

The logo for NARBO (Network of Asian River Basin Organizations) features the word "NARBO" in a bold, blue, sans-serif font with a white outline. The letters are set against a blue background that includes a stylized globe with latitude and longitude lines.

Network of Asian River Basin Organizations

RED RIVER BASIN ORGANIZATION

The Role of Reservoirs and Dike

(The key for success)

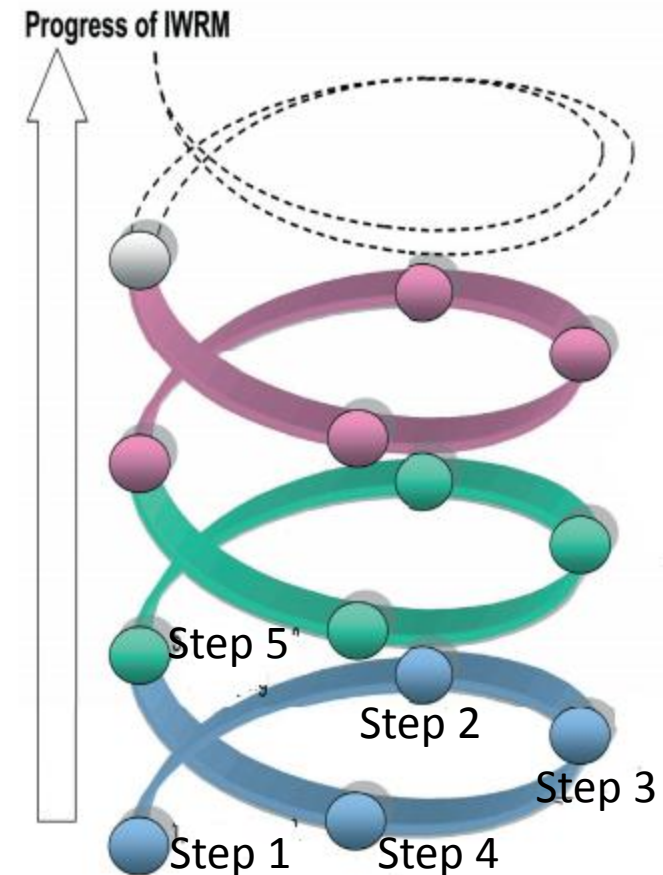
Presented by: Mr. Nguyen Van Manh, Director of DABO

Mr. Nguyen Duc Lu, Deputy Director of BHHO

Mr. Sai Hong Anh Water Resources Engineer

Presentation Outline

- Introduction of RRBO (Step 1)
- Identifying (Step 1)
- Conceptualizing (Step 2)
- Solutions (Step 3)
- Implementing (Step 4)
- Identifying again (Step 5)

