Water Management in Korea
– focusing on current issues –

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Characteristics

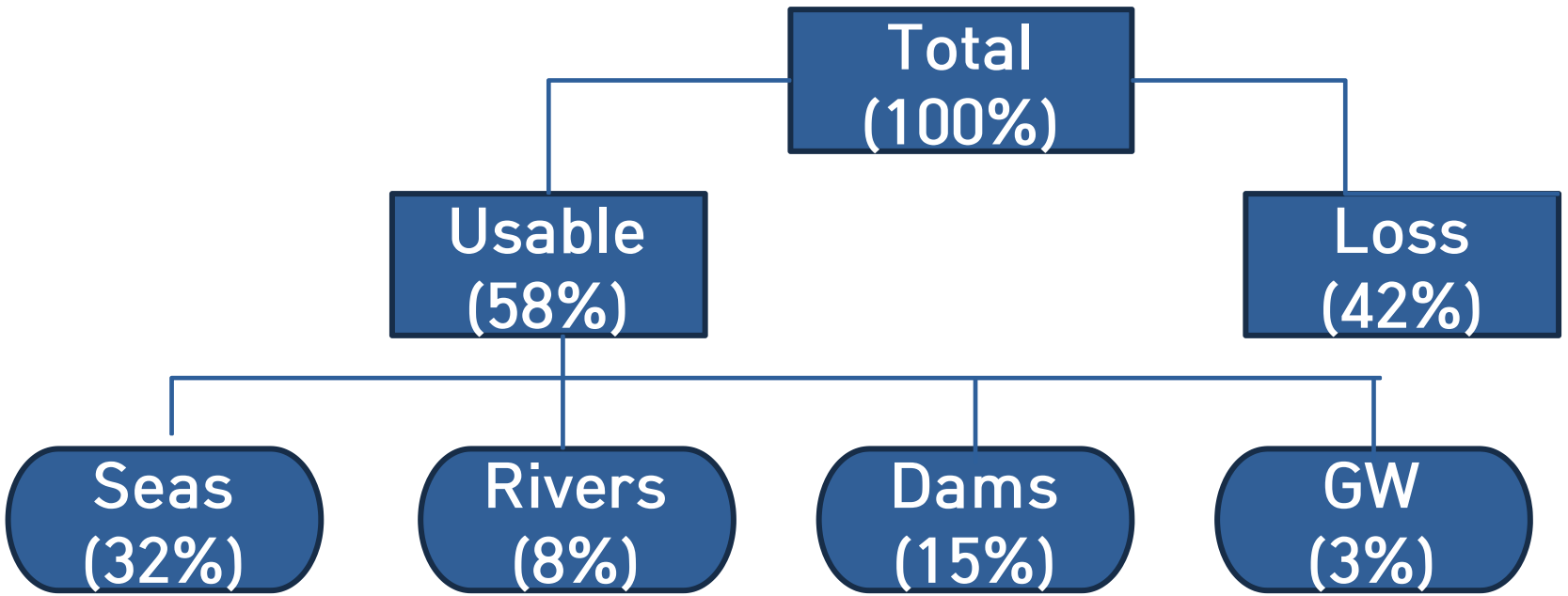
- The Annual precipitaion is 1,300mm, slightly above the world's average
- But, geographically difficult to control and use waters
  - 70% the of rainfall are focused in the summer and rapidly discharged into seas
  - Very large fluctuation in water flow (Min 1 : Max 300↑)

River	Coefficient of river regime	River	Coefficient of river regime
Han (Korea)	1:393	Mekong(Vietnam)	1: 35
Nile (Egypt)	1: 30	Yangtze(China)	1: 22
Rhine(Germany)	1: 14	Thames(UK)	1: 8

