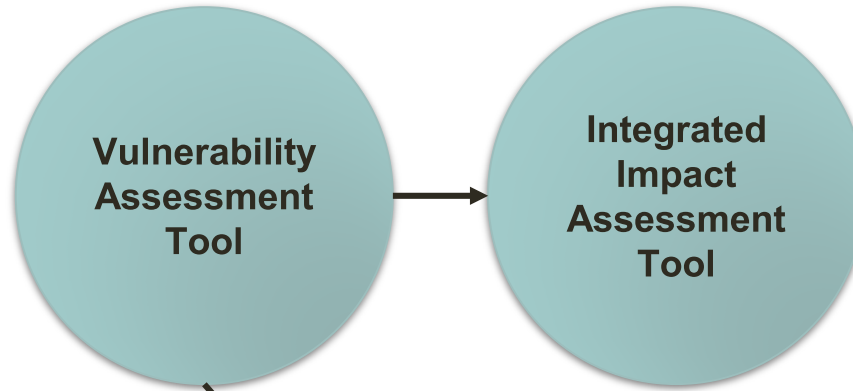
Strategizing Decision Support System for Long-term Local Climate Adaptation Planning

Jung Hee Hyun and Dong Kun Lee
Seoul National University

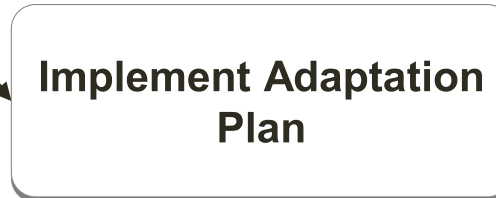
24th AIM International
Workshop
November 6, 2018

