

Development of platform for impact assessment models

Development of framework for decision support integrated impact assessment
platform and application technology for climate change adaptation
(DIRECTION)



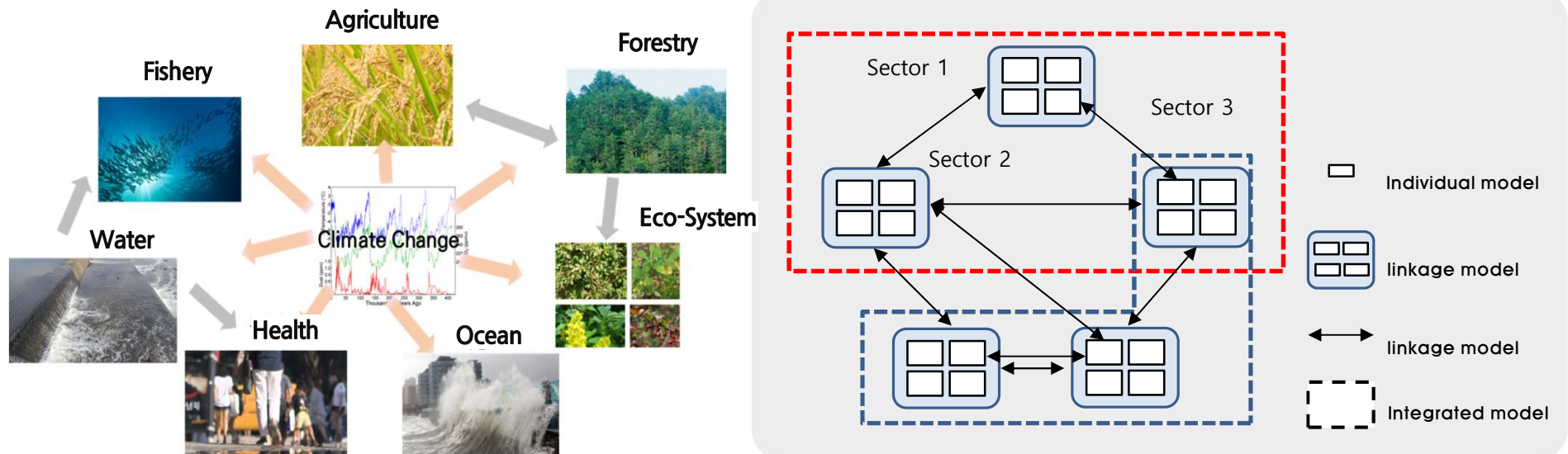
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Background

- Lack of **integrated impact and vulnerability assessment** based on scientific evidence
 - Climate change impact and vulnerability assessment **without considering across different sectors**
 - **Use of different DB for each study, Index-based assessment with weight values by expert opinions**
 - Need to establish **scientific climate change adaptation policies with minimization of mal-adaptation**
 - Development of '**Risk Assessment**' to communicate with adaptation policy
 - ✂ to utilize setting priority of adaptation plan

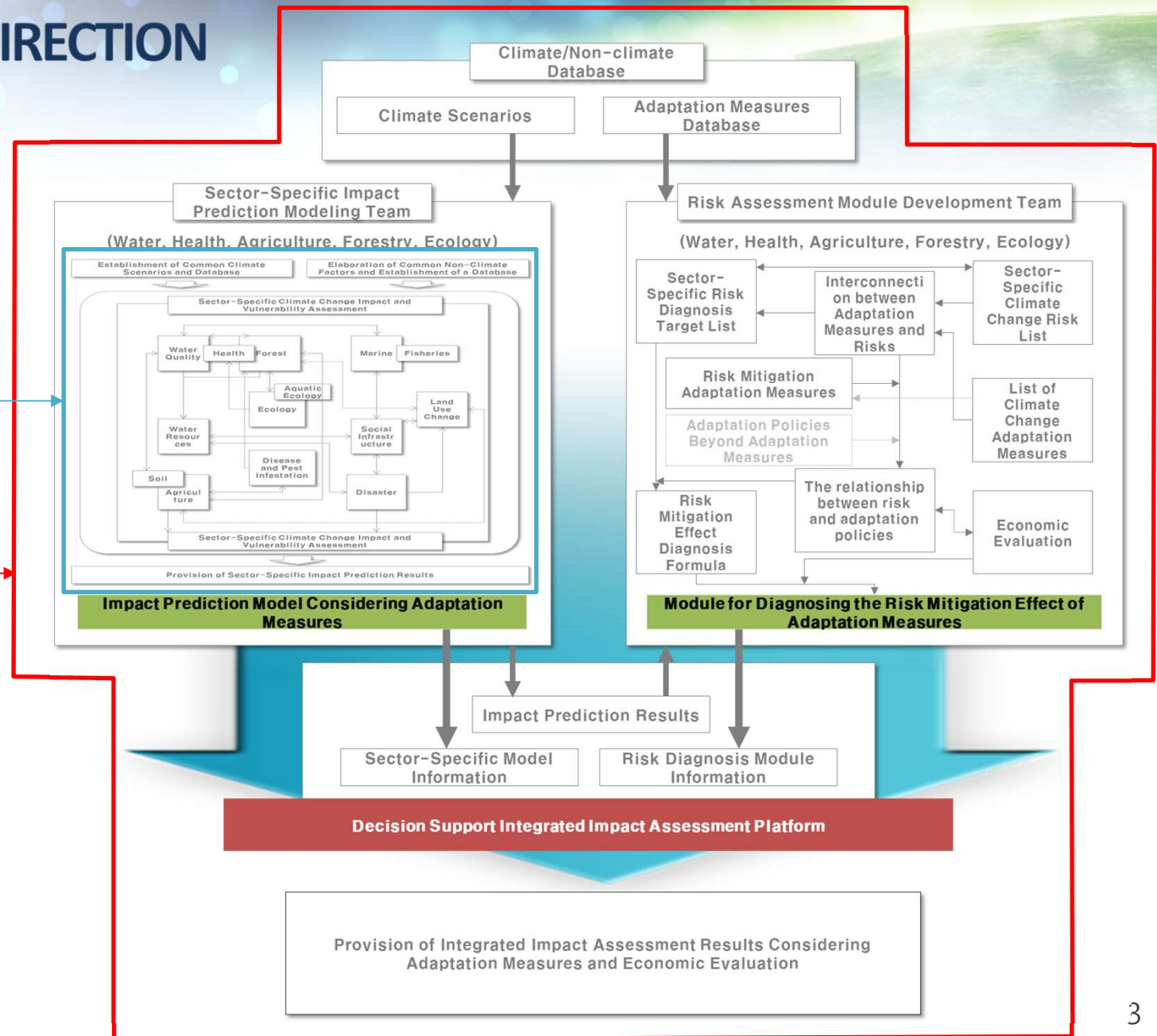
< Concept of Integrated Assessment Model >



