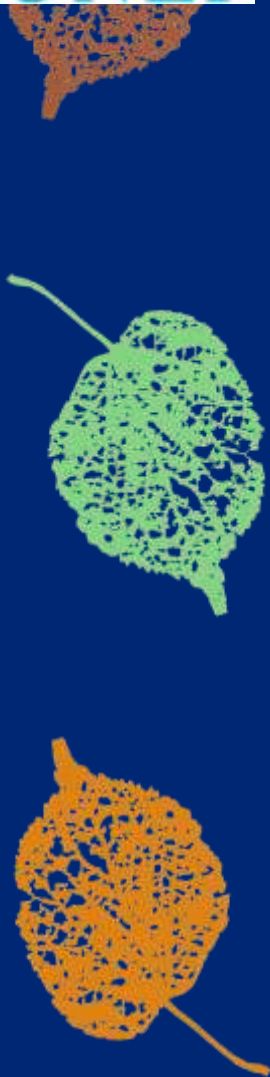# Module 2

- **Presentation of workshop catchment example**

- **Think about your home catchment; providing grounding to personal reality**

- **Each team present their catchment**

- **Lecturer describes workshop example catchment**

- **Groups develop conceptual model-what does a catchment ecosystem look like?**

- **Groups present**
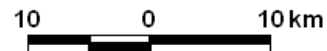
Module 2
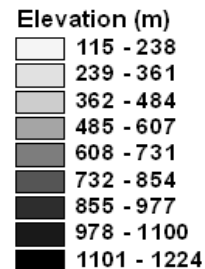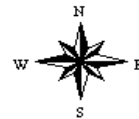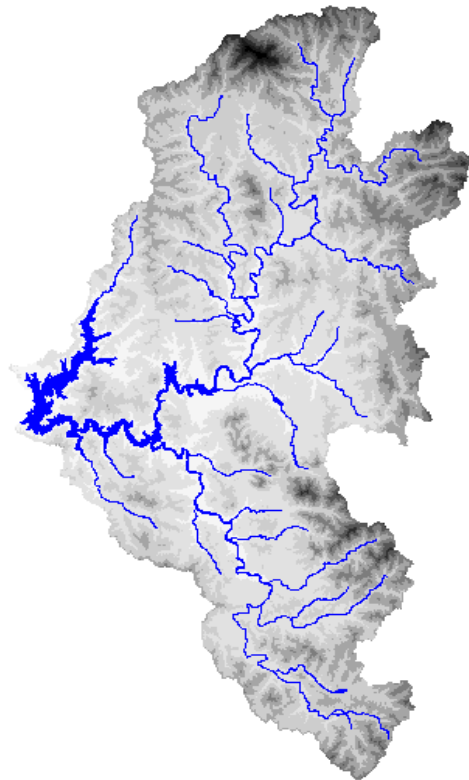## An Initial Conceptual Framework

Our Workshop Catchment

- **Maward dam**
  - **Largest multipurpose dam among total 20 multipurpose dams in Atlantis region.**
  - **Located at upstream of Achlach River which is second largest river in Atlantis region.**
  - **Mazahr Dam $3*10^6 m^3$**
  - **Storage volume in Maward dam is $6*10^8 m^3$**
  - **Major source of drinking water in the upper area of the Achlach River Basin**
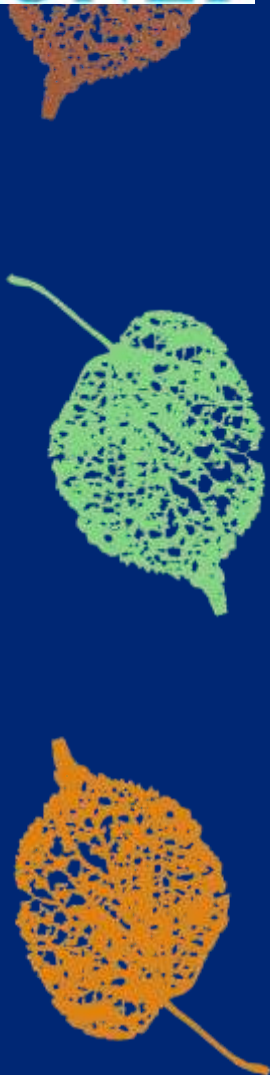
Our Workshop Catchment

- **Interested catchment**
  - **Catchment area:1361 km^2**
  - **Length of river: 98.1 km**

Elevation (m)
	115 - 238
	239 - 361
	362 - 484
	485 - 607
	608 - 731
	732 - 854
	855 - 977
	978 - 1100
	1101 - 1224