Tools for Korea's Adaptation Planning

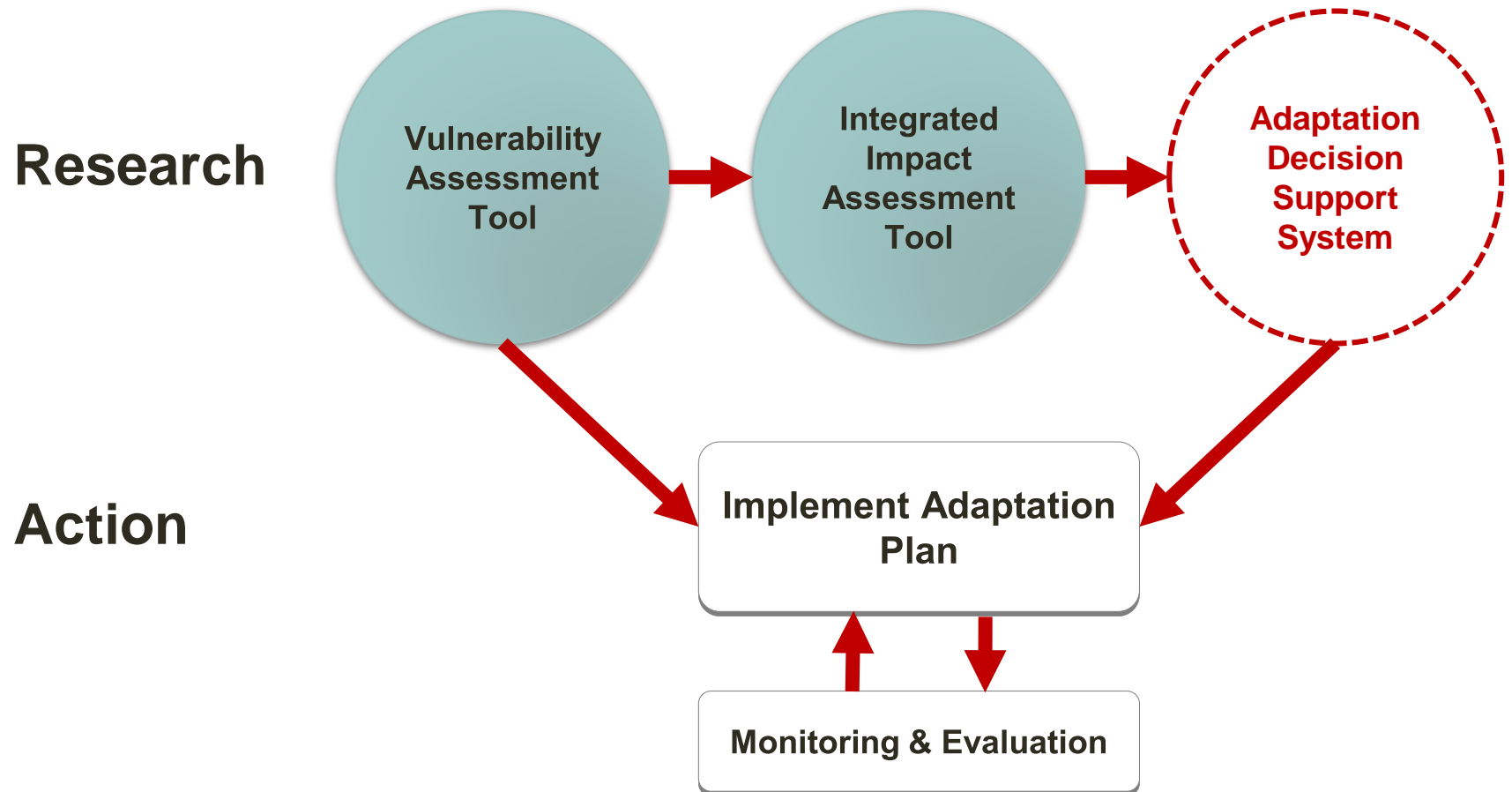
Research



Action



Tools for Korea's Adaptation Planning

