

# **Water Disaster Mitigation Policy and Strategy under Climate Change : Case of Korea**

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Prepared by MOLIT

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# Climate Change Response Strategy

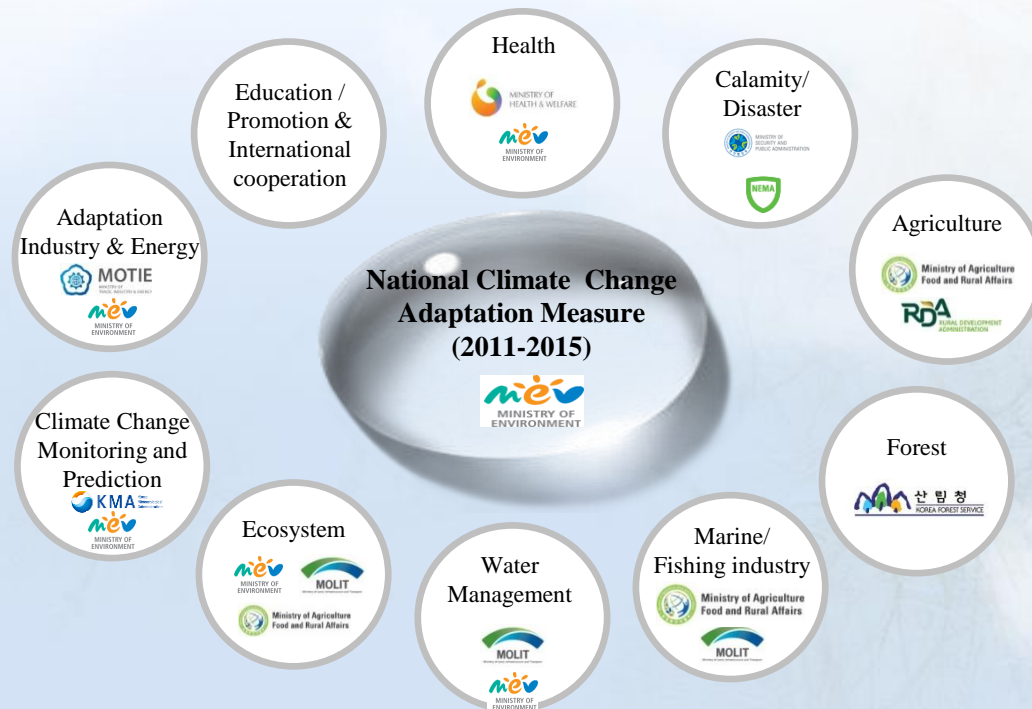
## ➤ The need for climate change response strategy

- **Climate change** is a global issue that stands behind **water-related disasters** such as flood and drought, and affects agriculture, groundwater, water quality, and ecology, thereby negatively influencing the environment and the daily lives.
- 
- A cartoon illustration of a sad Earth with a face, surrounded by CO2 molecules. The Earth is depicted with a blue and green surface, a sad face with closed eyes and a downturned mouth, and is shedding large blue tears. It is encircled by a thick, orange, wavy border. Several yellow CO2 molecules are floating around the Earth, with some appearing to be entering or leaving the atmosphere. The background is a light blue and white textured pattern.
- **Cost of climate change** is expected to reach over 800 trillion dollars by the end of the 21 century. However, **this cost can be saved by taking preventative actions and minimizing trial and error process.** A national climate change response strategy is essential to both efficiently and effectively address the challenges of climate change.

# Climate Change Response Strategy

## ➤ The need for climate change response strategy

- In April 2010, the Korean government enforced 'Framework Act on Low Carbon, Green Growth' and established 'National Climate Change Adaptation Master Plan' (2011-2015). 87 projects under 10 themes are underway to implement the Plan. 13 line ministries and local governments have set up specific plans to support the Plan and act in response to climate change (Related ministries, 2010).