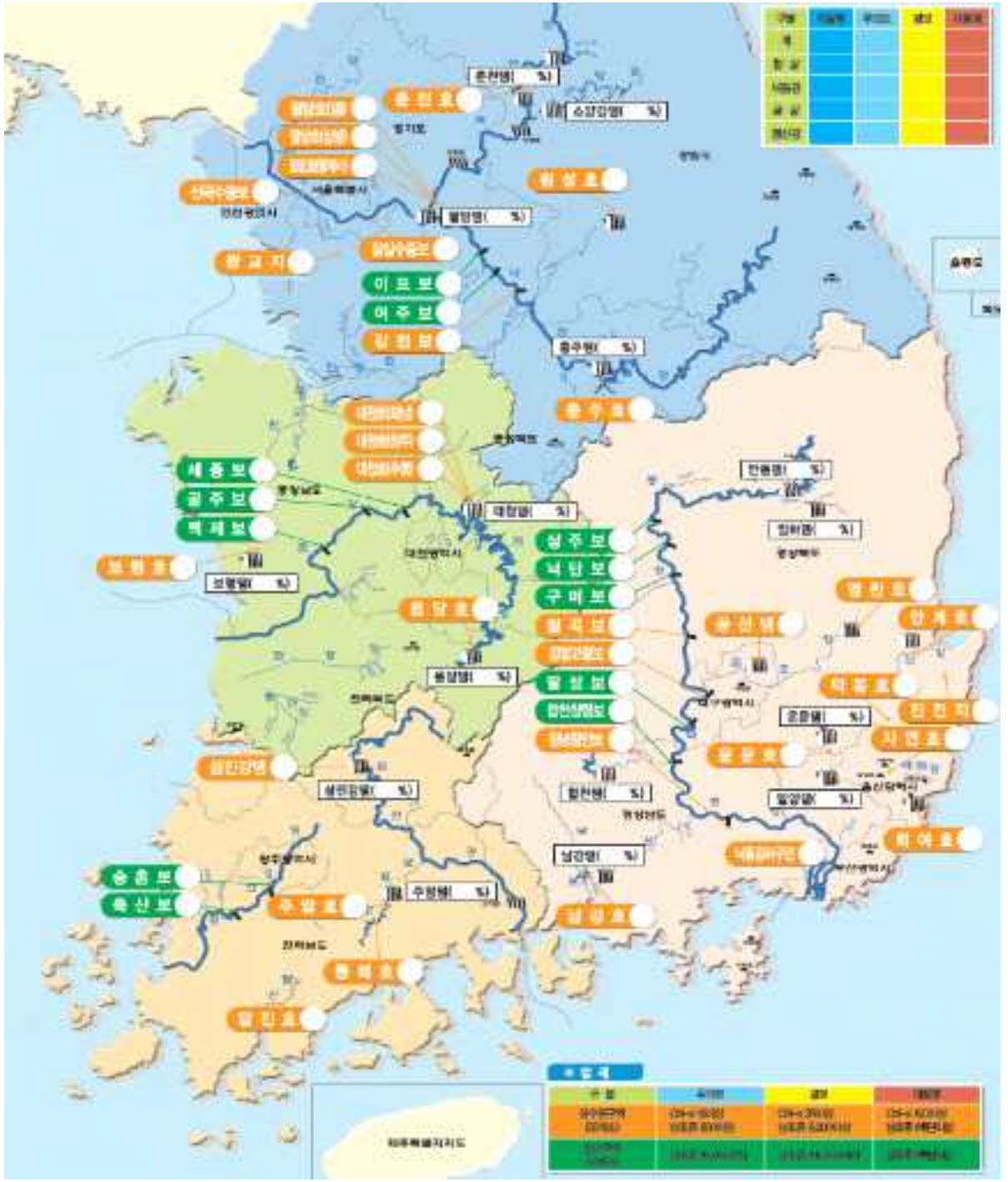
Water Sources & Usage

- Surface water covers most of the water uses, such as agriculture, households and industries.

(source : Ministry of Land, Infrastructure and Transportaion, 2011)