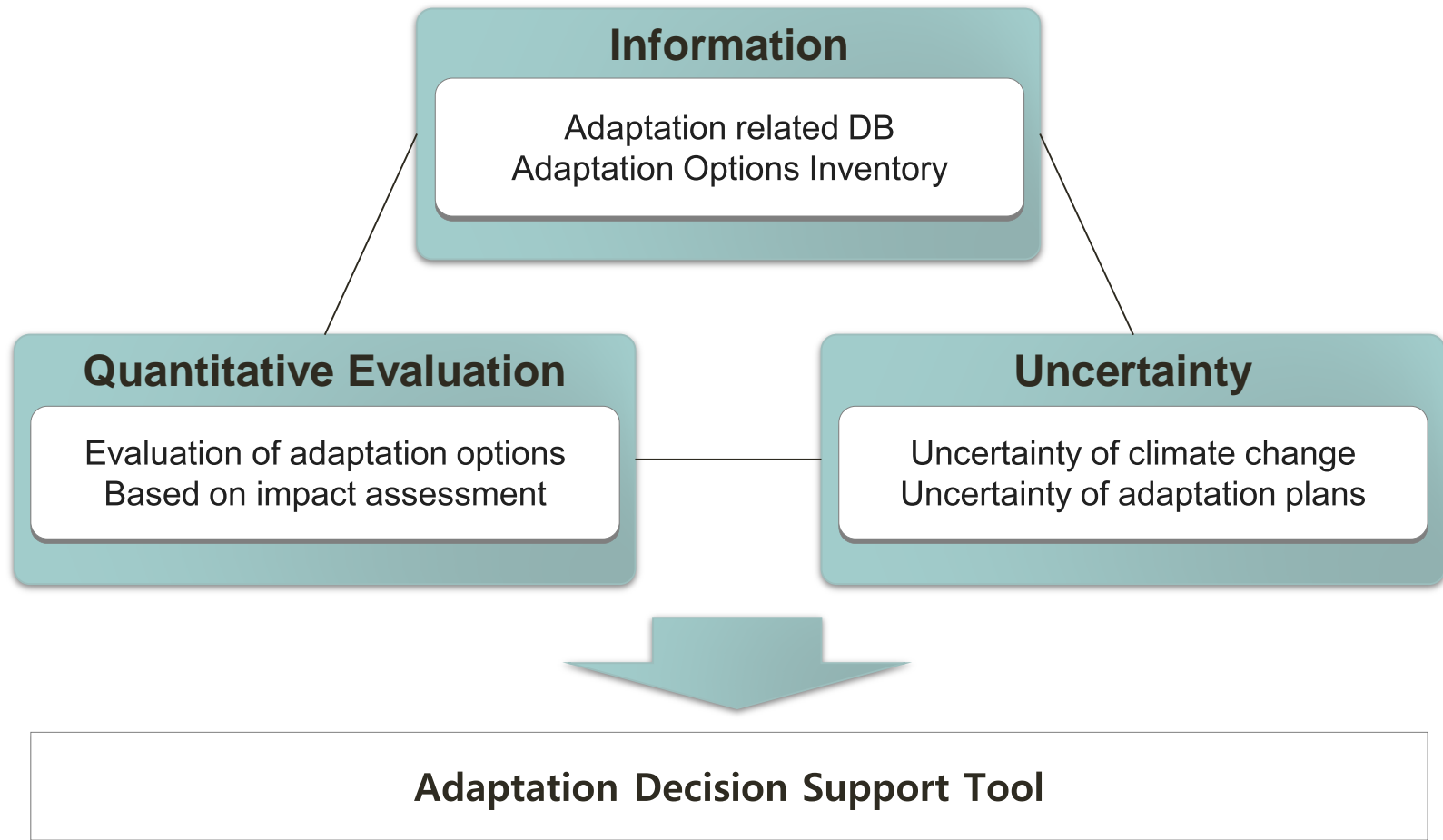


Adaptation Decision Support System project

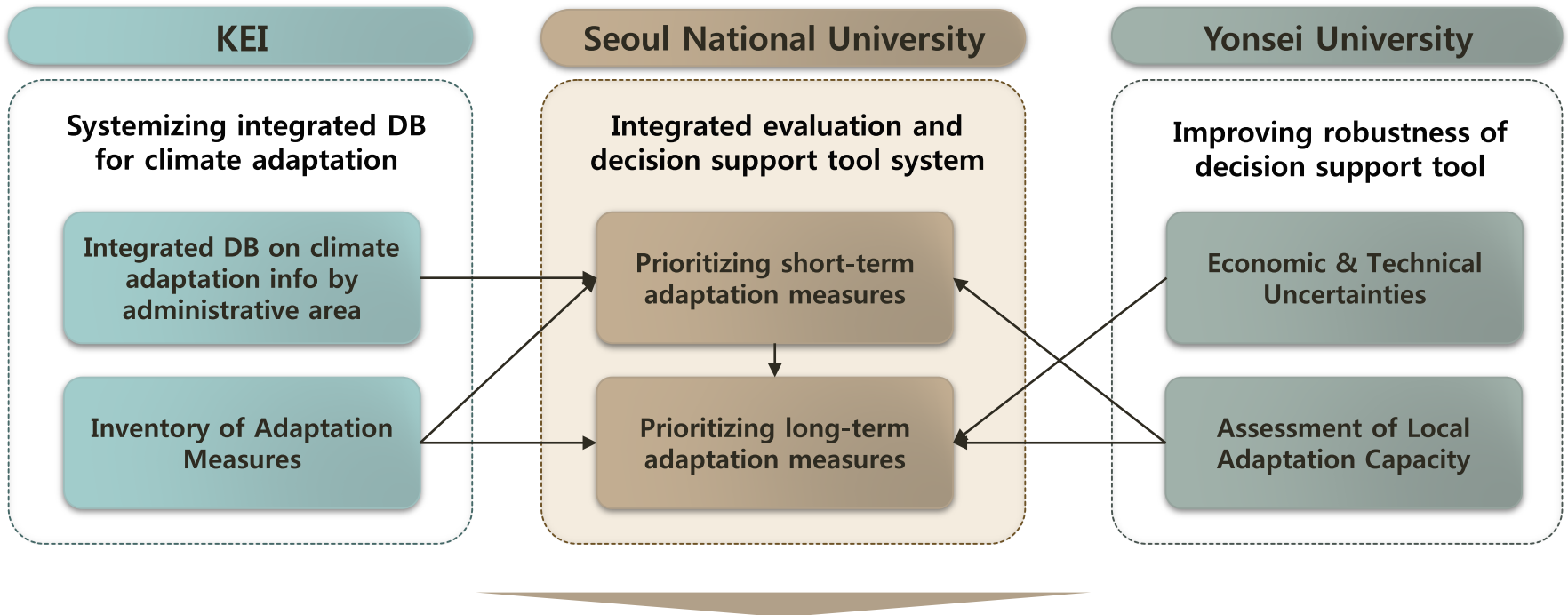
Development, Implementation and Enhancement of an
Integrated Decision Making Support Tool for
Selecting Climate Change Adaptation Policies

