

Belmont Forum

E-INFRASTRUCTURES & DATA MANAGEMENT Collaborative Research Action

climate change program on data integration, production, dissemination and adaptation
service

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THE FRAMEWORK OF TAIWAN CLIMATE CHANGE RESEARCH PROGRAM(2017-2022)

Taiwan CC Information & Knowledge Service Programme

Climate Information Platform
 (Climate Scenario, Climate Coupling data, Climate, Hydrology, Ocean, Eco, Obs)

Adaptation Knowledge Services
 (Adaptation measure, Strategy Process, Cross-discipline interaction, Tools,...)

Key Sector Vulnerability & Impact Research
 (Water, Agriculture, Flood, Ecosys, Landslide, Landuse, Health,)

Provide CC Science and Data service for Central, Local Govern. and Industry

Exchange Platform of CC Knowledge -Govn, Industry

Bridge S&T and Govern. Implementation

CC adaptation governance Suggestions

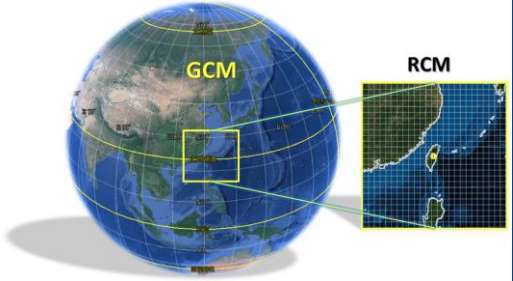
Climate Science & Simulation

Belmont Forum – EI&DM

S&T Transfer & International Cooperation

Technology & Tools for CC Risk Assessment

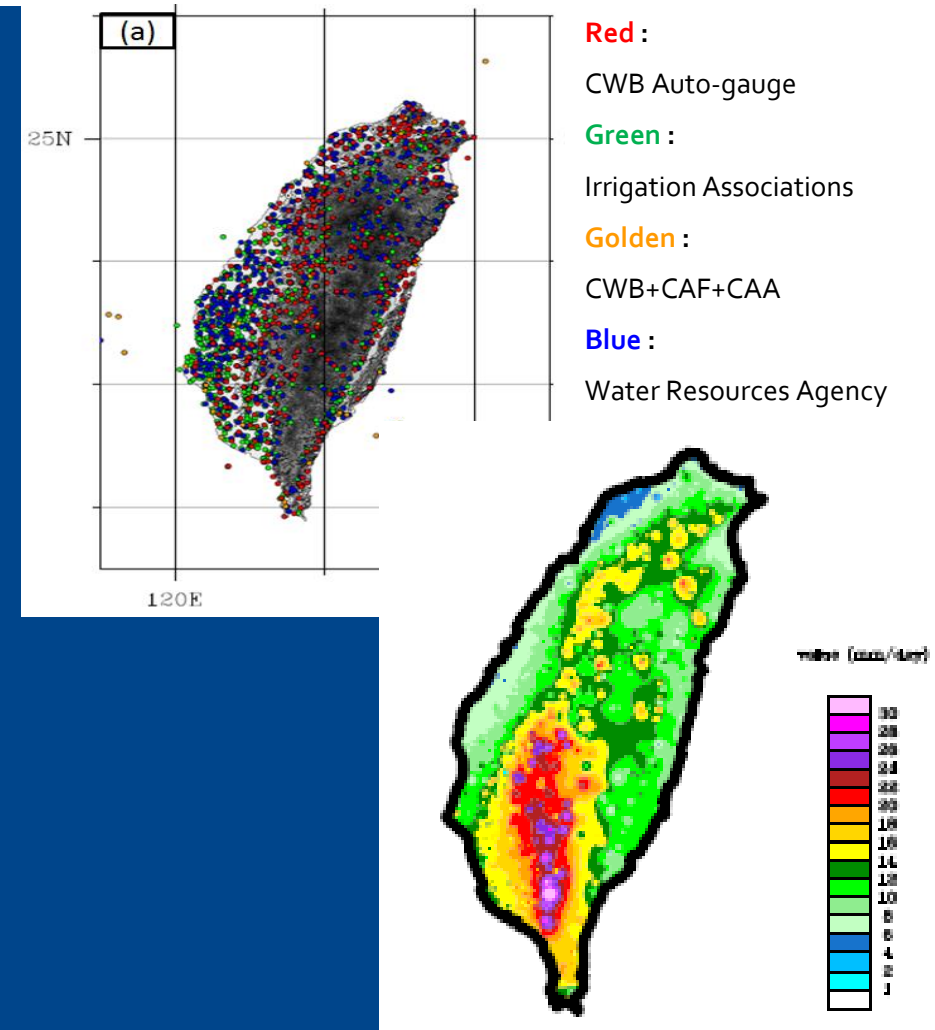
Model of CC Adaptation



TCCIP — Main results

(Taiwan Climate Change projection and Information Platform)