10   0   10 km
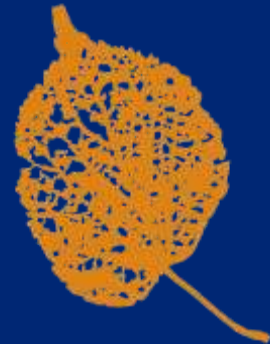
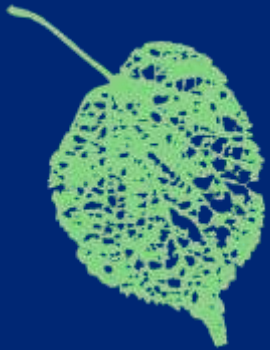# Our Workshop Catchment

- **Stakeholders**
  - **Farmers**
  - **Fishers**
  - **X-water which operate Maward dam**
  - **Local government**
 - **Central government**
  - **Urban community**

Our Workshop Catchment

- **What's problem (1)?**
  - **High turbidity**
  - **Turbidity reached up to 1,221 NTU and continuous for 340 days after two storms**
  - **High turbidity impact the ecosystem including fish and benthic macro invertebrates**
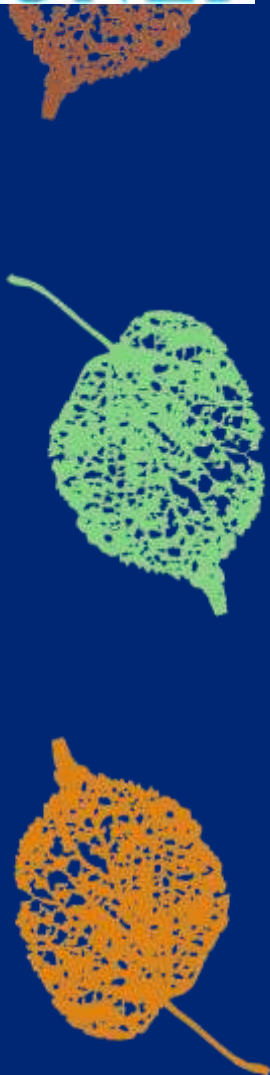
Our Workshop Catchment

- ## Average SS concentration in two dams

Our Workshop Catchment

- **Average turbidity concentration in two dams**
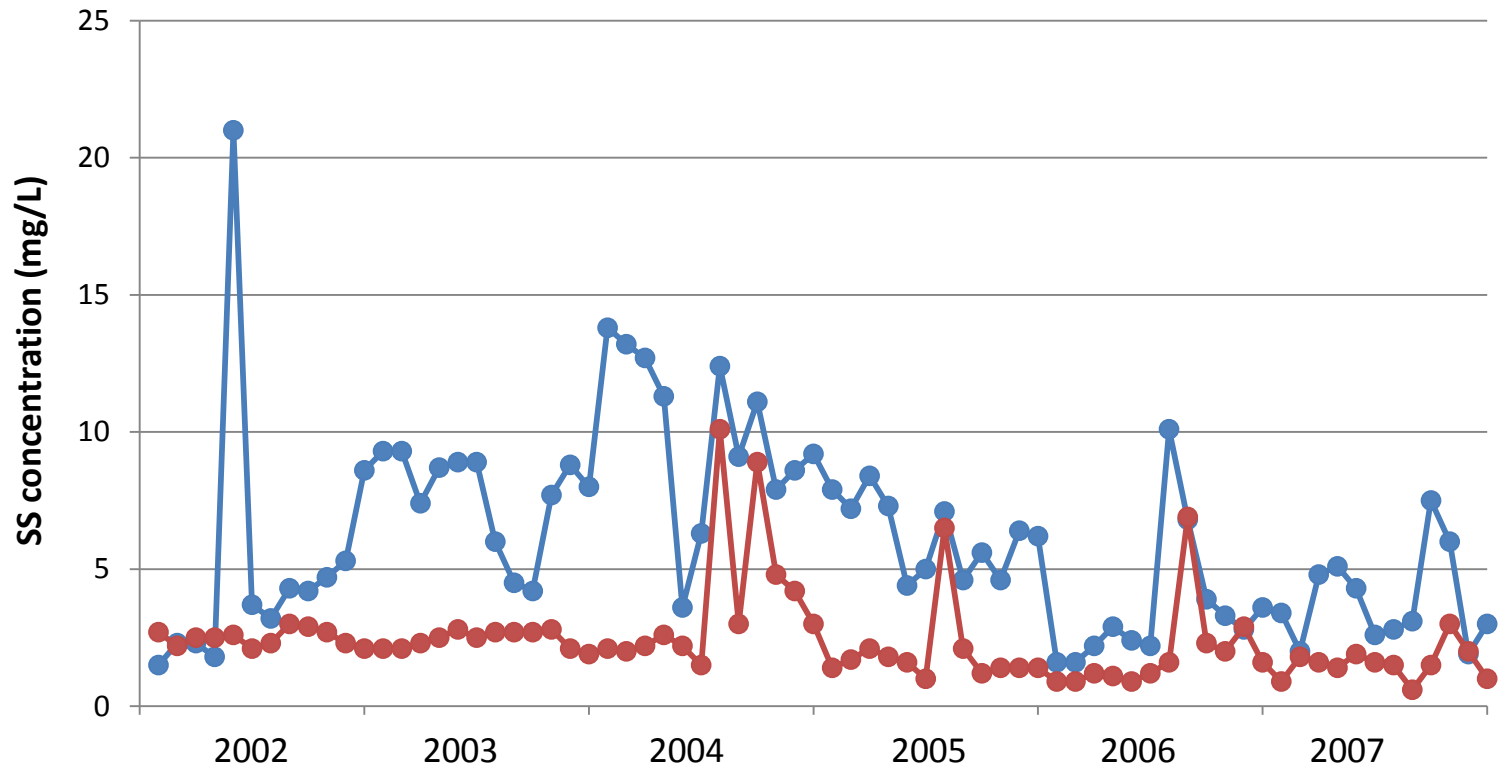
Our Workshop Catchment