- Sponsored by Ministry of Environment
- Project Period: 2018.08.02~2020.12.30 (2.5 years)

Adaptation Decision Support System project



Project Team



What are the decision support tools needed by the local governments?
What adaptation plan should be developed using this?

Prioritizing Adaptation Measures for Decision Support

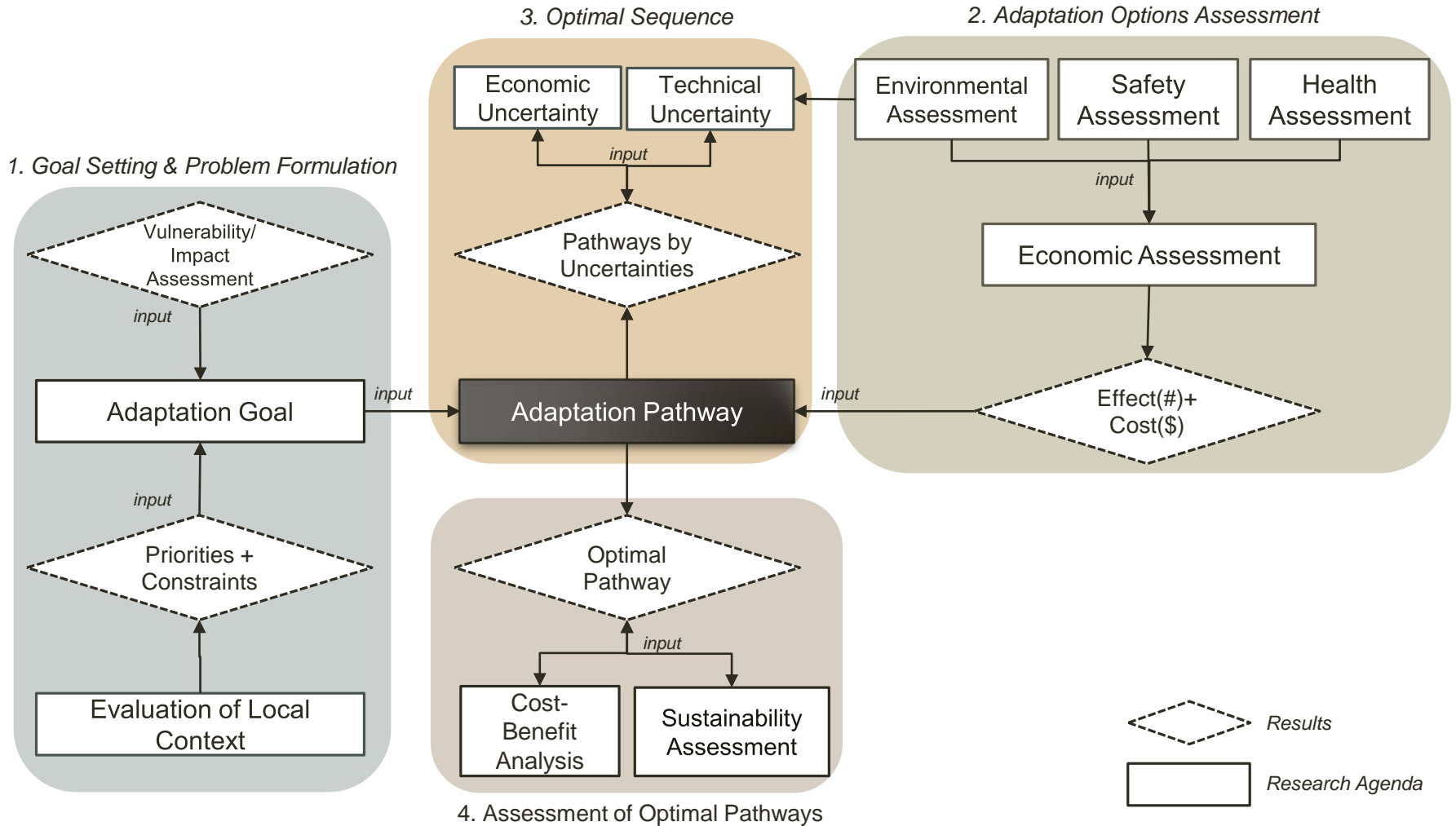
Short-term

- Static plan
- Qualitative assessment
 - Survey based
- Meso-scale adaptation agendas/challenges

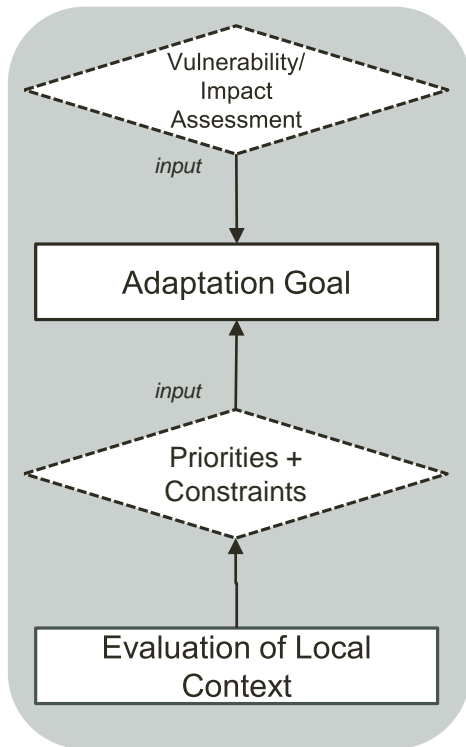
Long-term ✓

- Dynamic plan
- Quantitative assessment
 - Physical modeling based
- Specific adaptation options/technologies