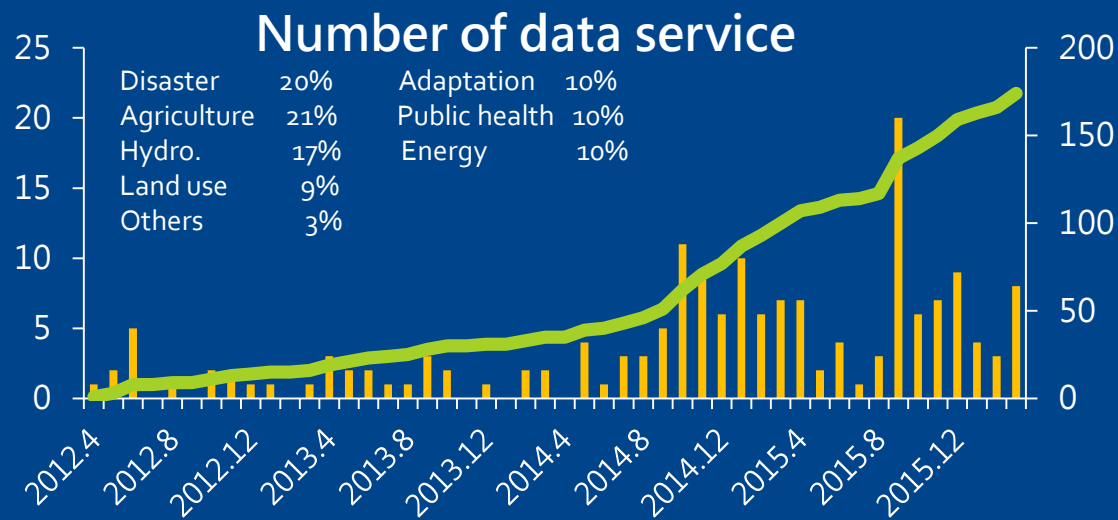
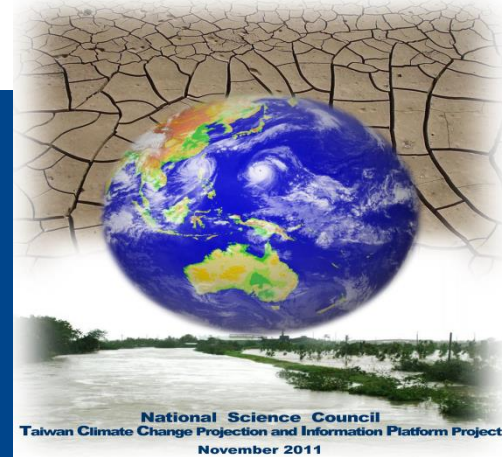
- The first time to gather more than 1400 stations for long term rainfall record and to make it homogeneous and Gridded in Taiwan
- High Resolution (5Km x 5Km) projection data based on Statistical downscaling in Taiwan (IPCC AR5 45GCMs)
- Projection data of extreme event based on Dynamic downscaling in Taiwan (MRI + WRF)
- Module creation for connection between Meteorology and Hydrology study on Climate Change
- Impact assessment of property loss of flood under CC



TCCIP — Main results (Cont.)

- **Data service** for domain scientists and government agencies
- **Curriculum** of IPCC AR5 for Governmental Agency, Academic Society, and General Public
- **Science report** on Taiwan Climate Change

Climate Change in Taiwan :
Scientific Report 2011
(Summary)

