

**MLTM**

Republic of Korea

*WATER IN THE GREEN ECONOMY IN PRACTICE:  
TOWARDS RIO+20*

**WATER & GREEN GROWTH**  
**THE 4 MAJOR RIVERS RESTORATION PROJECT**

**Office of National River Restoration, Korea**

*3 to 5 October 2011 -Zaragoza, Spain*



# HYDROLOGICAL CHARACTERISTICS IN KOREA

## 1 Shortage of the amount of water available per capita

- Annual average precipitation of Korea: 1,245mm > World Average: 880mm
- Total amount of water available per capita in a year is approx. 1/8 less than the world average

## 2 2/3 of annual rainfall during rainy season (6 ~ 9)

- Disasters caused by repeated floods and droughts

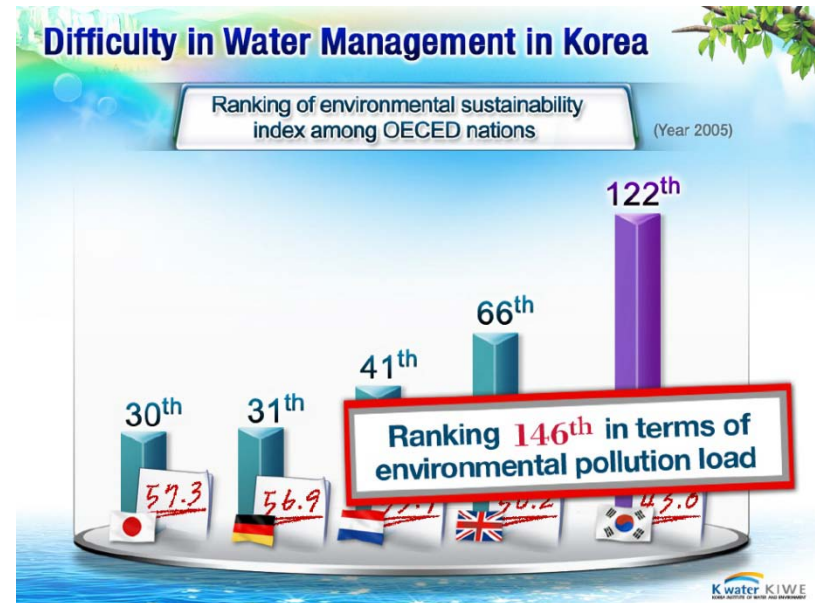
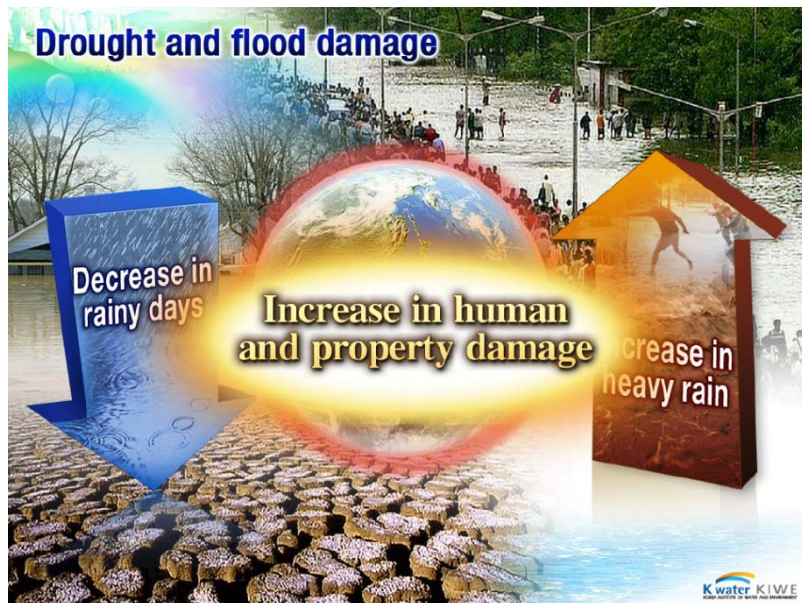
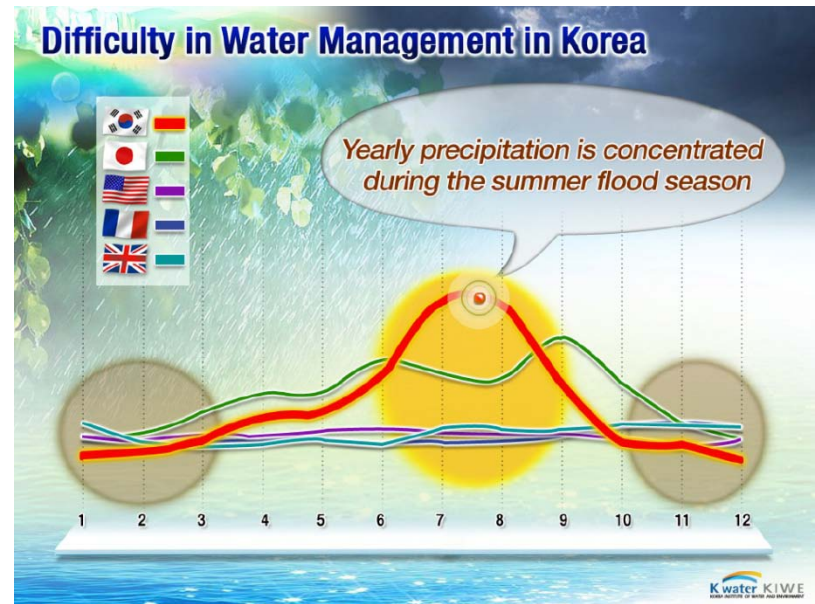
## 3 Flow variations are large