Model Framework: Optimizing Adaptation Pathways



Goal Setting and Problem Formulation



I. Planning horizon, $t = 90$ years

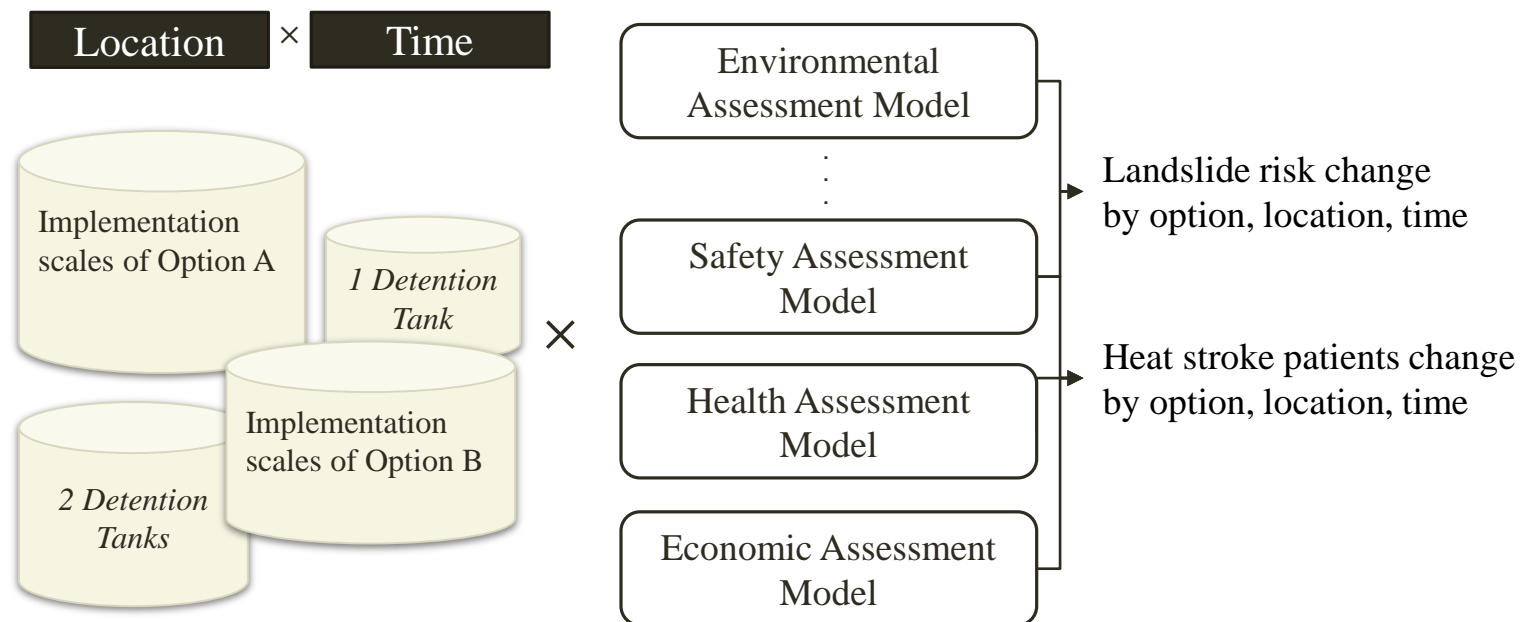
II. Objectives

- *ex) Min. damage (50%) from multi-hazards, Min. deaths (30%) from extreme heat*

III. Constraints, *budget = \$50M*

IV. Prioritization of goal, *multi-hazard 80%, extreme heat 20%*

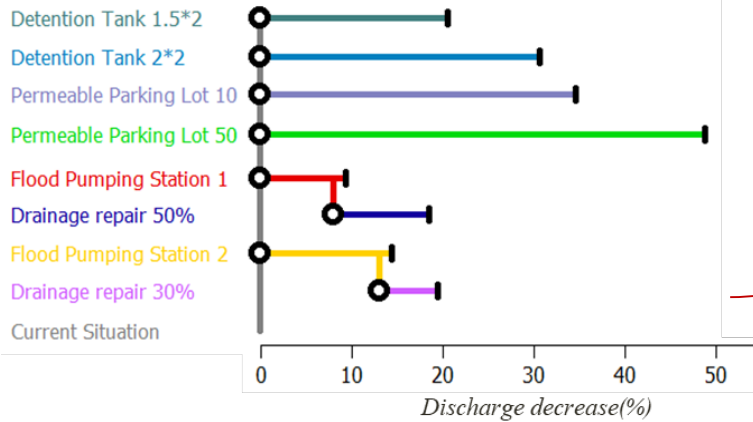
Adaptation Options Assessment



Options are assessed across four dimensions: scale, space, time, sector

Determining Optimal Sequence of Adaptation Pathways

1. Evaluate Adaptation Options



$$\text{For municipality A} = w_1 (\alpha_{1ij}, \alpha_{2ij} \dots \alpha_{nij}) + w_2 (\beta_{1ij}, \beta_{2ij} \dots \beta_{nij}) + w_3 (\gamma_{1ij}, \gamma_{2ij} \dots \gamma_{nij})$$