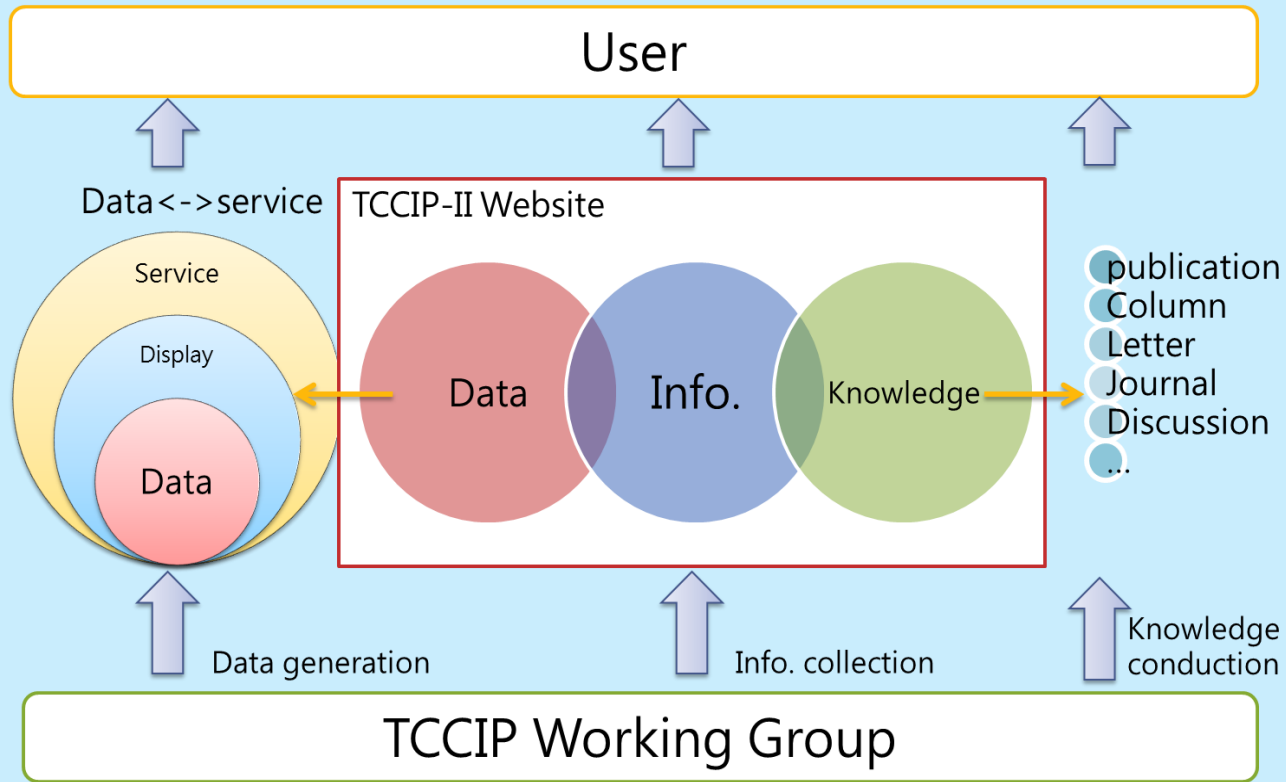


IPCC氣候變遷第五次評估報告
(第一工作小組) 導讀講座
IPCC CLIMATE CHANGE 2013:
THE PHYSICAL SCIENCE BASIS