- The Han: 90, Nakdong: 260, Geum: 190 / The Rhine: 18, The Yangzi: 22

## 4 Just 27% (33.7 million ton) is available

- 73% of total water resources loss into the air and ocean

# Difficulty in Water Management in Korea



# FLOOD & DROUGHT DAMAGES (2000 - 2010)

## Flood Damages (2002 Rusa, 2003 Maemi, 2006 Ewinia)

|                                | Nation | Han   | Nakdong | Geum | Yeongsan | Others |
|--------------------------------|--------|-------|---------|------|----------|--------|
| Death                          | 689    | 167   | 126     | 38   | 26       | 332    |
| Damage Amount<br>(Billion KRW) | 15,112 | 2,936 | 3,943   | 899  | 716      | 6,618  |

\* Total flood damage: \$14 billion (2000-2010)

## Drought Damages

| Year      | Damages  |
|-----------|--|
| 1994~1995 | 86 Cities & Counties (173,269 ha)  |
| 2001~2002 | 86 Cities & Counties (304,815 people experienced water supply restriction) |
| 2008~2009 | 77 Cities & Counties (1,227 Villages experienced water supply restriction) |

\* Severe drought cycle after 1990 : 7 year ('94→'01→'08)

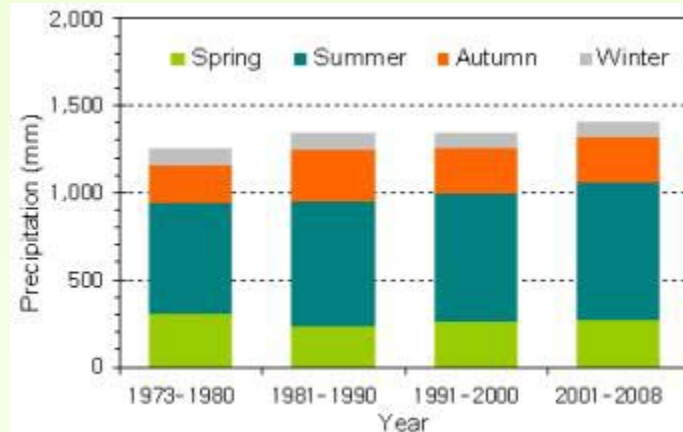
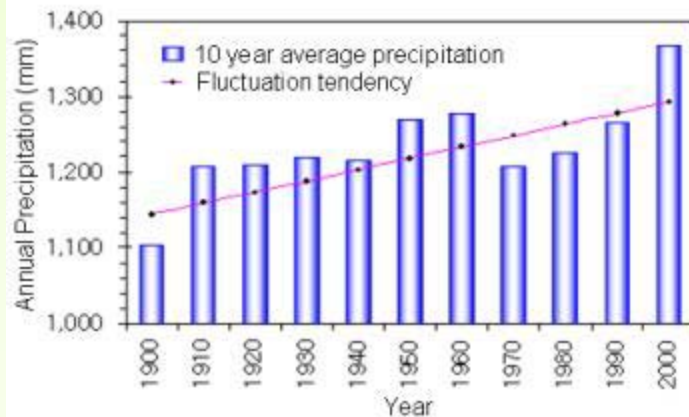
# PROSPECT OF CLIMATE CHANGE IN KOREA

## Temperature & Precipitation

- Annual temp. 3.6 °C & annual average precipitation 14% ↑

| Annual Average | 1971~2000 | 2061~2090 | Increase |
|----------------|-----------|-----------|----------|
| Temperature    | 12.5 °C   | 16.1 °C   | 3.6 °C   |
| Precipitation  | 1,230mm   | 1,398mm   | 14%      |