MOTIVE vs. DIRECTION

MOTIVE

DIRECTION



MOTIVE vs. DIRECTION

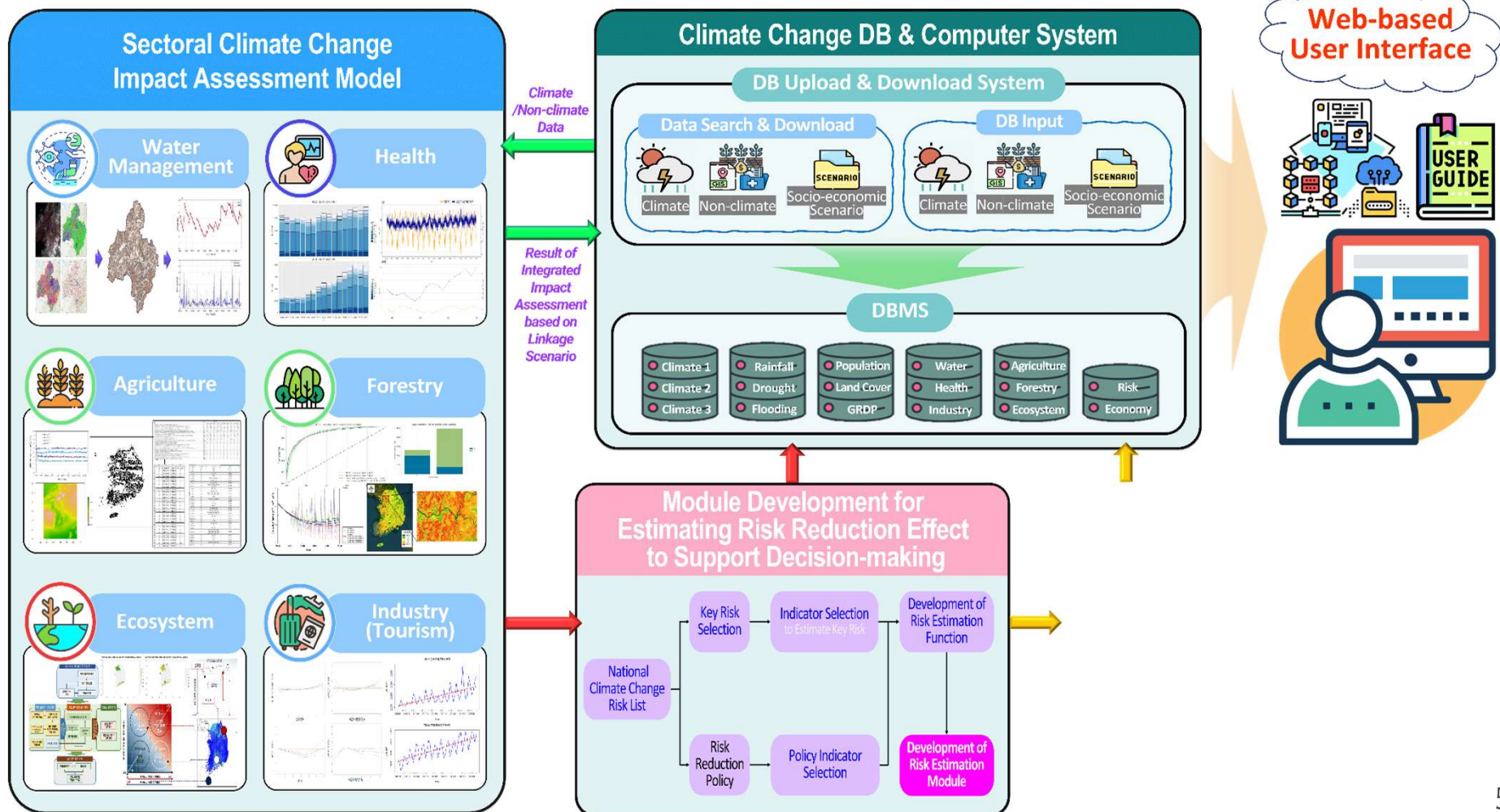
- Integrated Impact Assessment Platform for Adaptation Measures Support
 - (MOTIVE) Providing impact assessment results and image information by local government through result inquiry.
 - (DIRECTION) User-driven model operation and result presentation centered on impact assessment simulation and result inquiry.
- Decision support is necessary for selecting sector-specific impact assessment items reflecting the opinions of policymakers and evaluating the effectiveness of adaptation measures.