< National Climate Change Adaptation Policies of South Korea >

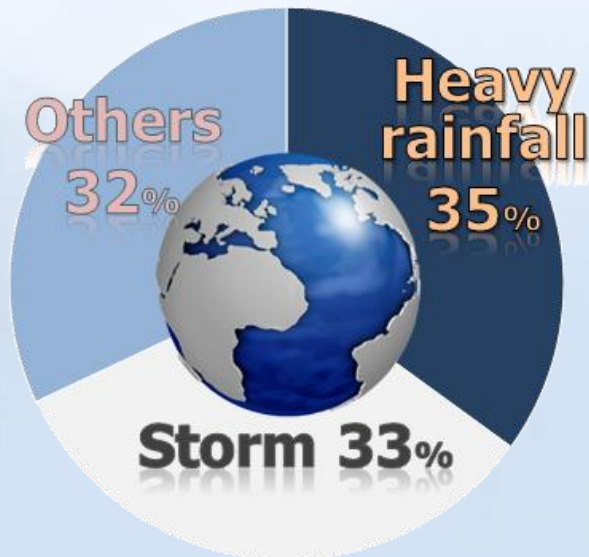


# Key Water-related Disasters in Korea

## ➤ Status on Water-related Disasters

- Flood and typhoons are the two key water-related disasters in Korea. Both account for 33% of the number of water-related disasters, respectively, thereby taking up 66% of the entire figure. In terms of damage costs, floods rank the first (59%) followed by typhoons (28%).

### WATER-RELATED DISASTERS IN KOREA



Rank	1	2	3	4	5
Year	2002	2003	2006	1998	1999
Cause	Typhoon (RUSA) 8/30~9/1	Typhoon (MAEMI) 9/12~9/13	Heavy rainfall and typhoon (EWINIAR) 7/9~7/29	Heavy rainfall 7/31~8/18	Heavy rainfall and typhoon (OLGA) 7/23~8/4
Index	Unit				
Maximum wind velocity	City : m/sec				
	Jeju:43.7 Yeosu:29.1	Jeju:60.0	Gunsan:31.0	-	Wando : 46.0 Muan : 41.0 Gwangju :39.6 Masan:37.0
Maximum daily rainfall	City : mm				
	Gangneung : 870.5 Donghae : 319.5 Sokcho : 295.5	Namhae : 456.3 Goheung : 304	Hongcheon : 255.5 Namhae:264.5 Sancheong : 229.5	Ganghwa : 481.0 Boeun : 407.5 Yangpyeong : 346.0	Cheorwon : 280.3 Chuncheon : 237.2
Cost	(1,000\$)				
	5,448,148	4,371,790	1,713,418	1,308,717	1,123,817

# Key Water-related Disasters in Korea

## ➤ Status on Water-related Disasters

### End of 1990s : Flood of the Imjin river basin



- The river also has a steep gradient with numerous streams, and the downstream is heavily influenced by tides.
- Unusual weather patterns led to sequential torrential rainfalls.
- The Korean government introduced a multi-purpose dam in Imjin river basin to prevent water disasters at the source
- The Korean government issued a provision on 'Disaster Relief and Disaster Restoration Standards' that include the areas that require permanent restoration efforts.

### 2000s : Flood due to Typhoon



- The Korean government amended the Natural Disaster Countermeasures Act to include 'Special Disaster Area' and declared all severely harmed counties as Special Disaster Area so that the victims of natural disaster can focus on recovery.
- revised the River Act to designate river sections and introduce emergency action plans for dams and reservoir as a mandatory.

