What South Korea can offer
The World of Smart Water Management

Preparedness for Drought Risk and
Regional Water Scarcity

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Drought should be assessed based on the shortfall of the climatic averages in the region. The lack of water in the desert region is the average nature of the area, not a disaster. Therefore, there should be no drought in the desert. Drought refers to the occurrence of an unusual water shortage. If there is no disaster caused by water shortage, it is not necessary to define it as drought.
“Risk” is defined as the expectation value of losses (deaths, injuries, property, etc.) that would be caused by a hazard.
What is Drought Risk

- **Drought hazard**: potential occurrence probability, severity & extent of a drought event
- **Drought vulnerability**: potential damage to local systems that may be caused by drought (population, farmland area, industrial water demand...)
What is Drought Risk

Drought Risk = Hazard + Vulnerability

Hazard + Exposure = Coping Capacity

Water Budget Analysis

Water shortage
Data for Risk Assessment

HRU of Korea

GCM Selection

<table>
<thead>
<tr>
<th>Name</th>
<th>Period</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Line</td>
<td>1976-2005</td>
<td>S0</td>
</tr>
<tr>
<td>Near Future</td>
<td>2011-2040</td>
<td>S1</td>
</tr>
<tr>
<td>Mid Future</td>
<td>2041-2070</td>
<td>S2</td>
</tr>
<tr>
<td>Far Future</td>
<td>2071-2099</td>
<td>S3</td>
</tr>
</tbody>
</table>
Using SPI (Standardized Precipitation Index)

GCMs

- IPSL-CM5-LR
- HadGEM2-AO
- CanESM2

Drought Hazard Area

RCP 4.5

S0

S1

S2

S3

RCP 8.5

S1

S2

S3
Vulnerability Assessment

Future Water Demands

Municipal Water

Agricultural water

Industrial water
Potential Water Supply Capability

- IPSL-CM5-LR
- HadGEM2-AO
- CanESM2

RCP 4.5

RCP 8.5

S1  S2  S3  S1  S2  S3

0   4800  9600  14400  19200  24000  28800  33600  38400  43200  48000
Vulnerability Assessment

Water Shortage

<table>
<thead>
<tr>
<th>RCP 4.5</th>
<th>RCP 8.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>S2</td>
</tr>
</tbody>
</table>

- IPSL-CM5-LR
- HadGEM2-AO
- CanESM2
Future Drought Risk Area of South Korea

Drought Risk Map

- IPSL-CM5-LR
- HadGEM2-AO
- CanESM2

RCP 4.5
- S1
- S2
- S3

RCP 8.5
- S1
- S2
- S3

Legend:
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Thank you

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