	MOTIVE	DIRECTION
Outcome	Integrated Impact Assessment Model	Decision-Support Integrated Impact Assessment Platform
Composition	Intra-sector and Inter-sector Impact Assessment Model	Intra-sector and Inter-sector Impact Assessment Model, Evaluation Module for Risk Reduction Effect , Evaluation Module for Economic Effect
Result	Projected Impact Results of Climate Change	Projected Impact Results of Climate Change, Risk Reduction Effects Considering Adaptation Measures , and Economic Evaluation of Risk Reduction Effects
Utilization	Utilization of Sectoral Impact Assessment due to Climate Change	Utilization for Decision-Making in Diverse Sectors in Selection for Adaptation Measures to Cope with Climate Change

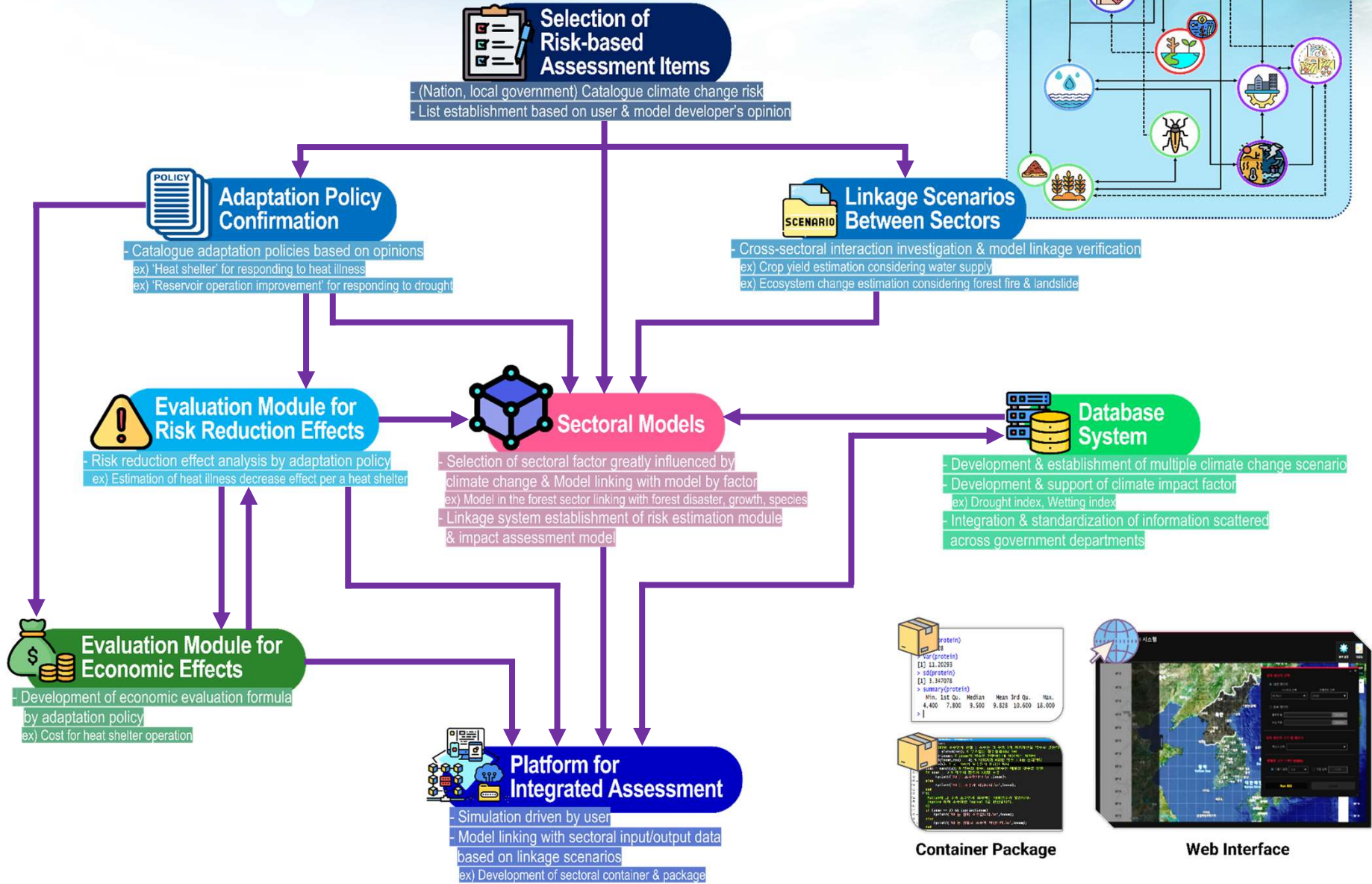
Goal

“Decision Support Integrated Impact Assessment Platform

for Supporting the Establishment of Climate Change Adaptation Policy”