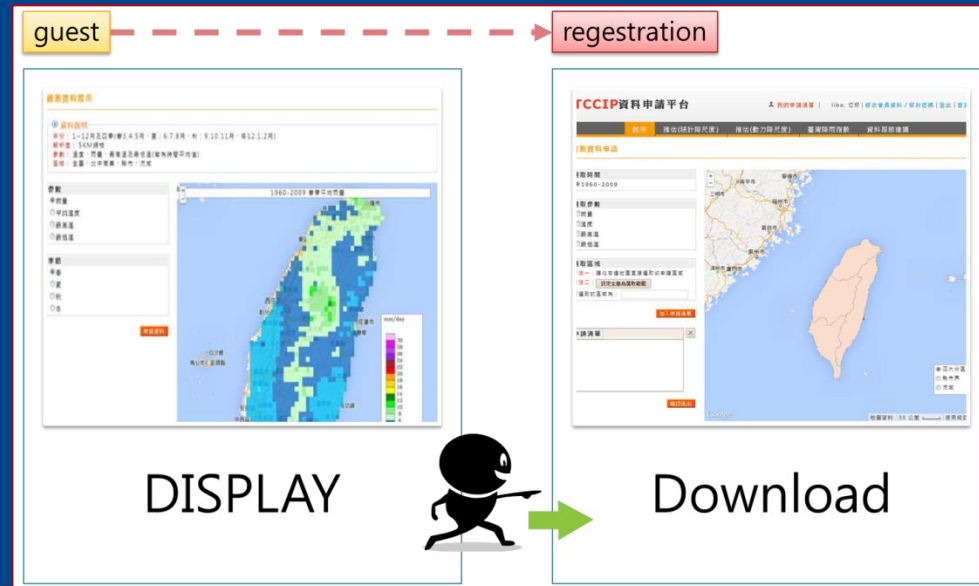
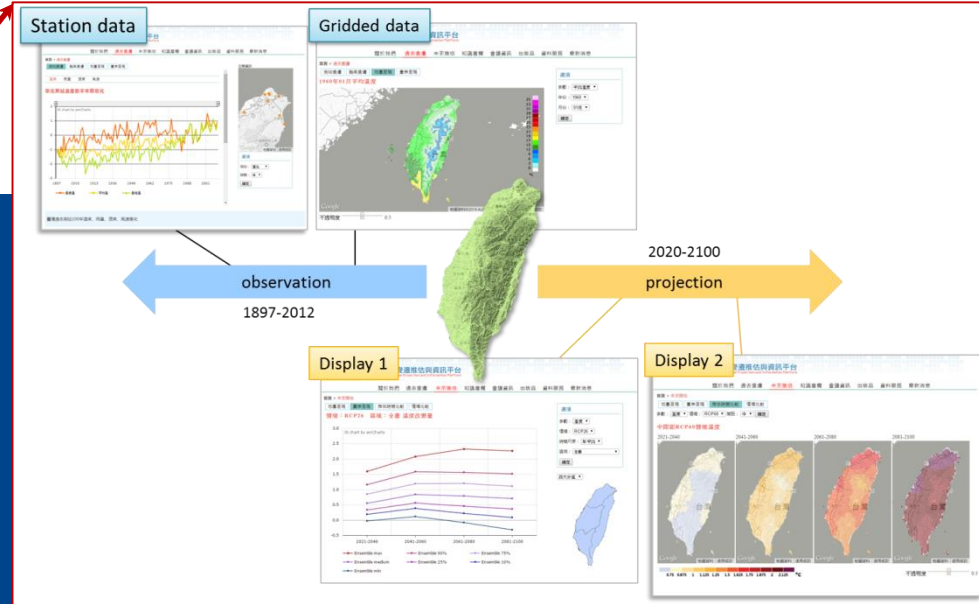


A PLATFORM FOR DATA AND INFORMATION SERVICE

Structure of TCCIP II Website



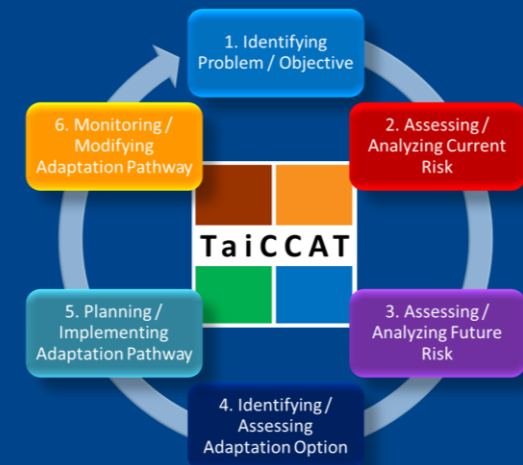
https://tccip.ncdr.nat.gov.tw/v2/index_en.aspx



TaiCCAT — Main results

(Taiwan integrated research program on Climate Change Adaptation Technology)

- **Climate Adaptation 6-Steps is established to provide guidelines for different potential users.**
 - Detail directives is prepared.
 - Check list is provided to evaluate the progress of adaptation plan
 - Assessment & Supporting Decision Tools have been developed
- **Cross-sectoral system dynamics model is developed to identify the spillover effects or tradeoff among sectors.**
 - Information flow through different sectors is analyzed.
 - Preliminary information protocol is proposed.
 - Apply cross-sectoral system dynamics model to identify key cross sectoral problems among key issues and adaptations
- **Establish vulnerability and resilience indicator systems**
- **Establish user-friendly knowledge service platform**



TaiCCAT – Main results (Cont.)

1. Identifying Problem / Objective

2. Assessing / Analyzing Current Risk

3. Assessing / Analyzing Future Risk

4. Identifying / Assessing Adaptation Option

5. Planning / Implementing Adaptation Pathway

6. Monitoring / Modifying Adaptation Pathway

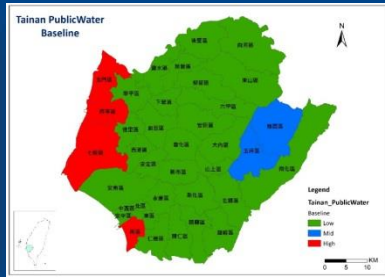


Water Resources to Food Security

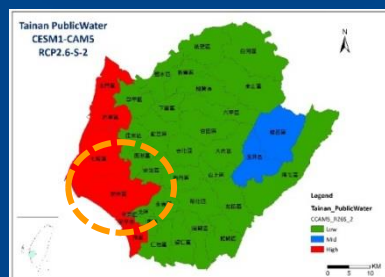
Impact on paddy production due to climate change and adaption measures of water resources