### Early 2010s : Urban Flood

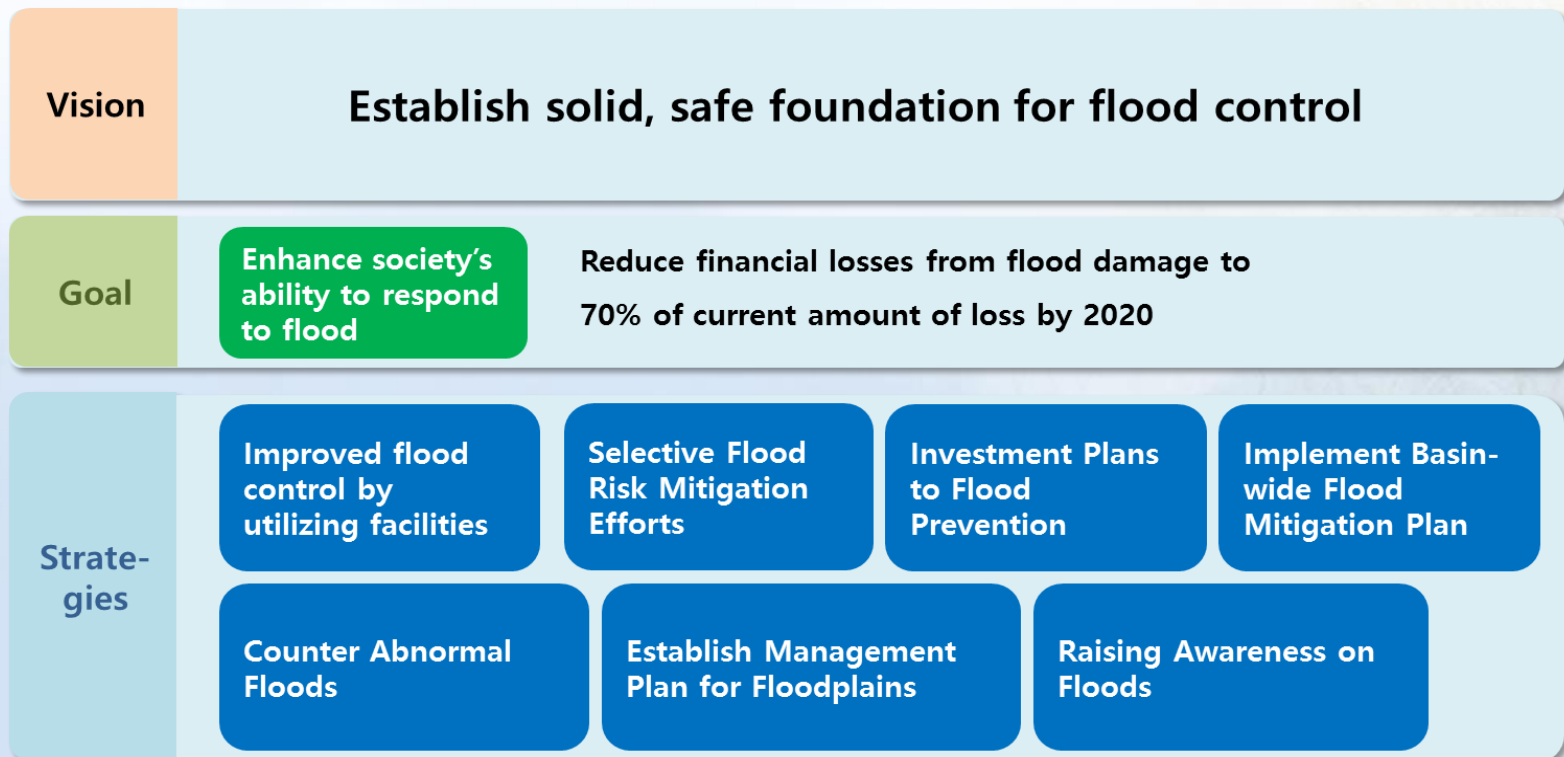


- Consecutive localized heavy rains have raised awareness on the issues entailed urban flood.
- Various regulations on urban planning were amended to introduce disaster vulnerability analysis system.
- Design criteria for sewer systems and pump stations have been extended from 10 to 30 years; that for streams have also been extended from 50 to 80 years.