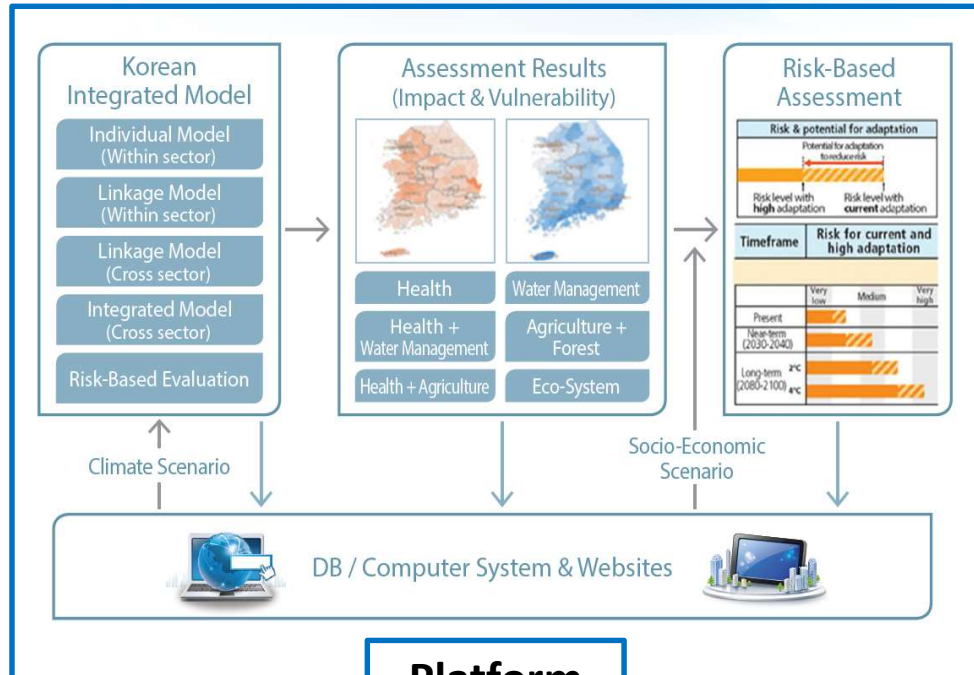
DIRECTION Development Procedure



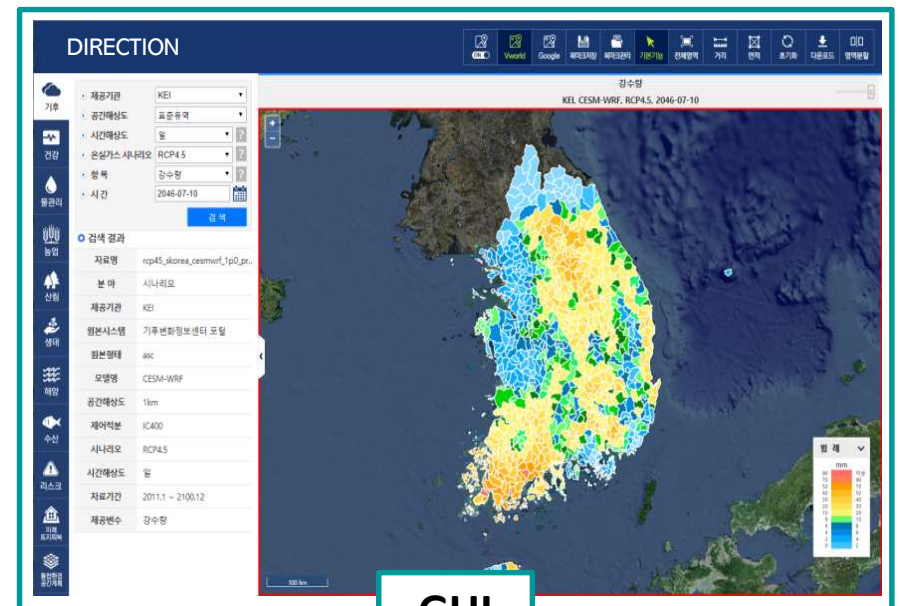
Linkage Scenarios for Models

CASE			Linked elements			
1	Agriculture	-	Water(Drought)	Irrigation water quantity	→	Water shortage
2	Agriculture	-	Water(Drought)	Evapotranspiration	↔	Evapotranspiration
3	Agriculture	-	Water(Water quality)	Soil loss	↔	Soil runoff
4	Forestry(Wildfire)	-	Ecosystem	Probability of wildfire occurrence	↔	Habitat/Species changes
5	Forestry(Landslide)	-	Ecosystem	Probability of landslide occurrence	→	Habitat/Species changes
6	Forestry(Wildfire)	-	Water(Water quality)	Probability of wildfire occurrence	→	Soil runoff
7	Forestry(Wildfire)	-	Water(Water quality)	Probability of wildfire occurrence	→	Outflow
8	Water(Drought)	-	Ecosystem	Outflow	→	Species changes
9	Water(Drought)	-	Ecosystem	Drought index	→	Species changes
10	Water(Water quality)	-	Ecosystem	Outflow	→	Species changes
