3rd SUIJI seminar in Kochi

(Six University Initiative Japan Indonesia)

Rural Engineering & My Current Research

Laboratory of Water Use and Environmental Engineering

Associate Professor

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2013.08.29 Southern City Hotel

Urban Engineering

- Civil Engineering
- Architecture

Tower

Highway

Building

Bridge

Waste water treatment

Rural Engineering

- Storage
- Intake
- Transportation

Water

Head works

Dam

Canal

Division works

Pond

Facilities for water use

Main materials for the structure

- Rock & Sand
- Soil
- Concrete

- Merit
  - Low permeability (water)
  - Low cost (economical)
  - High strength (compressive, tensile..)
  - High durability
  - Easy to operate (shape, size, ..)
- Demerit
  - Easy to generate the cracks
  - Lifespan is limited…

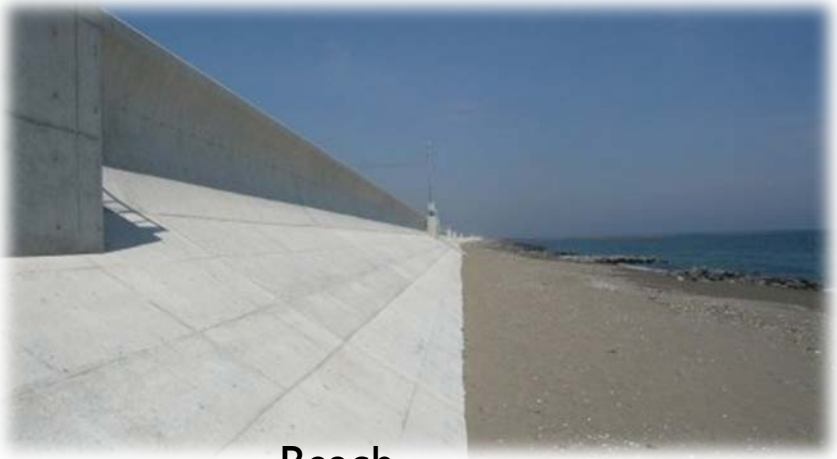
  and …

Improvement for human life

- Safety
- Security
- Efficiency
- Convenience

- Destroyed the relationship with the "NATURE"

River



Beach

Canal

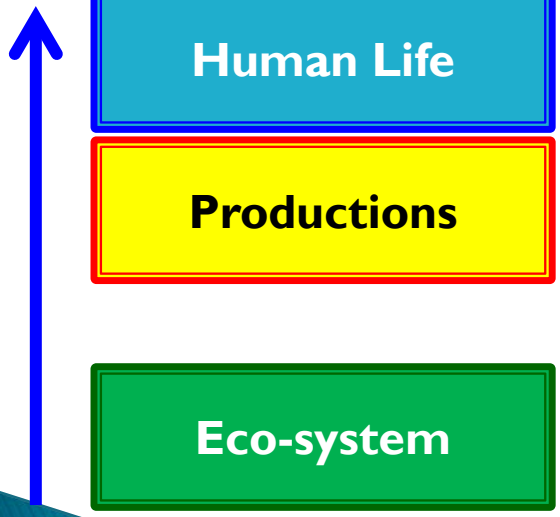
Coast

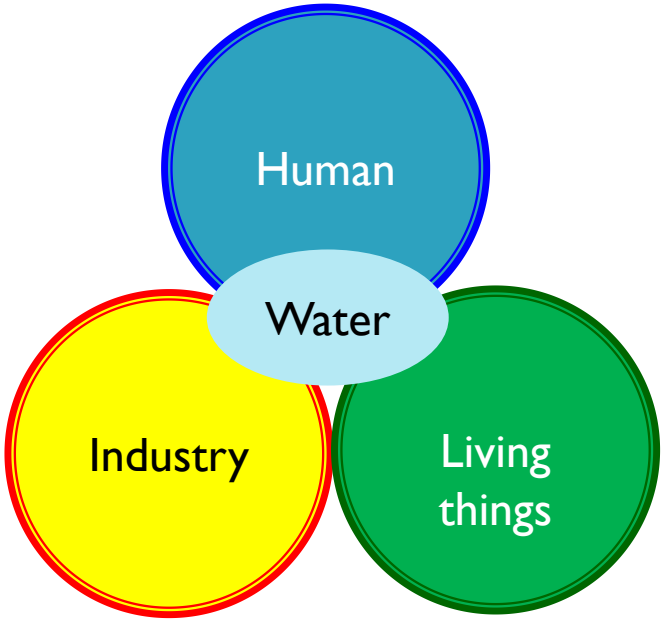
Harmony with nature

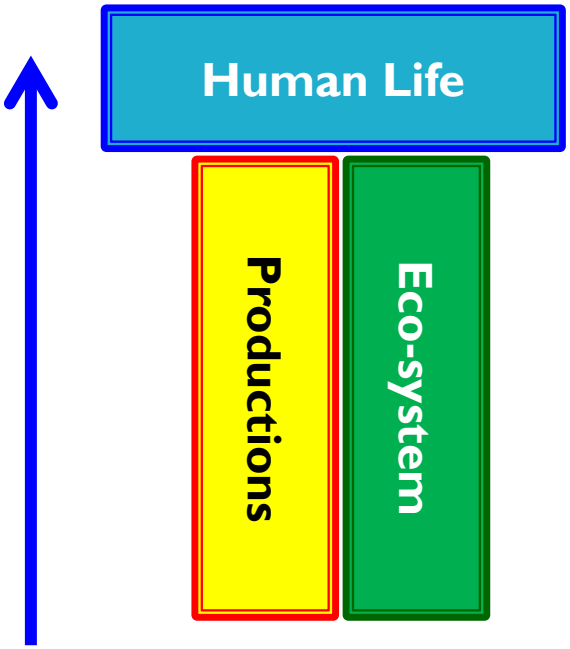
- Safety
- Security
- Efficiency
- Convenience

- People would mention to the Quality of Life.