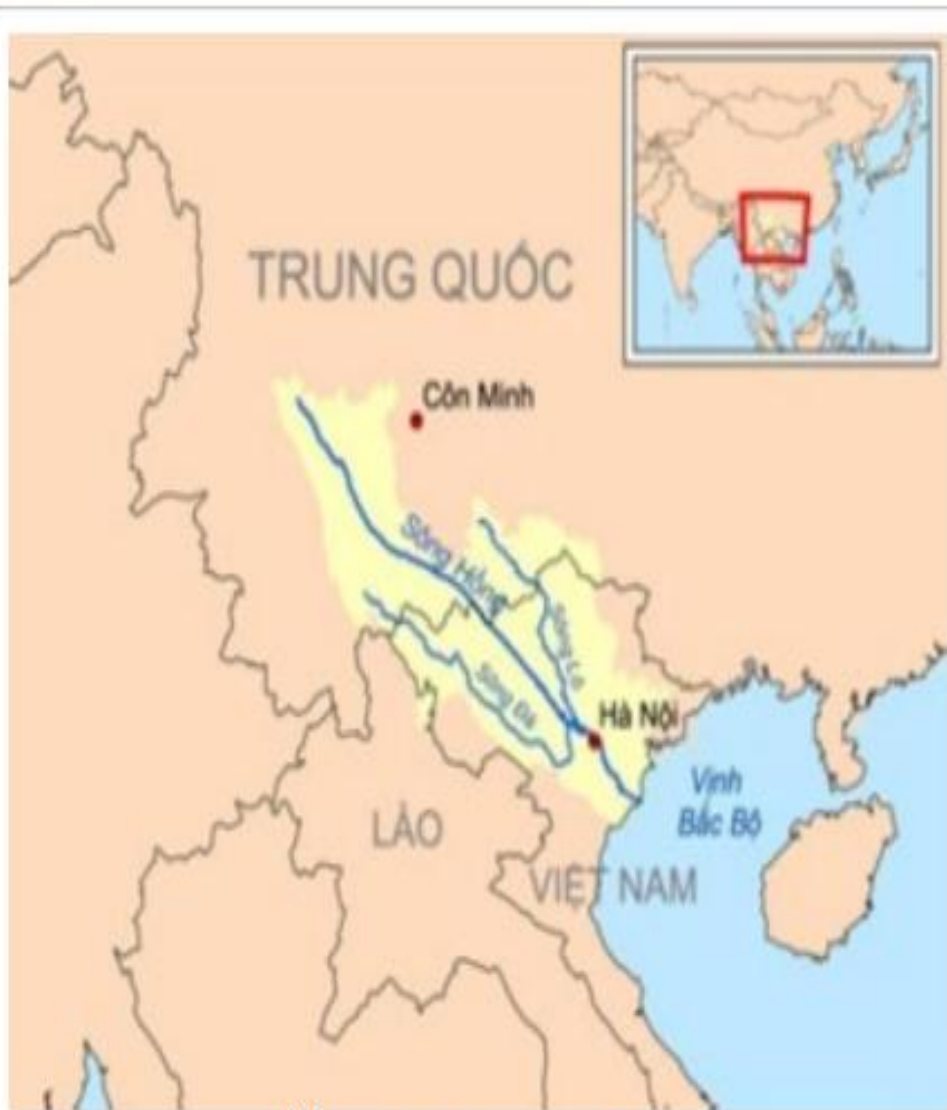
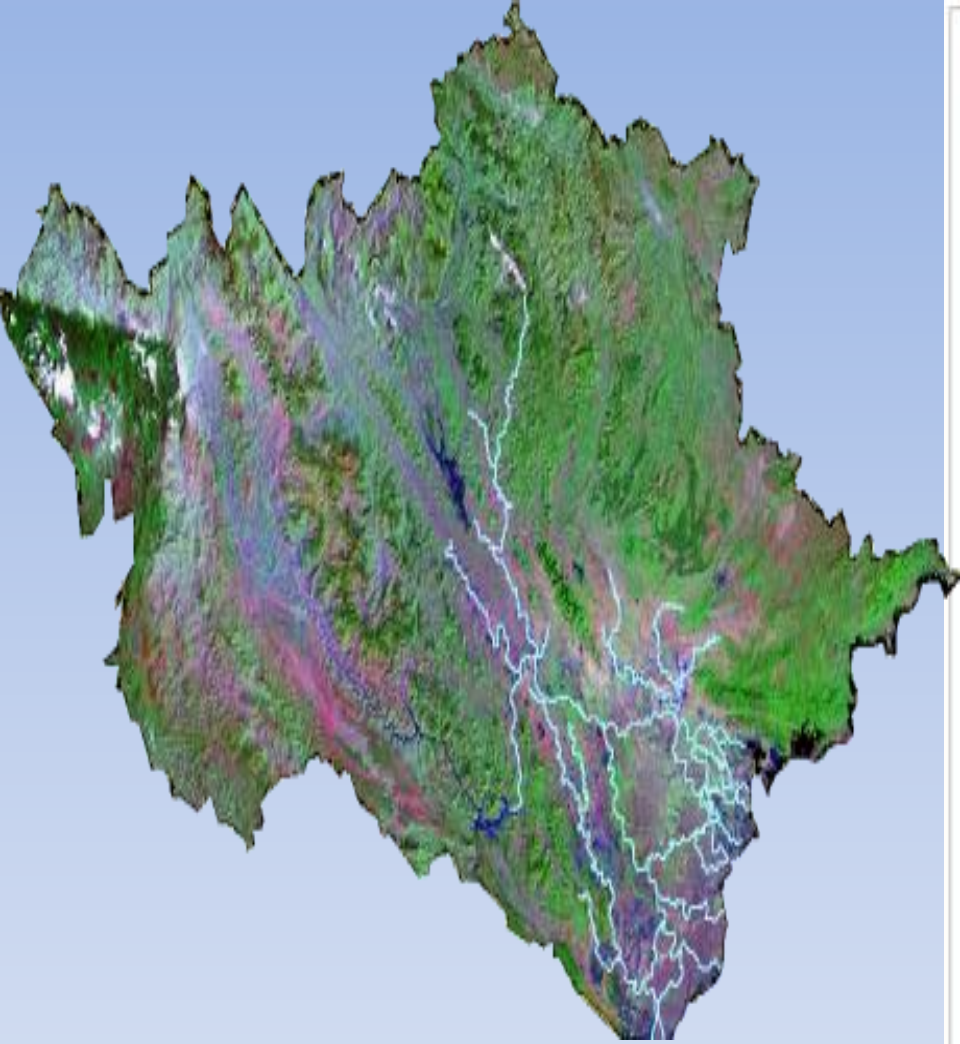