11	Agriculture	-	Health	Rice paddy area change	→	Excess number of patients
12	Agriculture	-	Industry	Crop yield change	→	Food industry sales
13	Health	-	Industry	Excess deaths, Excessive number of inpatients	→	Number of tourists, Sales
14	Forestry(Wildfire)	-	Industry	Probability of wildfire occurrence	→	Number of tourists, Sales
15	Forestry(Landslide)	-	Industry	Probability of landslide occurrence	→	Tourism sports sales
16	Forestry(Wildfire)	-	Health	Probability of wildfire occurrence	→	Number of patients with respiratory diseases

Platform Development and Use



Platform

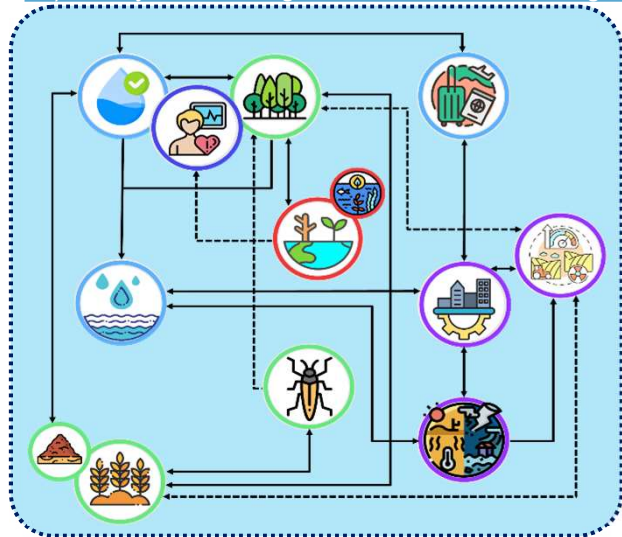


GUI

Platform Development and Use

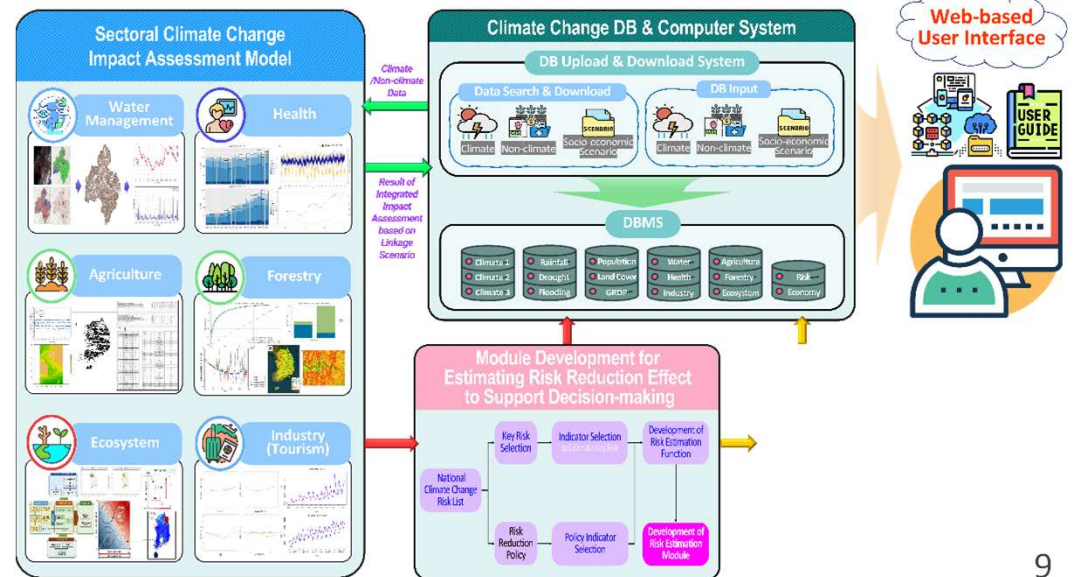
SCENARIO Linkage Scenarios Development

- Cross-sectoral interaction investigation & model linkage verification
- ex) Crop yield estimation considering water supply
- ex) Ecosystem change estimation considering forest fire & landslide