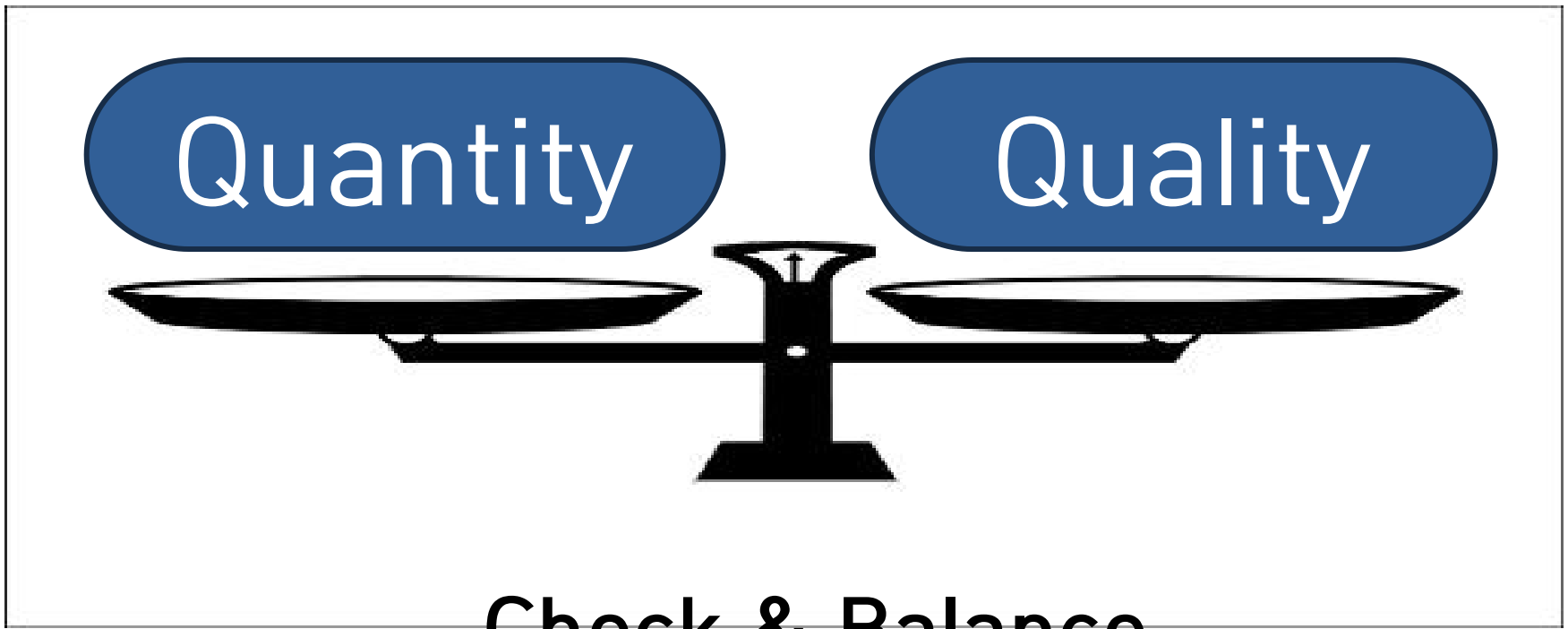


- 4 Major River Basins
  - Han, Nakdong, Geum and Youngsan
  - 16 weirs for controlling flood, increasing water depth and storage volume
- 22 Reservoirs (Dams) for drinking water



Water Management System

- Divided from Quantity and Quality management



Check & Balance

Four Rivers Restoration Project

1. Backgrounds

- Climate Changes
  - storms and heavy rainfalls focused in the summer
  - damages from floods, droughts and other natural disasters
- Water shortage
  - increasing water use in households and industries
  - regional water shortage due to geographic conditions
- Fulfilling increasing demands for a better life
  - boosting economy and comfortable living environments
  - tourism, leisure sports, recreation

2. Process

- President Lee's election pledge (2008)
  - Green New Deal
    * we can have economy & environment, simultaneously
- Organize structures (2009)
- Master Plan for the Project
  - consulting and discussing, meetings, hearings
- EIS (Environmental Impact Assessment), Land compensation
- Constructions (2009~2012)

3. Main Project (1)

- Flood mitigation
  - dredging river bed sediment, flood control reservoirs
- Expanding water supply capacity (1.17 Billion ton)
  - construction of 16 weirs in 4 rivers, 3 small-mid size multipurpose dams, bank-heightening
- Improving water quality control and management
  - sewage treatment plants, abandoned waste disposal

3. Main Project (2)

- Creating water amenity space
  - riverside parks, bike routes, campsites
- Boosting ecomomy
  - public investment ($18.8 billion), job creation

4. Visible phenomenon in rivers

- Blue-green Algae Bloom
  - during summer(Jun. to Sep.)
  - starts from the edge of the river then extends to the middle, as temp. goes up to 20℃

5. Criticisms

- NGOs, Environmental Activist Group (including experts)
  - against the project from the beginning
  - weirs and dredging may influence water flows and underwater eco-systems
  - worrying drinking water sources
  - enormous public spending
- Farmers and Fishermen
  - the damages from inundated arable land
  - decreasing fish catching


SOS 4Rivers
렌드마크보세구조물
이포보지역을 상징하는 명품보
NEWSIS

5. Criticisms (2)

- Inspection Results by BAI (Board of Audit and Inspection, 2013)
  - lack of durability of weirs and structures
  - unreasonable water quality management plan
    - despite flow change, still focus on BOD standard
    - overestimated water supply for river maintenance
    - unprepared algae alert system protecting drinking water sources
  - estimation of higher maintenance costs