Data

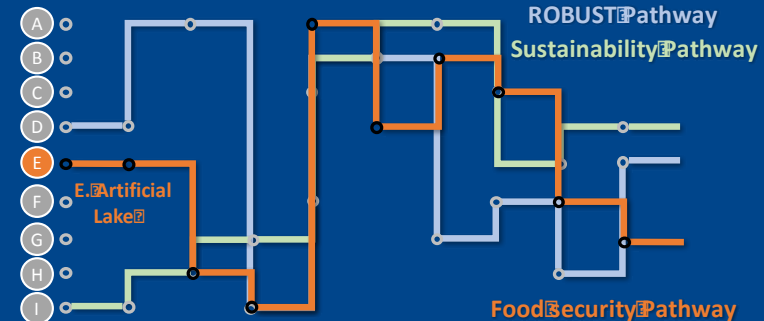


Public / Agriculture Water Risk

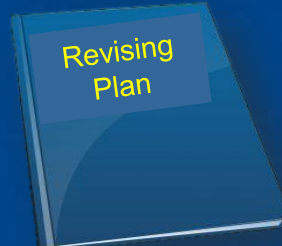


No.	Adaptation Measure	Effectiveness	Sustainability	Legitimacy	Urgency	Equity	Total	Rank
A	Desalination	7	3	2	2	5	19	6
B	Water treatment plant expansion	4	4	5	5	3	21	5
C	Construction of water supply facilities	5	2	4	3	2	16	7
D	Construction of reservoir	8	0	0	1	4	13	8
E	Artificial Lake	0	1	1	0	8	10	9
F	Agriculture water conservation	2	5	8	8	1	24	2
G	Adjustment of cropping system	3	6	7	7	0	23	3
H	Reduce the leakage rate	1	7	3	4	7	22	4
I	Concept of water conservation promoting	6	8	6	6	6	32	1