## Flood Vulnerability

### ➤ Policy Directions based on Flood Forecasts

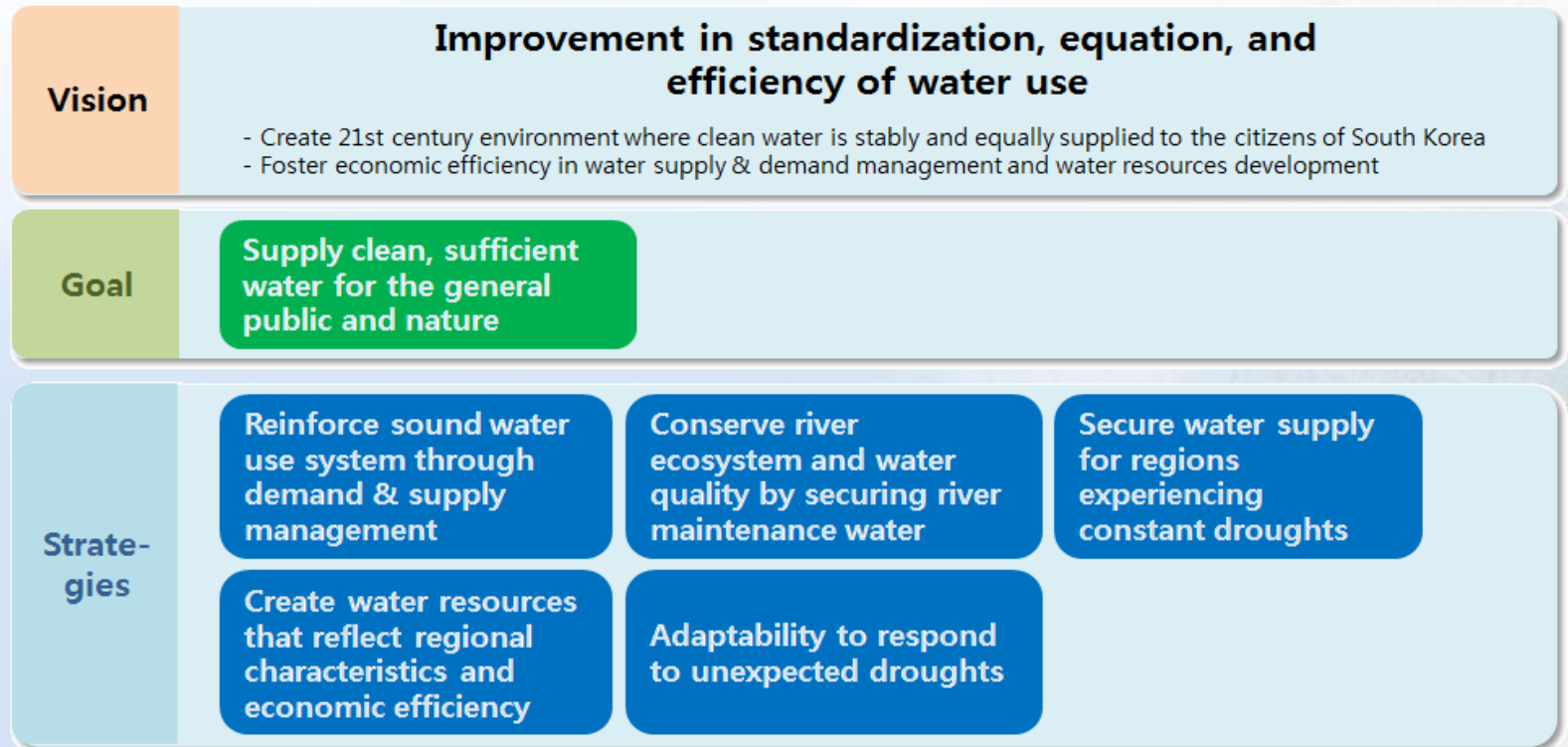
- The National Water Resource Plan (2006-2020) by the Ministry of Land, Infrastructure and Transport includes a section on flood mitigation. The government envisages establishing a solid, safe foundation for better flood control and will aim to enhance society's ability to respond to flood.



## Water Demand

### ➤ Policy Directions for Future Water Shortage

- In National Water Resources Plan (2006), in order to respond efficiently to future water shortage and to secure abundant water environment, the government set the target to provide clean and sufficient water to people and nature consequently setting its vision to achieving water rich country in the 21st century.





# Urban Flooding

## ➤ Directions for Future Urban Flooding

- Limitation of existing urban flood protection

- Investment of flood prevention /  
Lack of investment in urban area
- Establishing and implementing of investment plan  
by each department
- Not enough to relieve flooding in the city with  
structural problems
- Existing individual investment takes excessive costs



Lack of linkage between plans

limitation of respond in target area  
(limitation of flood control ability/ excessive costs)

Need for new concept of flood control measures which are optimally  
linked to each department's flood control facilities