6. Investigation & Evaluation

- Special Committee was created in 2013
- consisted of 13 members, all civilian experts
  - to be independent and fair, neutral experts selected through verification (divided, pro and con)
- research and discuss 16 tasks in 4 fields
  - water resource secure, water environment, agriculture, tourism and recreation
  - working group conducted activities including on-site study, underwater investigation, modeling, survey and workshop

6. Investigation & Evaluation (2)

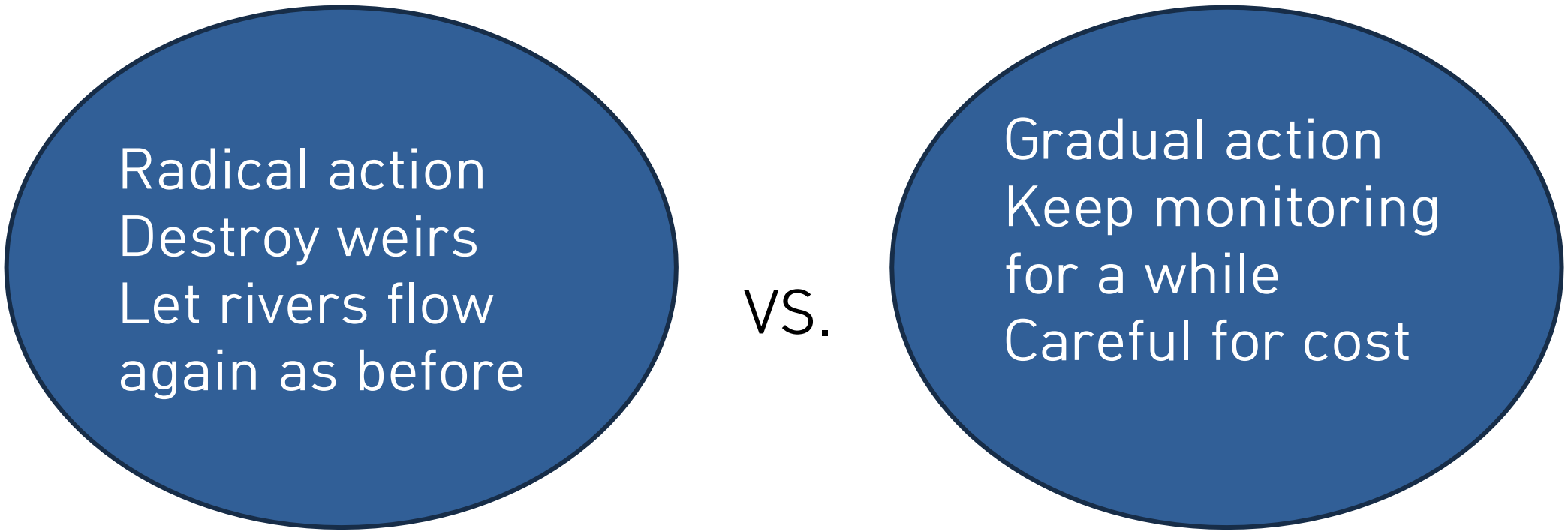
- As to Water Resource Secure
  - general safety level of 16 weirs : acceptable, even if there are several cracks and leaks
  - flood mitigation & water storage capacity : adequate, even if geographical mismatch b/t water shortage region and water volume-up region
  - aftermath of dredging & weirs : continuous maintenance required, due to the retarded water flow (less than 0.1m/sec)

6. Investigation & Evaluation (3)

- As to Water Environment
  - partly increased plant plankton and BOD due to delayed water flow
  - partly blue-green algae (cyanobacteria) dominance (rather than diatom)
  - drinking water supply system, well-managed and safe
  - diminished biodiversity by straightened water course
  - fish species change from shallow-water species to mid or deep water species

7. Demands for Recovery

- Two divided proposals for the recovery



8. Acknowledgement (conflict management aspect)

- Long journey ; 3 yrs of construction, 8 yrs of disputing
  - time, cost, energy consumed, emotional distress and destroyed confidential relationship b/t Gov & NGOs
- Who or which organization played the Mediator role ?
  - No one at first, then later the Committee
- We did evaluation, it's time to make a decision & act
  - what measures to take ? how to embrace severely divided stakeholders ?

Thank you