Identifying/Assessing Adaptation Options

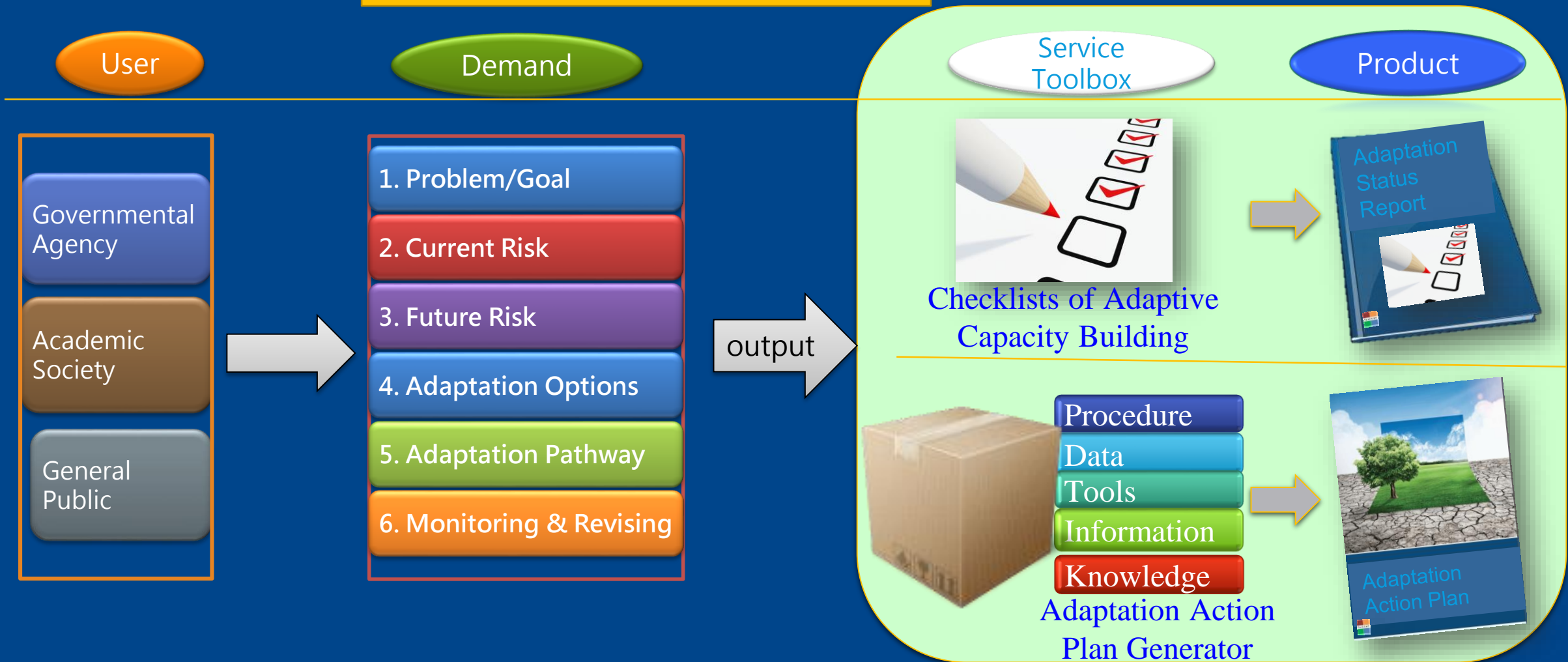


Adaptation Pathways



SERVICE OF KNOWLEDGE PLATFORM

Structure of TaiCCAT Website



GAPS IDENTIFIED IN PREVIOUS STUDY PHASE

- **The Data format**

For climatologists : NetCDF, Binary, ASCII....

For domain users: GIS-Based, shp file, csv.....

- **The understanding of variables**

For climatologists

Temperature: Tave, Tmax, Tmin...

Rainfall: hourly, Daily, Monthly...

Wind: different levels, average wind, gust wind....

For domain users

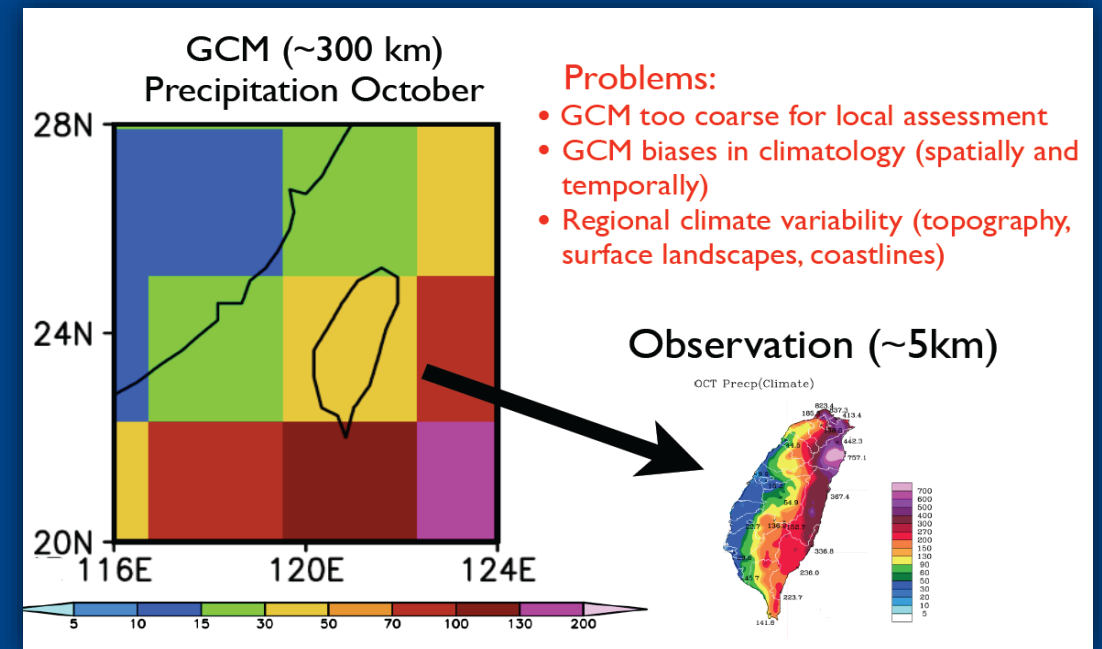
Temperature, Rainfall, Wind

⇒ Communication is required.