- **What causes the problem (1)?**
  - **Heavy rainfall**
  - **Soil erosion from alpine field**
  - **Geological characteristics : soil layer is consist of fine clay**
    - **It does not settle well**
   - **It caused different turbidity in Maward dam**

Our Workshop Catchment

- **What are we doing to solve the problem?**
  - **Establishment Maward Reservoir Commission**
    - **Consists of central and local governors, professors, X-water**
    - **Making decision of implement of Basin Management Plans(BMP)**

Our Workshop Catchment

- **What are we doing to solve the problem?**
  - **Research project to find hot spot and evaluate the BMPs to reduce soil erosion**
  - **Monitoring during rainy and dry day**
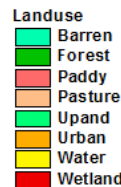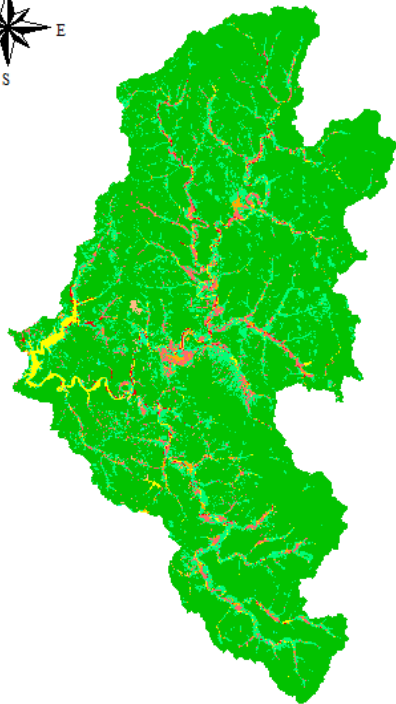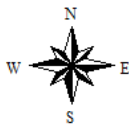 - **Implement the BMPs**
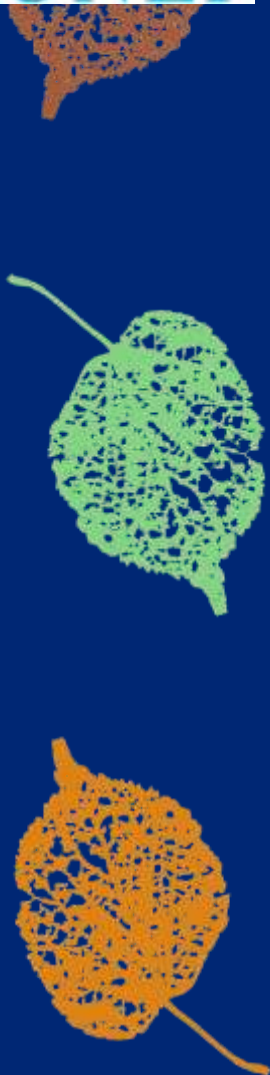
Our Workshop Catchment