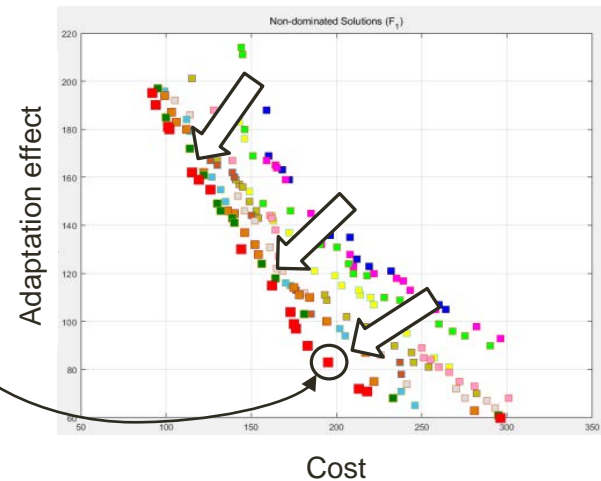
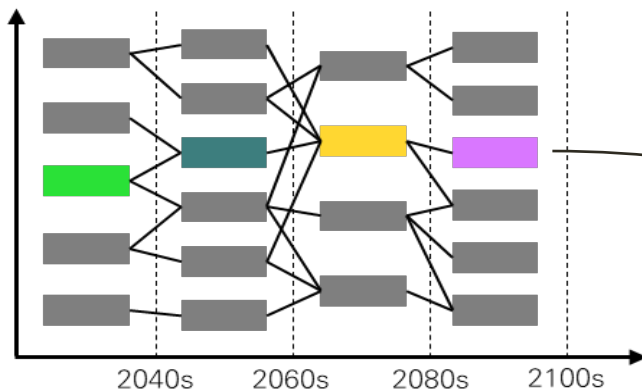
$\alpha, \beta, \gamma = \text{flood pumping, drainage repair, permeable lot}$
 $i = \text{cost}$

$j = \text{adaptation option's effect}$

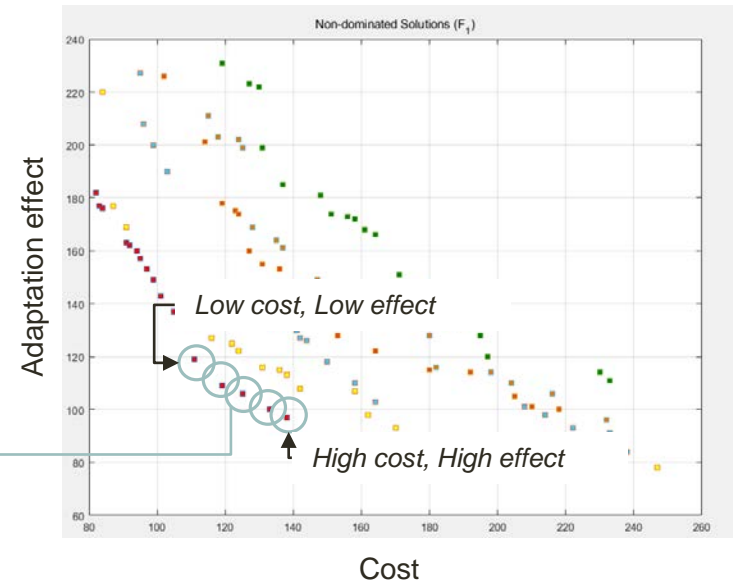
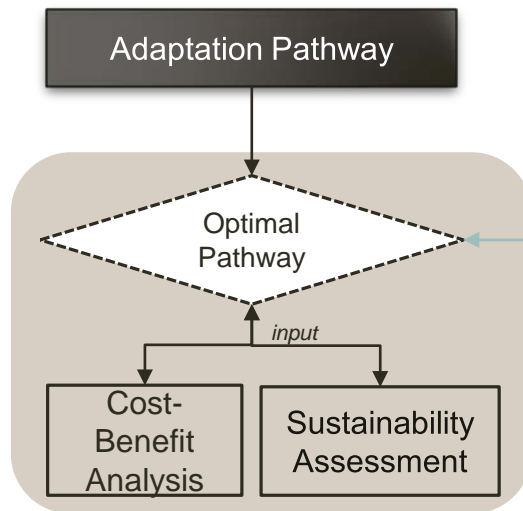
$w_1, w_2, w_3 = \text{priority weights between options}$