- **The Time and Spatial resolution**

Extreme event: hourly rainfall is required

Public Health: meter-scale is required

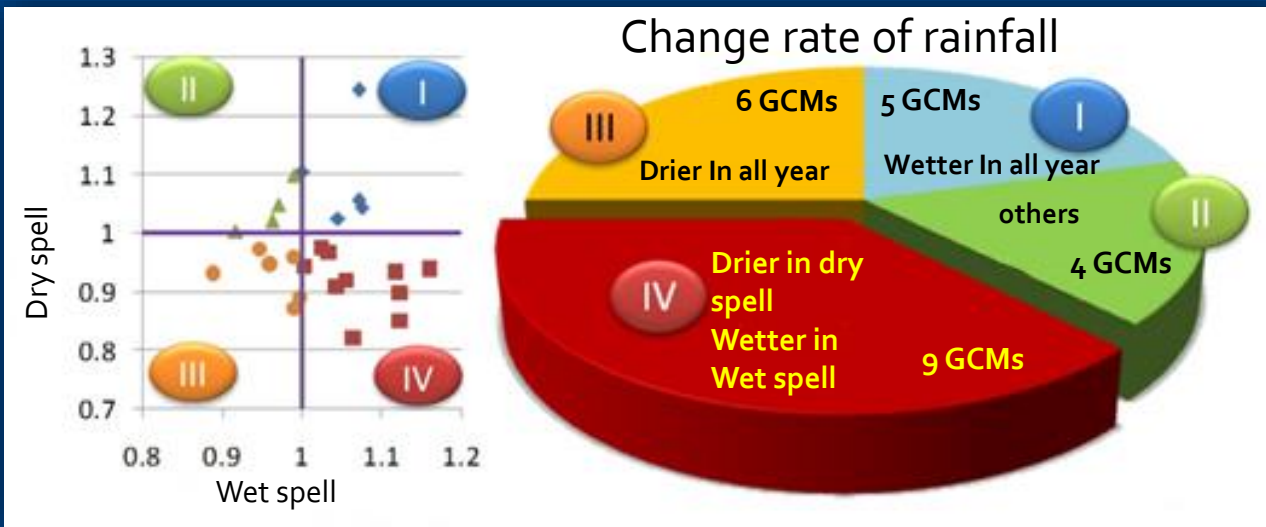


GAPS IDENTIFIED IN PREVIOUS STUDY PHASE

- The projection data application problem

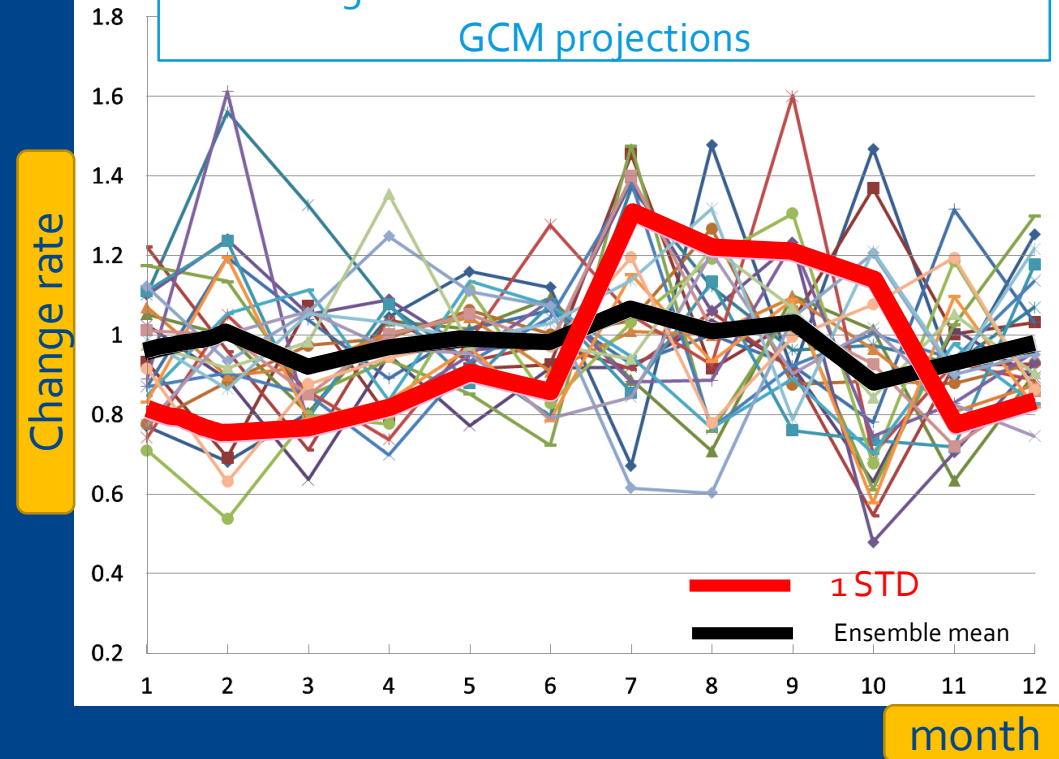
For climatologists: the projection results based on multiple GCMs should all be considered