## Change of the pattern of precipitation



# PROSPECT OF CLIMATE CHANGE IN KOREA

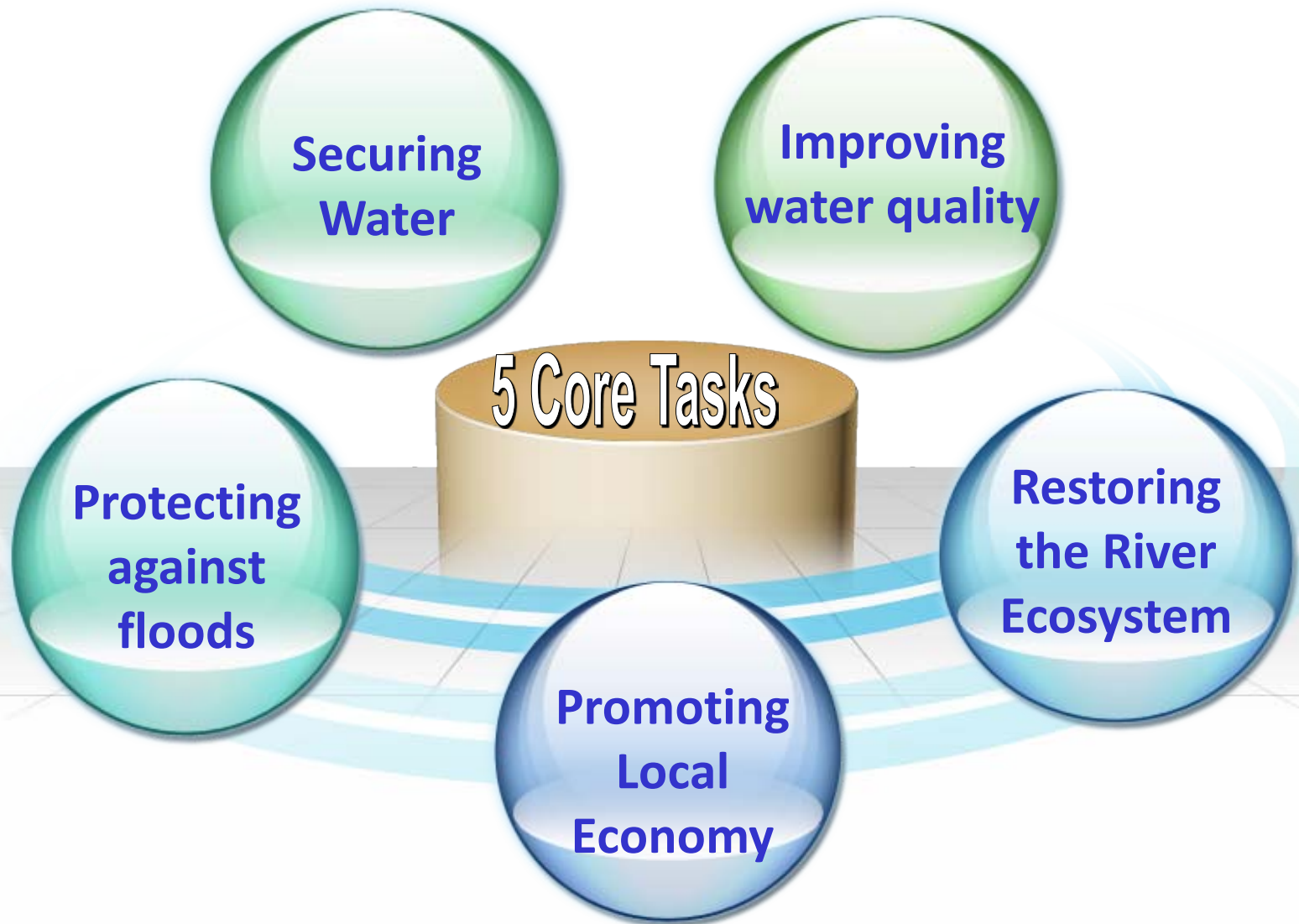
## Vulnerable to Flood

- Over 100mm/day precipitation will be Increased by 2.7 times
- 100 years Frequency Flood Discharge Will be Increased by 20%
- Flood Control Capacity of Dike will be Decreased by 50%

## Vulnerable to Drought

- Drought Return Period will be Increased by 3.4 times
  - ➔ Decrease River Flow
- Expecting Severe Water Shortage
  - ➔ Increase 1 °C, increase 10% of Agricultural Water
  - ➔ 3.3 billion m<sup>3</sup> Water Deficiency by 2060