I. Introduction

Red is an international river basin covering 169,000 km² flowing through 3 countries: Vietnam, China and Laos.

- +The part in China covers 81,200 km² or 48% of the basin area.
- +The part in Laos covers 1,100 km² or 0.7% of the basin area.
- +The part in Vietnam covers 86,680 km² or 51.3% of the basin area.

- This is the second biggest river running through Vietnam to the East Sea. The Red river is formed by 3 main tributaries: Da, Lo and Thao rivers (picture 1).
- The basin is gradually sloping from Northwest to Southeast
- Topographical conditions in the Red river basin are very complex. More than 47% of the basin are above 1000m (79,200 km²), mostly found in the Western part (63,700 km²) in the Da and Thao sub-basins; 15,450 km² on the plateau in North of Lo river.
- More than half of the delta is less than 2 meter above mean sea level. It is protected from flooding and typhoon storm surges by 3,000 km of river dykes and 1,500 km of sea dykes.

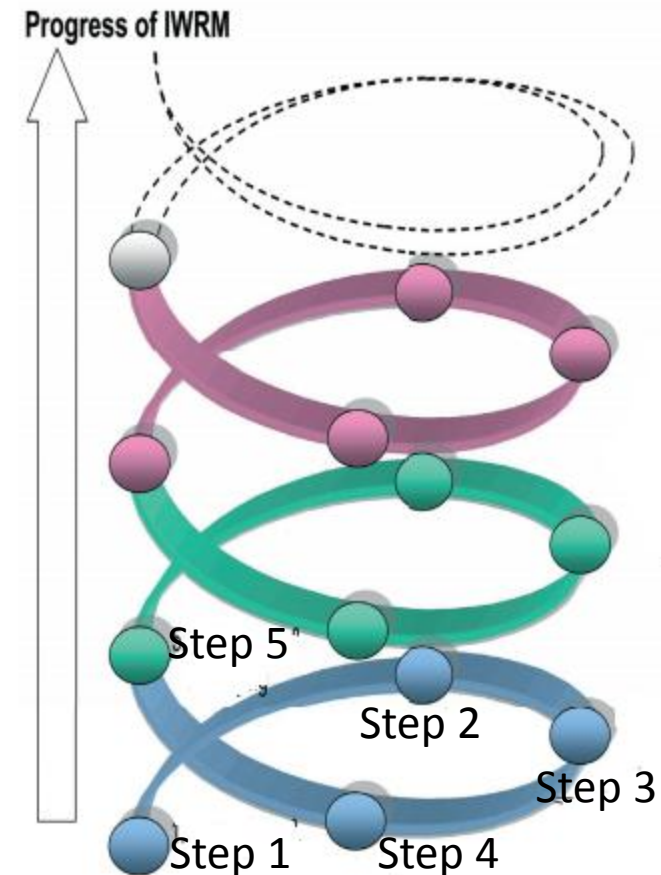


*Picture 1:*Red –Thai Binh River Systems in VietNam

[1]:The Red Thai Binh River delta

Presentation Outline

- Introduction of RRBO (Step 1)
- Identifying (Step 1)
- Conceptualizing (Step 2)
- Solutions (Step 3)
- Implementing (Step 4)
- Identifying again (Step 5)



II. Identifying

No	Documents	Contents	Methodologies
Step 1	Natural conditions of Red River Basin	Geographical location	Field, survey, combine with local data.
		Topography Geomorphology	Survey
		Meteorological situation	Collected from meteorological stations of Several districts in the North of VN
		Water resources situation	Field, survey, combine with local data.
Step 2	People's situation - economic	People's situation - economic	Survey, combine with collect reports of local government
Step 3	Current status of water resources	Deciding stakeholders and Current status of water resources	Survey, calculation and combine with data of local government.