## Urban Flooding

### ➤ Directions for Future Urban Flooding

- Limitation of existing urban flood protection

#### Cooperation

Connect the business of each department to watershed council



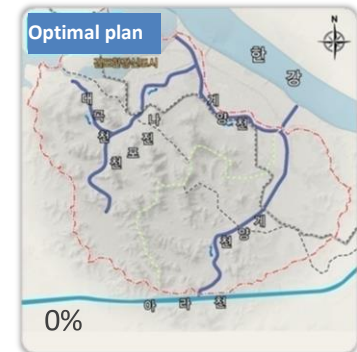
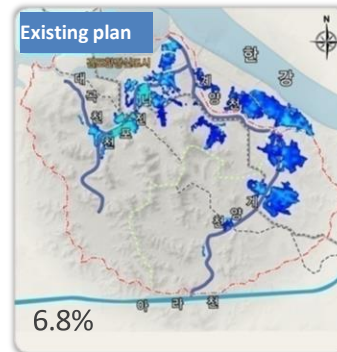
#### Flood protection capability

Significant rise from **15** to **100-year**

#### Reduction of budget

Reduce about **45%** of costs

※ When compare the 100-year frequency,  
Reduce from 448.2 billion won to 249.3 billion won



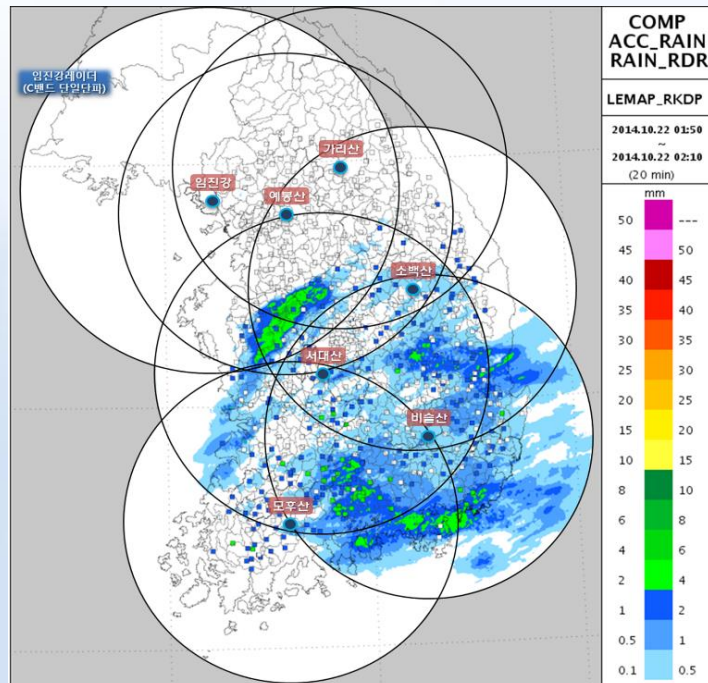
< Inundation area of flood at 100-yr frequency >

Need enlargement to nationwide as confirmed by the excellent results

## Urban Flooding

### ➤ Use of National Rainfall Radars for Flood Forecasting

- The Ministry of Land, Infrastructure and Transport uses rainfall radars with dual-polarization sensors to improve the accuracy of rainfall monitoring and efficiency of flood as well as other water-related work. The initial plan is to install 6 large S-band radars and 5 small X-band radars in 11 river basin observatories by 2016.



< Observation Landplane of National Rainfall Radars >



< Flash Flood Forecasting System: Jiri Mountain Case Study >



# Water-Disaster Management Plan through CC Adaptation

## ➤ Master Plan for Responding to Climate Change and Improving Disaster Management

- Master Plan for Responding to Climate Change and Improving Disaster Management envisions a 'disaster-free advanced nation'. The five strategies align to realize this vision:



<Figure 2> . Seoul's Flood Mitigation Plan



## Conclusion

- **Effects of climate change have become a part of everyday life**, affecting us in various forms.
- **The Korean Ministry of Land, Infrastructure and Transportation aims to establish water management system that can fully adapt to climate change** and has put strong efforts to build country's disaster risk management capacity against extreme flood and drought.
- And the Ministry of Land, Infrastructure and Transportation is leading the efforts to make Korea more resilient to climate change and is preparing water resource management strategies that **can not only minimize the damages from natural disasters but also support sustainable growth.**

# Thank you

“Although the impacts of climate change are uncertain,  
they can be managed like any other risk “