# REVIVAL OF RIVERS: A NEW KOREA

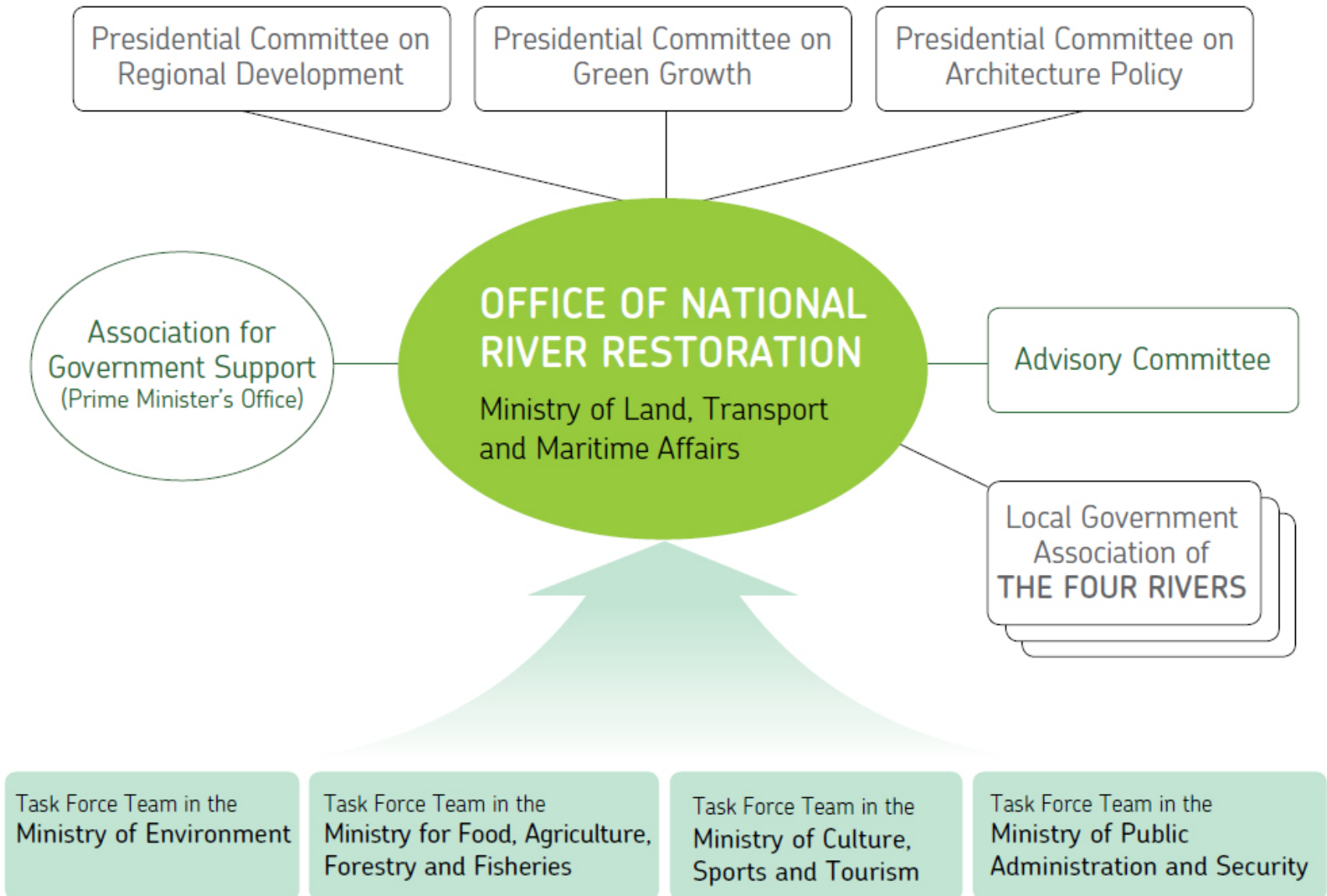


# PROJECT SCOPES & EFFECTS





# PROJECT ORGANIZATION STRUCTURE



# PROJECT ORGANIZATION STRUCTURE

Presidential Committee on  
Regional Development

Presidential Committee on  
Green Growth

Presidential Committee on  
Architecture Policy

## Public Meeting

- 126 Times with 37,000(2009)
- 70 Times with 23,000 (2010)

Ministry of Land, Transport

## Feedback Process with Local Government

- Local Gov't submitted 836 Recommendations,  
(worth 98.3 trillion KRW)
- River-related 213 cases were reflected in the Plan