↓ Optimization Algorithm

2. Sequence Options



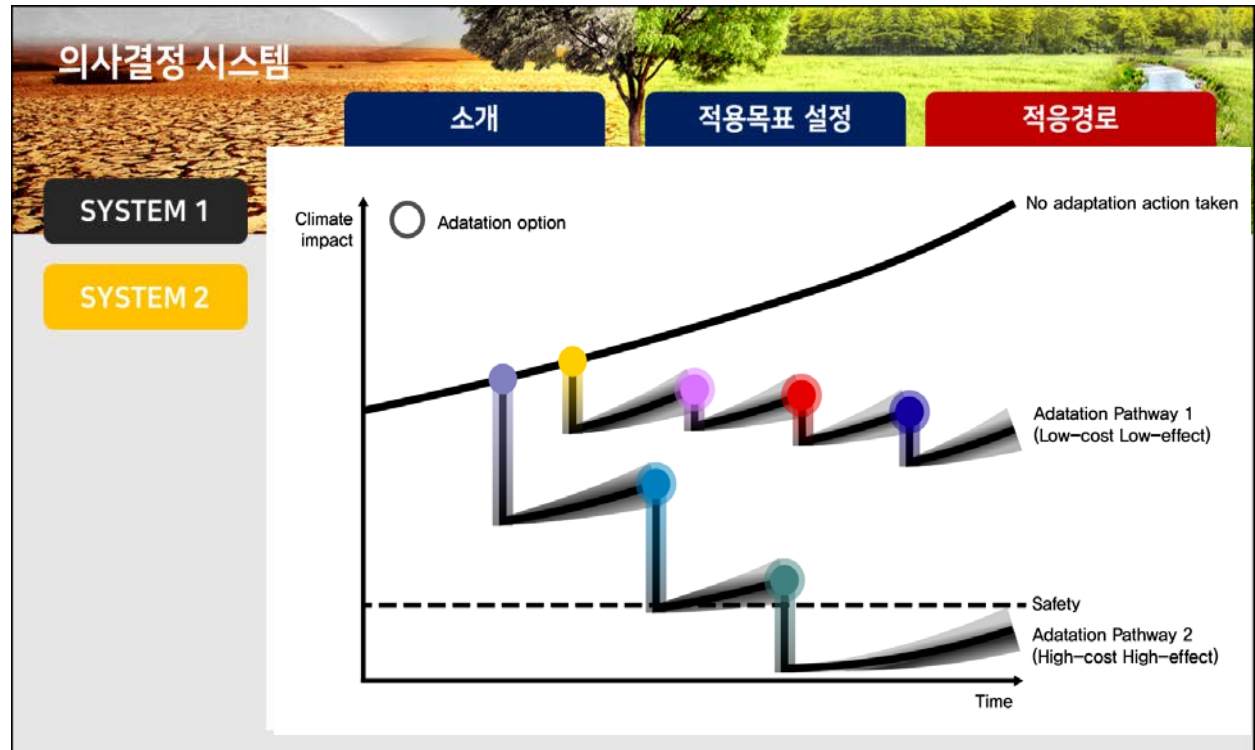
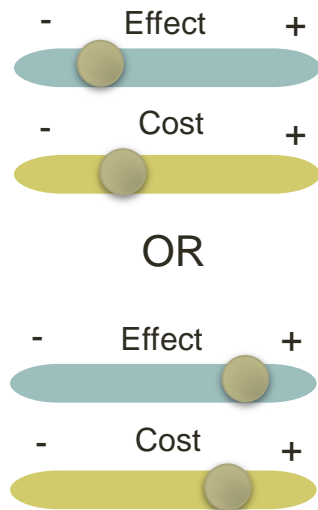
Assessment of Optimal Pathways



Aiming for “transformational”, “sustainable” adaptation plans

Adaptation Pathway Options for Decision-maker's Preference

Decision Maker's Preference Input



Conclusion & Future Research

System will include three main features:

- Adaptation DB + Inventory of Adaptation technologies
- Prioritization tools for short-term + long-term (adaptation pathway)

The direction of decision support system for adaptation planning:

1. Supports clearer goal setting based on local adaptive capacity,
2. Scientific Evaluation of adaptation measures should be tailored to local contexts,
3. Enable decision makers to respond to the uncertainties of future climate change by projecting a range of adaptation pathways

Thank you!