For domain users: Please give me just one answer



Solution 1

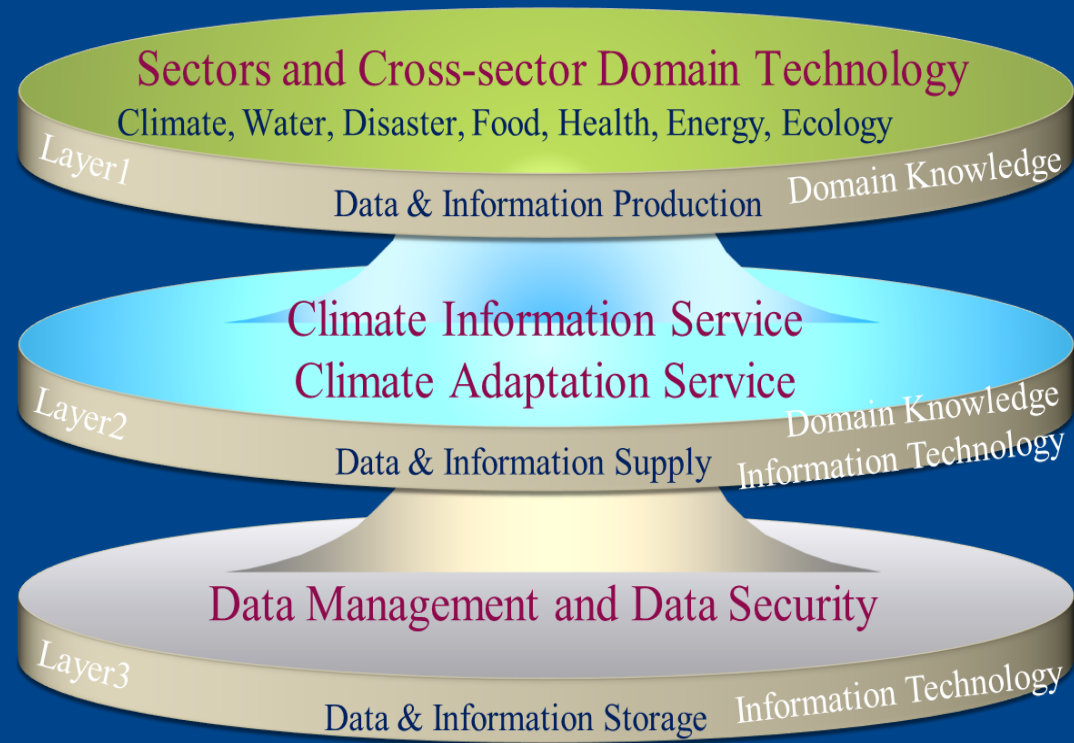
The change rate of downscaled rainfall based on GCM projections



Solution 2

FRAMEWORK OF E-I&DM IN TAIWAN

- **Bridge the gap** between the government, general public and science on climate change issues
- Provide **user-demand projection data** to users between sectors
- Conduct **a user-friendly platform** for Data and Information service on CC
- **Summary for policy makers** on impacts assessment and adaptation under CC
- **Facilitate the data workflows** among domain scientists, HPC, and data scientists

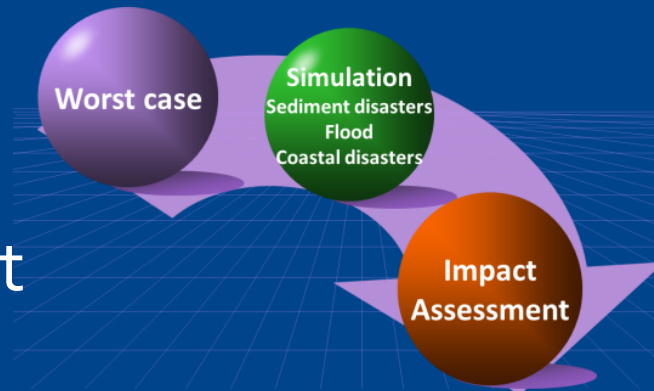


Client:

- Industry
- Governmental Agencies
- Professionals
- General Public
- Academic Society

EXPECTATIONS FROM E-I&DM CALL

- **Data and information protocols** to facilitate international collaboration
- **Data modelling** for interdisciplinary decision making
- **User/data-provider oriented strategies** on E-I&DM
- Interdisciplinary collaboration on **risk-assessment/decision-making of global changes**
- **Best practices on E-I&DM** involved in studies of disaster reduction, water resources, and climate change
- **Resolutions of uncertainties** affecting data management



Thank You