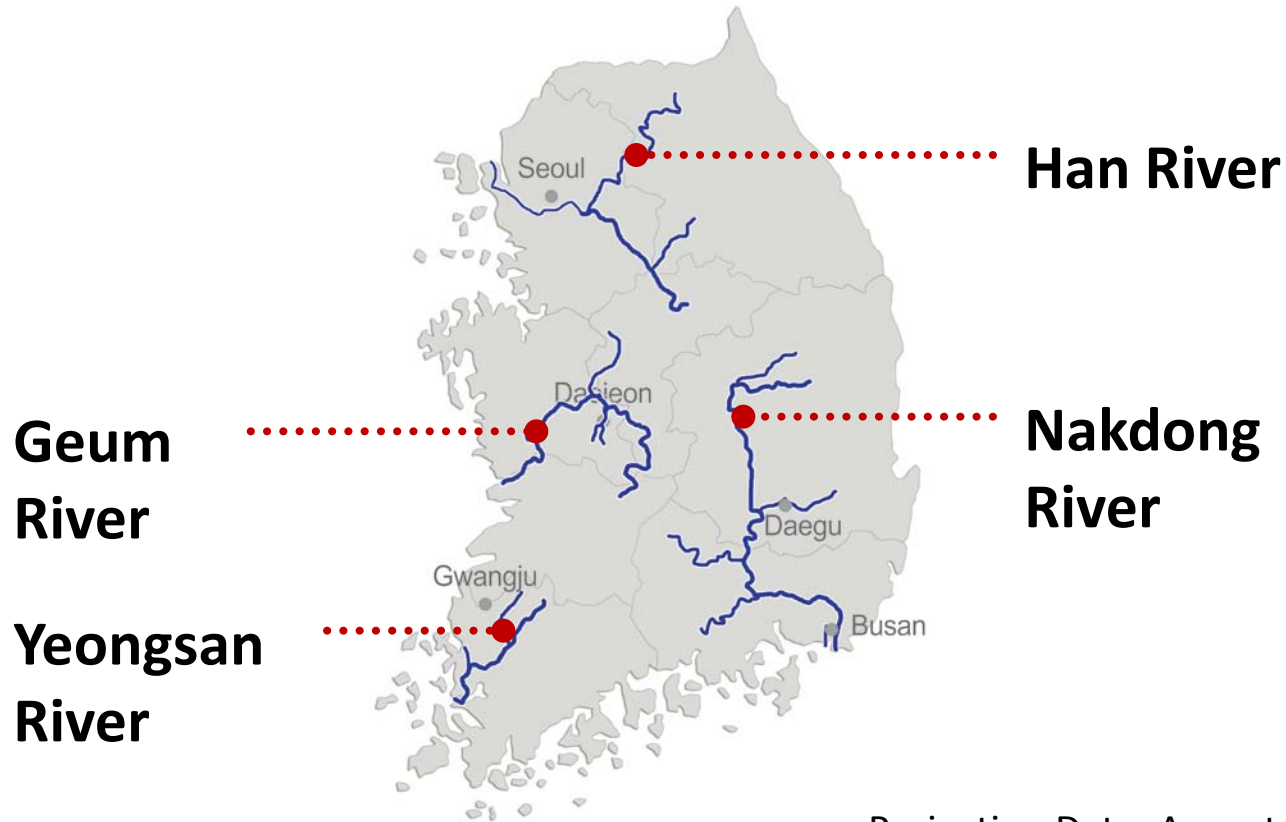
Task Force Team in the  
Ministry of Environment

Task Force Team in the  
Ministry for Food, Agriculture,  
Forestry and Fisheries

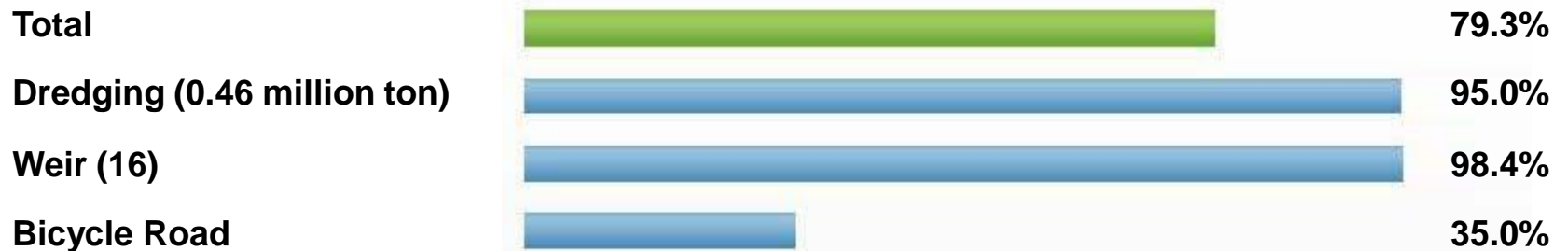
Task Force Team in the  
Ministry of Culture,  
Sports and Tourism

