Impacts of global warming and the adaptation countermeasures related to civil engineering.

○Building a sustainable society based on wise choices and persistent adaptation

Greatly reducing risk through mitigative and adaptation measures

(1) Water security
(2) Food security
(3) Energy security
] Three kinds of security ⇨ Building a sustainable society with peace and vitality

Dealing with uncertainty
- Effects of global warming
- Future social changes

⇨ **Wise choices**
- Multiple options
- Appropriate choices and combinations
- Adaptation responses
- Mainstreaming of adaptation

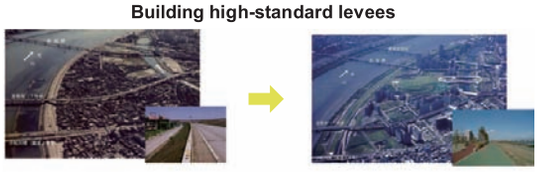
External forces that are greater than anticipated ⇨ **Persistent adaptation**
- Avoiding catastrophic damage
- Rapid recovery

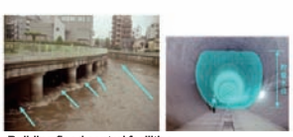
○Proposal of adaptation measures in water security

Adaptation measures for flood control (hydraulic engineering)

- Integrated flood control scheme by facilities and safety planning.
- Construction and overhaul of dikes, flood control basin, dams, etc.
- Using the existing stock in a way that is not limited by existing frameworks
- Developing and publishing methods for the evaluation of flood risk
- Supporting adaptation measures by developing countries
- Promoting innovative education regarding water issues
- Building frameworks related to legal, economic, and social structures and social systems
- Developing new lifestyles and institutions toward the realization of an sustainable society

Building high-standard levees





Building flood control facilities
(underground catchments)

(Photo: Ministry of Land, Infrastructure, Transport and Tourism)

Adaptation measures for coastal area (coastal engineering)

- Protect
- Accommodate
- Retreat

] Use of individual adaptation measures
Developing multi-purpose systems for disaster prevention and mitigation based on combinations of measures

- Planning and implementation of adaptation measures in view of anticipated timelines of the effects of global warming

Maintaining and improving the safety of existing facilities (example:coastal facilities)

Prior to corrective measures,these revetments were in a dilapidated state with deteriorating concrete.

(Photo: Ministry of Land, Infrastructure, Transport and Tourism)

The revetments after corrective measures,with anterior embankment widening.

Adaptation measures for water resources and environmental hygiene (environmental engineering)

- Promoting the reuse of water resources
- Mitigation of heat island phenomena
- Groundwater replenishment and utilization
- Restructuring water use systems within watersheds (agricultural, industrial, and city water use)
- Building water use systems for mutual accommodation within watersheds
- Establishment of sound nutrient salt cycles
- Countermeasures for pathogenic microorganisms and tropical diseases
- Adopting energy saving technologies

Before

After

Re-use of rebuilt discarded hydraulic power plant
(Photo: Tokyo Electric Generation Co., Ltd.)

Problems of global warming and climate change are closely related to social infrastructure construction.
→ It is essential to use civil engineering technologies effectively.
→ With knowledge and experience in a wide range of areas, JSCE has an important role to play.