Priority of past value sense on Environment







Proposition (ideal):

Modern life-style at Rural area?

By the way…

Lifespan of concrete

Q: Guess the supplement periods of concrete structure

- 10 years
- 50 years
- 100 years
- Forever

Depend on the type of structure

Dam: 100 years, Head works: 50 years, Canal: 40 years, etc

As the construction material,

Depend on the supplied environmental condition

Modern cement was developed in 1824, by J. Aspdin

Aging (decaying) of structures

Research theme 1:
Durability & Deterioration of cement & concrete materials

Research theme 2:
Repair & Reinforcement technique for water use facilities

Fixed gate (60years) was collapsed by flood

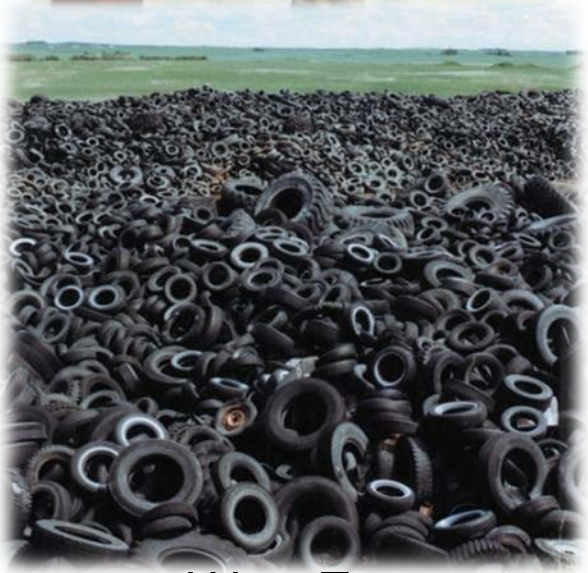
Renewal of Infra-structures

- Re-construct huge amounts of structures!

Research theme 3:
Develop the new functional material for structure

- Various Industrial wastes
- Give new function to concrete

Granite muck



Waste Tire

Water Environment

- Phosphorous is the inhibit factor
- Countermeasure against Non-point sources

Red tide

Research theme 4:
Develop the new functional material for the preservation of water environment

Waterbloom

Soaking type

Floating type

Phosphorous Adsorption Concrete

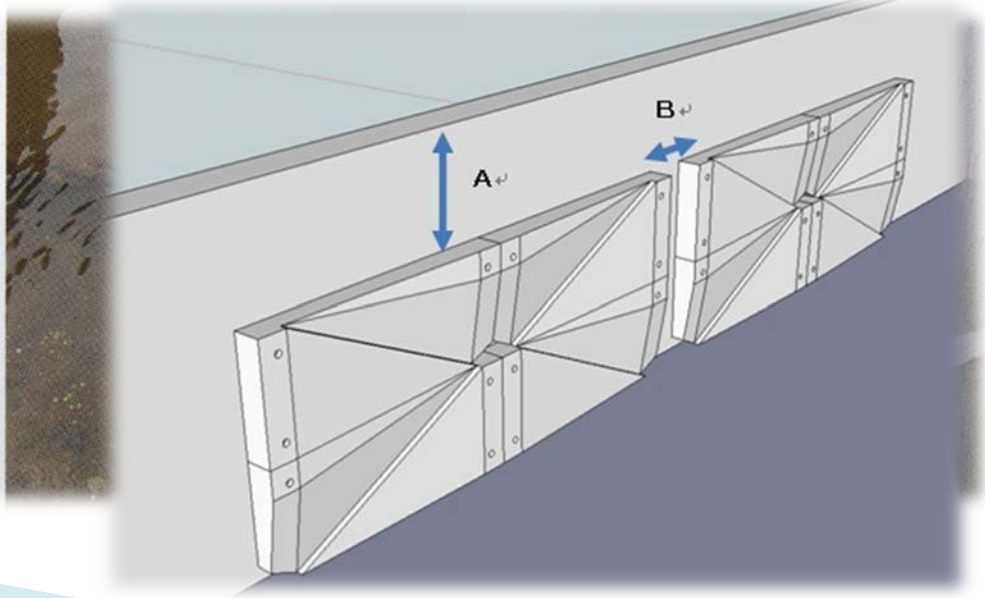
Paddy field and canal -Flogs

- Concrete canal is the death trap for flogs!

Research theme 5:
Develop the new functional material for structure

- Species
- Size
- Angle
- Width
- Void ratio

and so on



Paddy field and canal -others

M. Anguillicaudatus (weather loach)

some of them are in danger of becoming extinct.

Research theme 6:
Problems on endangered species

Cyrenidae (fresh water clam)

indigenous species are decreased, and replaced to other species

Research theme 7:
Problems on exotic species

Have the roll for Water purification (to organic matter)
Can adsorb the heavy metals in water (lead, arsenic, etc)

Apply to Bio-remediation technique?

Marine Environment

ISOYAKE

Seaweed bed

Red sea turtle

Lost of breeding beach in Kochi

Vision for ideal rural area

- Concrete is not the villain.
- Depend on the person who use this material.
- Con- crete → Con- **create**

Thank you for your kindly attention!