Task Force Team in the  
Ministry of Public  
Administration and Security

# PROJECT LOCATION & PROGRESS RATE



Projection Date: August 11, 2011



# WHY GREEN GROWTH?

## Total Solution for River

- ◆ Solving Water supply + Water Environment + Ecology + Culture + Recreation

## World's Largest Test-Bed

- ◆ River Tech for 1,700km
- ◆ River + Dam + Dike + Wet Land
- ◆ New Challenging for River Mgt

## ICT Fusion Technology

- ◆ ICT Tech for River Mgt
- ◆ Real Time Water Mgt

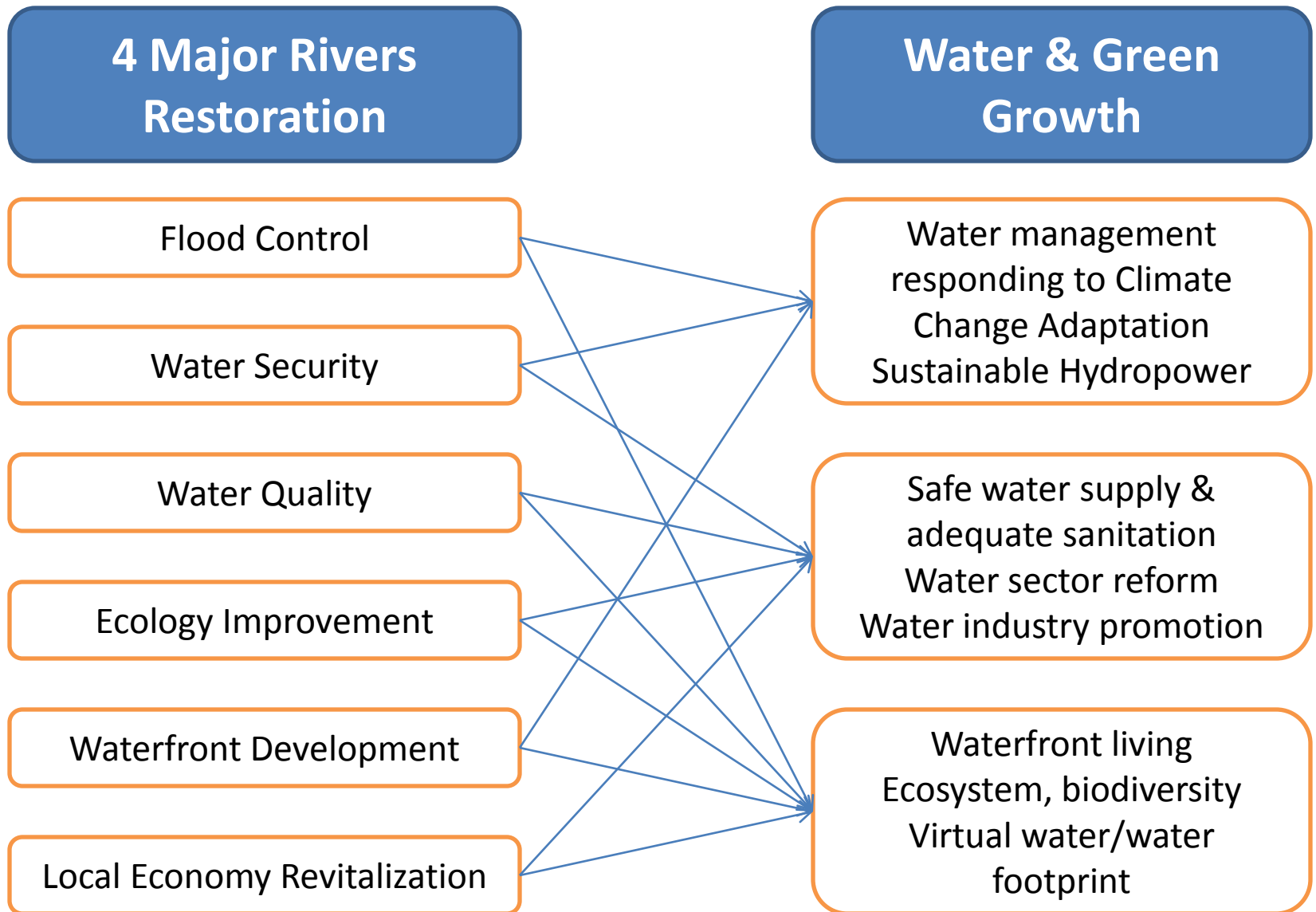
## Overcome Time Limitation

- ◆ Finish within 3 Years
- ◆ for all Target Objectives

Attain High Technology and Know-how for  
**Integrated River Basin Management**

Attain High Technology and Know-how for  
**World's Leading Water Industry**

# GREEN GROWTH & 4 MAJOR RIVERS RESTORATION



# FLOOD CONTROL EFFECT IN 2011

## Record-breaking rain during rainy season (June 20~July 17, 2011)

- Rainfall over 640mm for 20days (2.6 times more than the average)