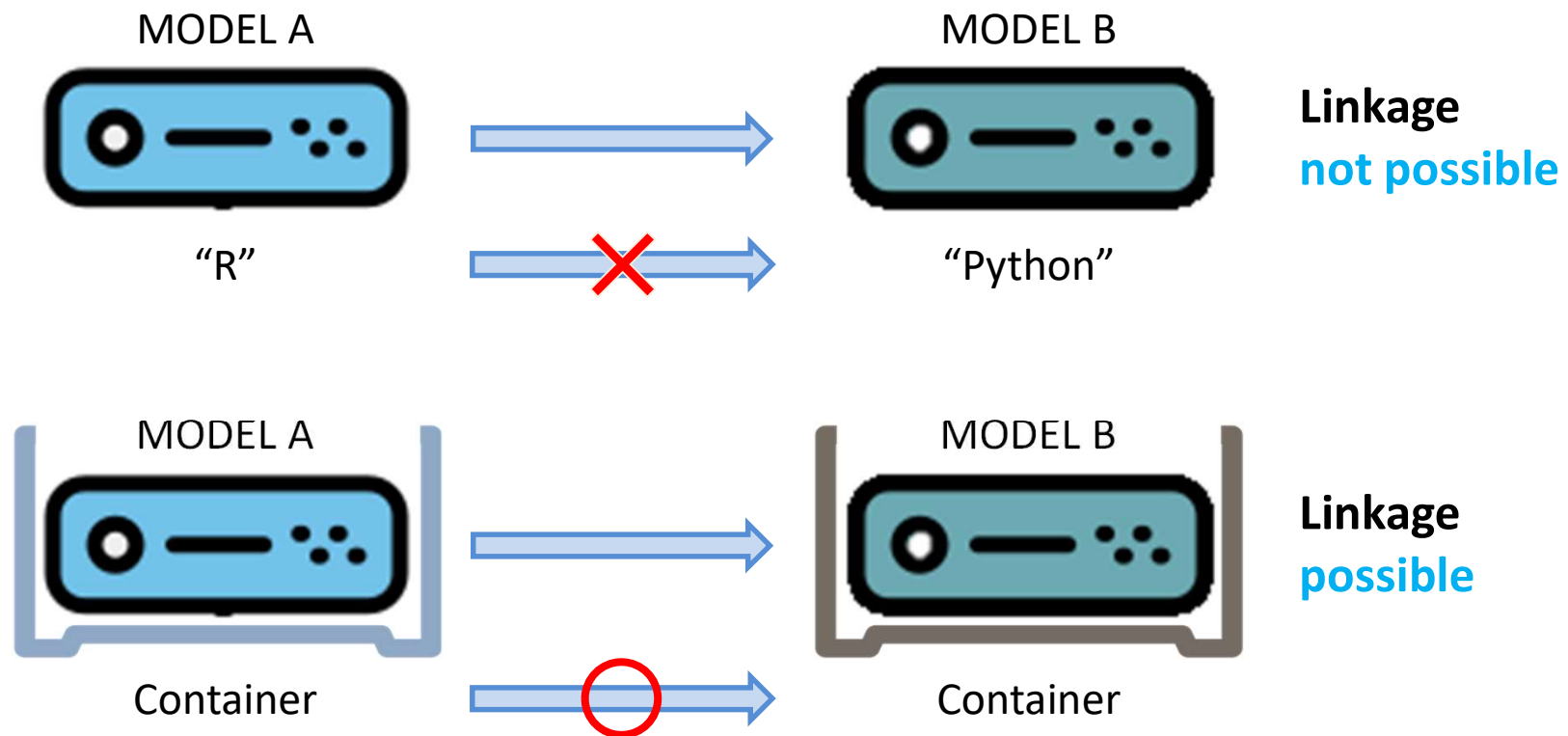
Platform for Integrated Assessment

- Simulation-driven by user
- Model linking with sectoral input/output data based on linkage scenarios
- ex) Development of sectoral container & package