- **What's problem (2)?**
  - **Constructing the diversion tunnel between Mazahr and Maward dams to storage more water ($3.0*10^7 m^3$)**
  - **Fisherman have opposed it because they guess exotic fishes in Mazahr Dam go to Maward Dam and they might disturb native fishes**

- **What's doing to solve the problem (2)**
  - **Installing facility to block the fish**

Our Workshop Catchment

- **Land use classification**

Landuse
- Barren
- Forest
- Paddy
- Pasture
- Upand
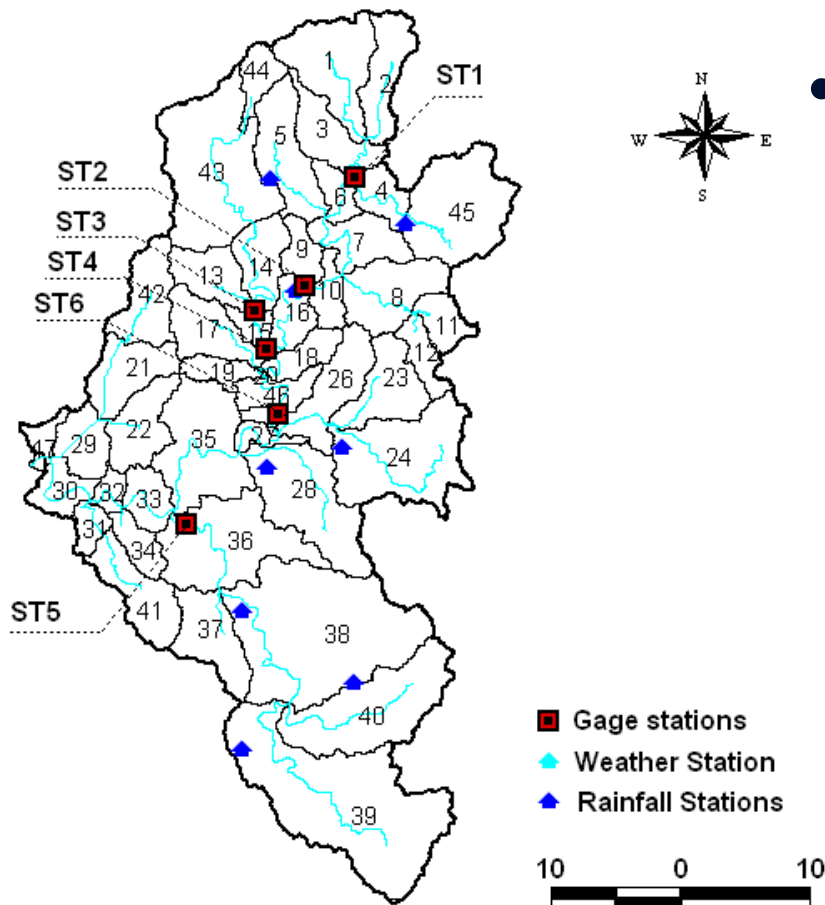- Urban
- Water
- Wetland

20   0   20   40 Kilometers

- **Urban: 1.4%**
- **Crop: 15.0%**
- **Forest: 78.8%**
- **Pasture: 0.4%**
- **Barren: 1.1%**
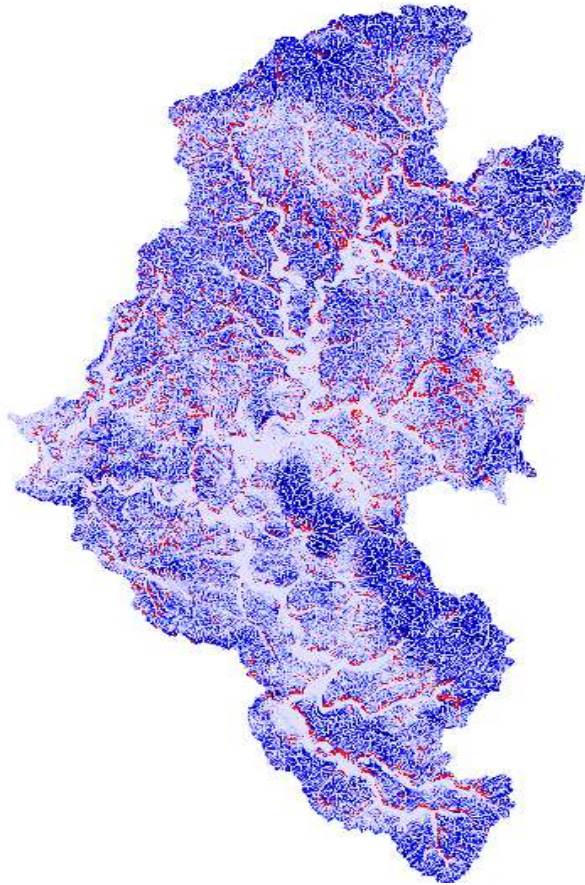- **Water: 2.4%**