\* The annual mean precipitation : 1,245mm

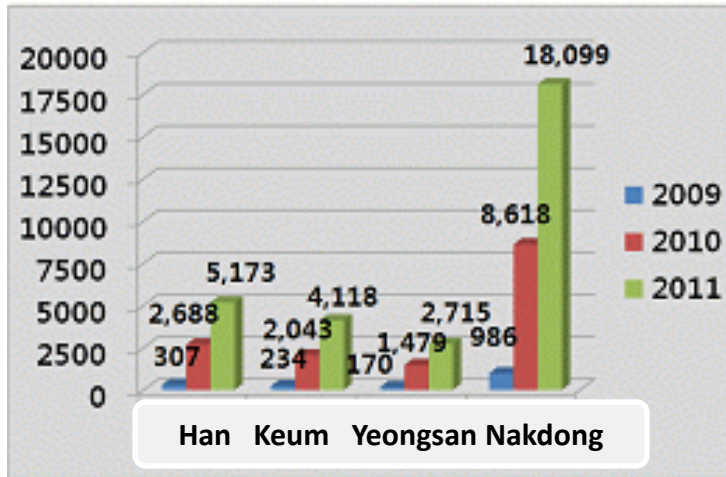
## But, decrease in Flood W.L by Dredging (2~4m ▼)

|            | Han   | Nakdong | Geum  | Yeongsan  |
|------------|-------|---------|-------|-----------|
| Mainstream | Yeoju | Sangju  | Yungi | Naju      |
|            | 2.54m | 3.78m   | 3.36m | 2.13m     |
| Tributary  | Seom  | Hyung   | Miho  | Hyungrong |
|            | 0.5m  | 1.3m    | 0.5m  | 0.6m      |

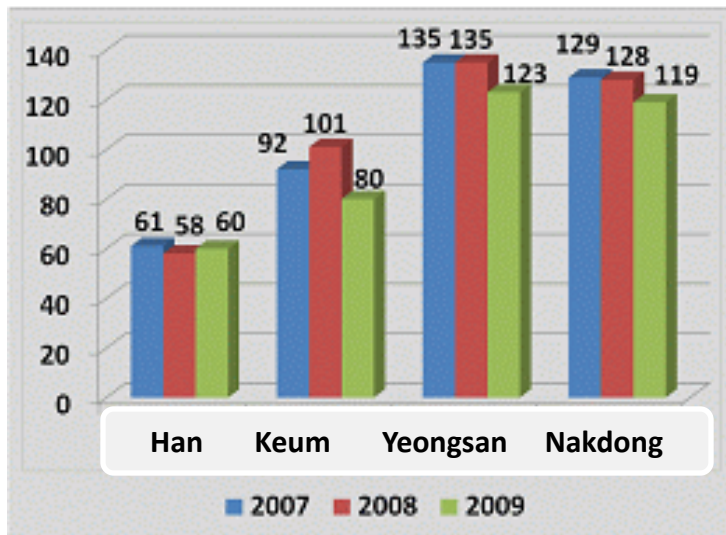
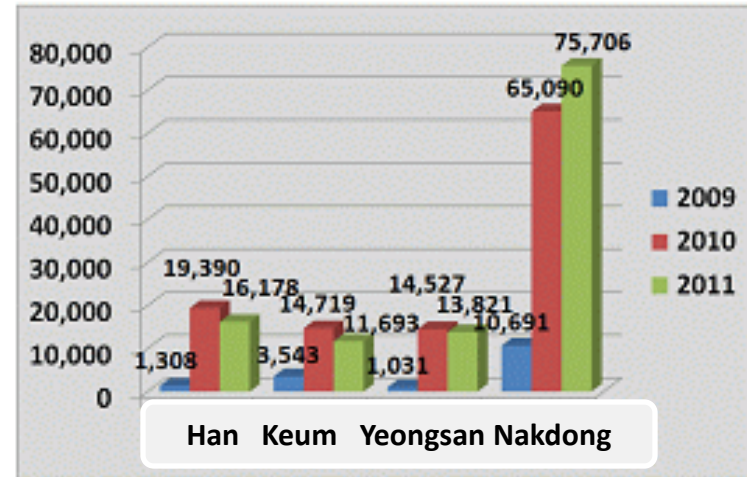