Methods for Model Link

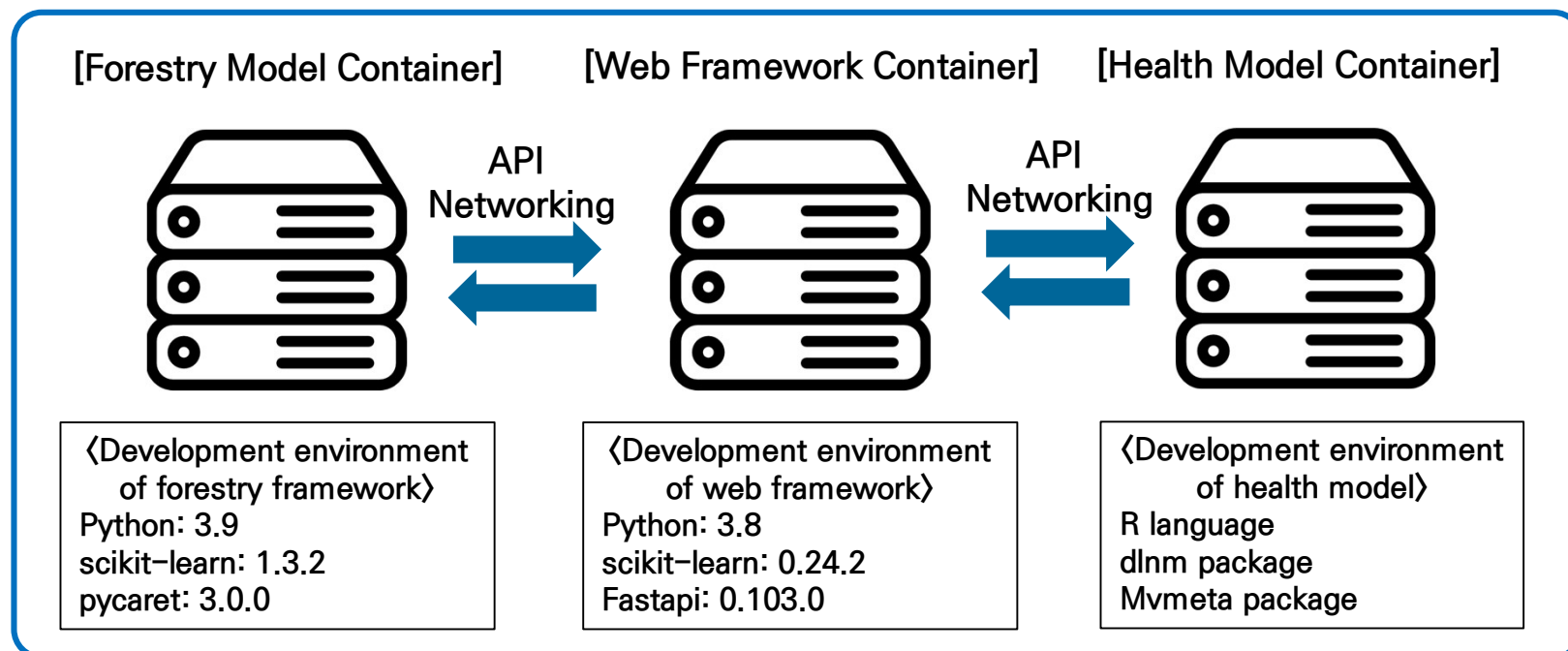
- **Container:** A device used to connect different types of models



※ Containers are connected through API.
(API: Application Programming Interface)

Platform Design by Using Container

- **Platform environment design and pilot project (Container system)**
 - Configuration plan for multiple containers within a single server
 - Networking: API networking → Custom-made API protocol
(SoftBus, KAIROS-F)