Our Workshop Catchment

- **Monitoring**

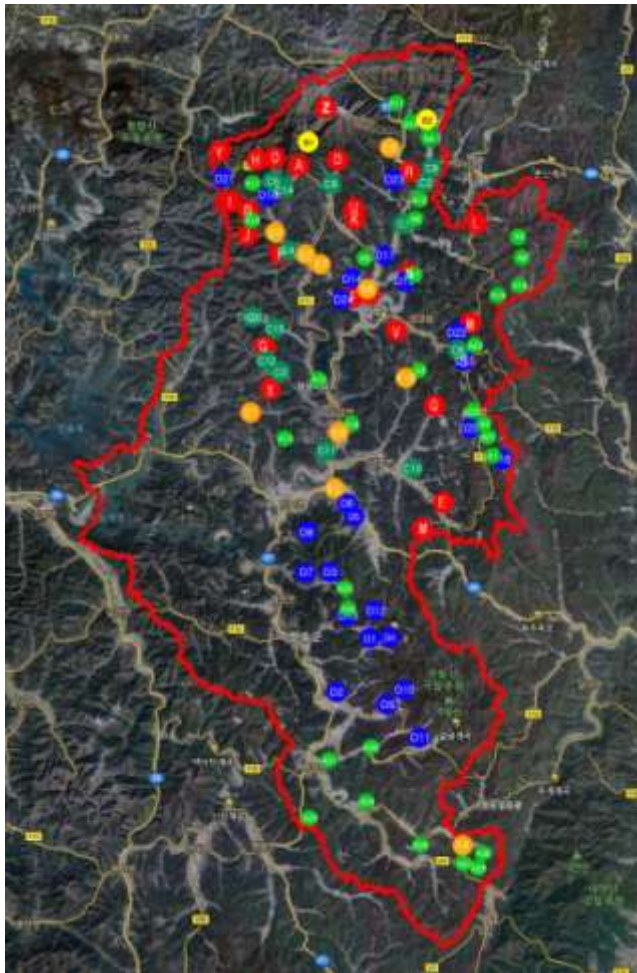- **Monitored every 4 hours during rainy day**

Our Workshop Catchment

- **Finding hot spot**

Our Workshop Catchment

- **Evaluating control measures**
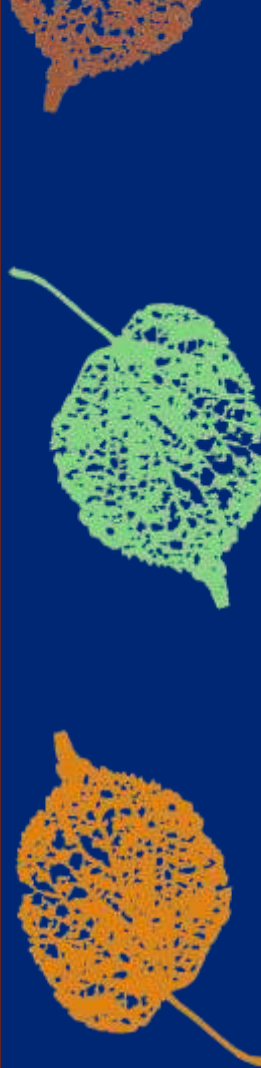
Maward reservoir commission

- **Recent meeting**

Field trip

- **Mountain field: cause soil erosion**

Field trip

Construction site: cause soil erosion

Field trip

Construction site: cause soil erosion

Field trip

BMPs : Roundabout channel

Field trip

BMPs : Roundabout channel

Field trip

- **BMPs: Restoration of stream**

Field trip

- **BMPs: Restoration of stream**

Your home catchment

- **Each country team will have 5 min to describe their home catchment. Present the material you prepared in advance, in the order requested**

Danum Valley, Borneo

Developing a Conceptual Model

- **Each group will present their conceptual model in plenary (10 min)**
  - ① **catchment name (country)**
  - ② **Issue**
  - ③ **Cause**
  - ④ **Control measures**

How might you implement that?

Can you see ways you might try that?
Can you envision challenges in trying that?
Do you have any questions about how that might work?