# GREEN GROWTH?: SHORT TERM EFFECTS

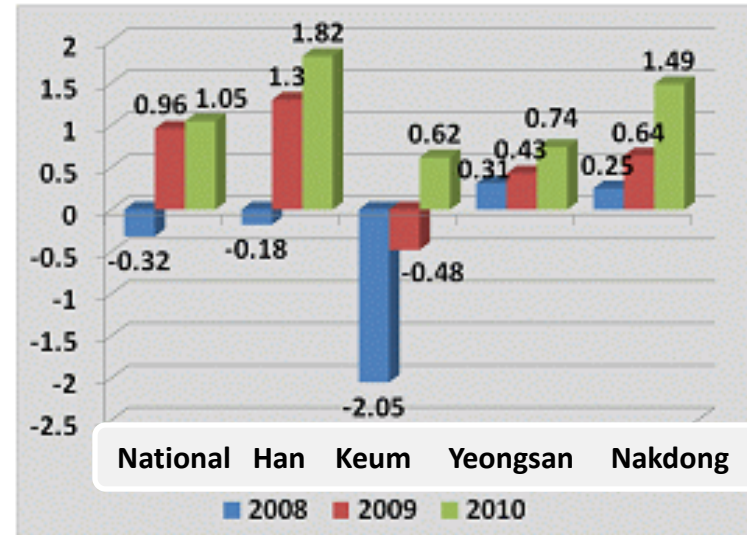
Regional Employment



Regional Income



Regional Development



Property Value

# FUTURE OF THE PROJECT

## ■ Adapting Climate Change

- Flood and Drought damage should be Decreased

\* Average flood damage in recent 10 years is \$1.4 billion

## ■ Revitalizing Regional Economy

- Increasing demand for water-related travel and recreation
- Direct and Indirect Impact on Regional Economy

## ■ Achieving High-Tech Fusion River Management Technology

- Integrating related river technology
- Supporting to River management of Other Countries



# LESSONS FROM THE PROJECT

## ■ **Need Proper Investment for Valuable National Asset**

- Korea should have invested earlier for the Sustainable River Management
- It take more money and time to fix accumulated problems
- Prevention Investment is the top priority, rather than recovery cost

## ■ **Under the Political Will, People aware the Value of Water**

- People Understand that water is a Scarce Resource
- People Understand that Somebody must Pay for proper Manage

## ■ **Public Involvement is the Most Powerful Way to Go**

- Social Conflicts bring Social Cost
- Conflict Resolution will Ensure the Future of 4 Major Rivers

# INTERVIEW WITH RESIDENTS

## Han River



## Geum River



## Nakdong River



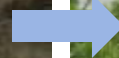
## Yeongsan River



# SITE PHOTOS



**Geum River (2010. 3)**



**Geum River (2011. 5)**

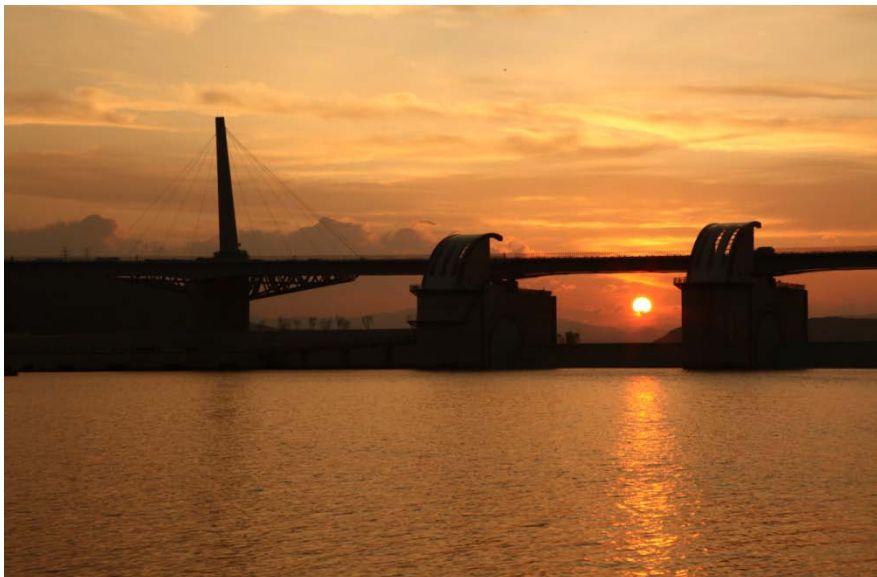


**Marathon racing (2011. 5)**



**Maegdo District (2011. 5)**

# SITE PHOTOS (weirs)



**Thank you for your attention!**

[www.4rivers.go.kr](http://www.4rivers.go.kr)