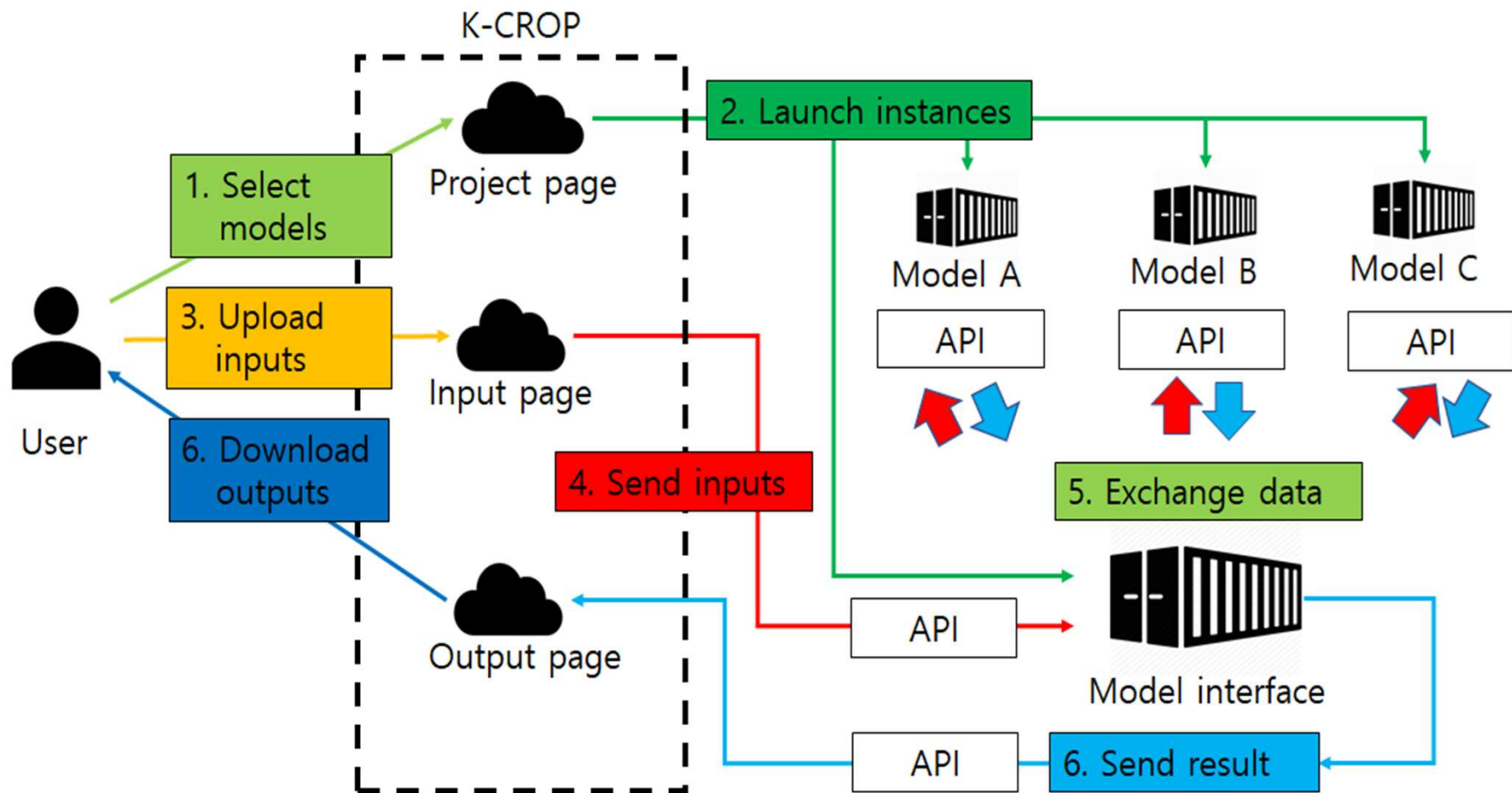


Platform Design by Using Container

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POST /uploads Uploads	① Upload the input file of the forestry model
GET /list List	② Print a list of files uploaded to the forestry model
POST /action Action	③ Perform forestry model calculations using input files
GET /action/{action_id} Action	④ Check the forestry model calculation results(status)
GET /downloads/{action_id} Downloads	⑤ Download forestry model calculation results(output)
POST /ref_action Ref Action	⑥ Calculate by using the forestry model results as input to the health model

Model Linkage System based on Multi-Containers



Display Tool – Result Viewing Page

DIRECTION

최고기온
KMA, HadGEM3-RA, RCP8.5, 2030

농작물 재배적지 변화
KMA, HadGEM3-RA, 등급, RCP4.5, 2030년

Evaluation criteria
Health(6) | Water(3) | Flood(3) | Tourism(2)
Agriculture(6) | Forestry(6) | Ecosystem(3)

Scenario selection Timeslice: 2050s
Emission scenario: RCP8.5
Climate model: HadGEM2-ES_RCA4
Climate sensitivity: Middle
Socio-economic scenario: SSP1 / We are the world
CO2 concentration = 578 ppm | Sea level change = +0.34 m

Socio-economic scenario settings (SESS details ON)
Economic (2) | Environmental(1) | Policy governance | Capitals
Guidance | Social | Technological | Economic (1)
The sliders and buttons on these tabs determine the scenario setting used by the models to determine impacts. You can change them to:
• Carry out a Sensitivity Analysis - under the baseline / current climate, investigate the response of the indicators to changes in the settings
• Explore the effects of uncertainty within a socio-economic scenario - the IMPRESSIONS socio-economic scenarios have been developed by the IMPRESSIONS team, based on the CLIMSAVE scenarios and the Shared Socio-economic Pathways (SSPs). They represent contrasting alternative futures within which to explore the potential impacts of future change. They are not predictions of the future. You can explore the effects of uncertainty within a

Socio-economic scenario settings (SESS details ON)
Economic (2) | Environmental(1) | Policy governance | Capitals
Guidance | Social | Technological | Economic (1)
Annual Temperature changed = 0 °C
Winter Precipitation ch. = 0 % | Summer Precipitation ch. = 0 %
CO2 concentration = 350 ppm | Sea level change = 0 m

Statistical Data Table:

Year	최고기온	2030	2050	2080	2030년
2030	34.10	2030	7.00		
2031	33.50	2050	6.00		
2032	34.00	2080	7.00		
2033	32.30				
2034	31.60				
2035	31.30				
2036	33.10				
2037	33.30				
2038	33.80				
2039	34.50				
2040	32.70				

Assessment result display

범례
등급
7.00
6.00
5.00
4.00
3.00
2.00
1.00
범례 설정



**THANK YOU
VERY MUCH !**