II. Identifying

The Delta system model based on **MIKE11 model**; the red arrows are the river inflows (regulated and non), the red squares the sea level at the nine river mouths and the red dots the intake points of the irrigation districts



Diagram of Mike 11 model to calculate water level and hydraulic water.

II. Identifying

1. We used Water Evaluation and Planning System (**WEAP**) model to calculate water balance.
2. We used NAM model to calculate flow in rivers
3. We used HEC-ResSim model to give operation process for reservoirs. (solutions)

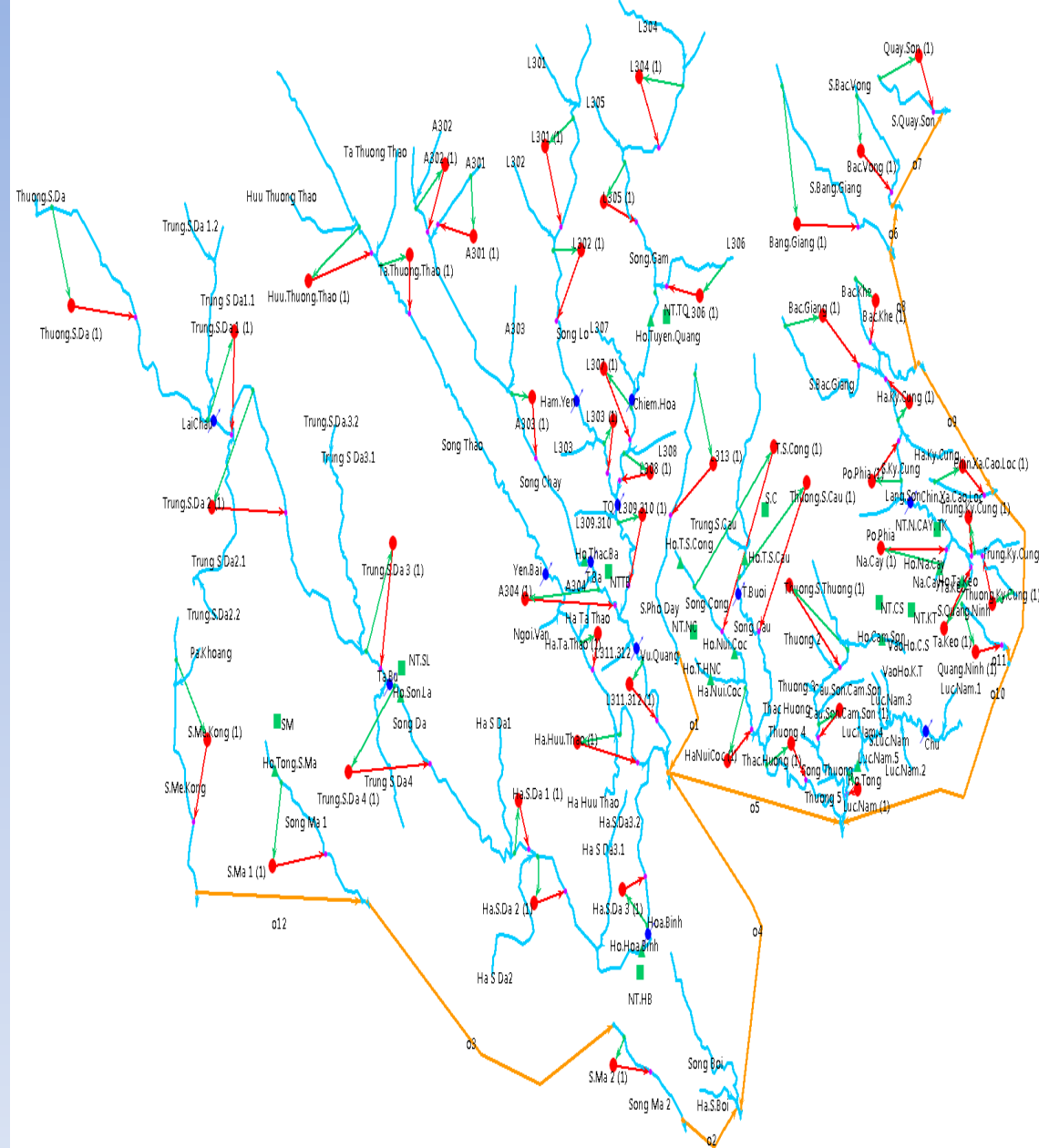
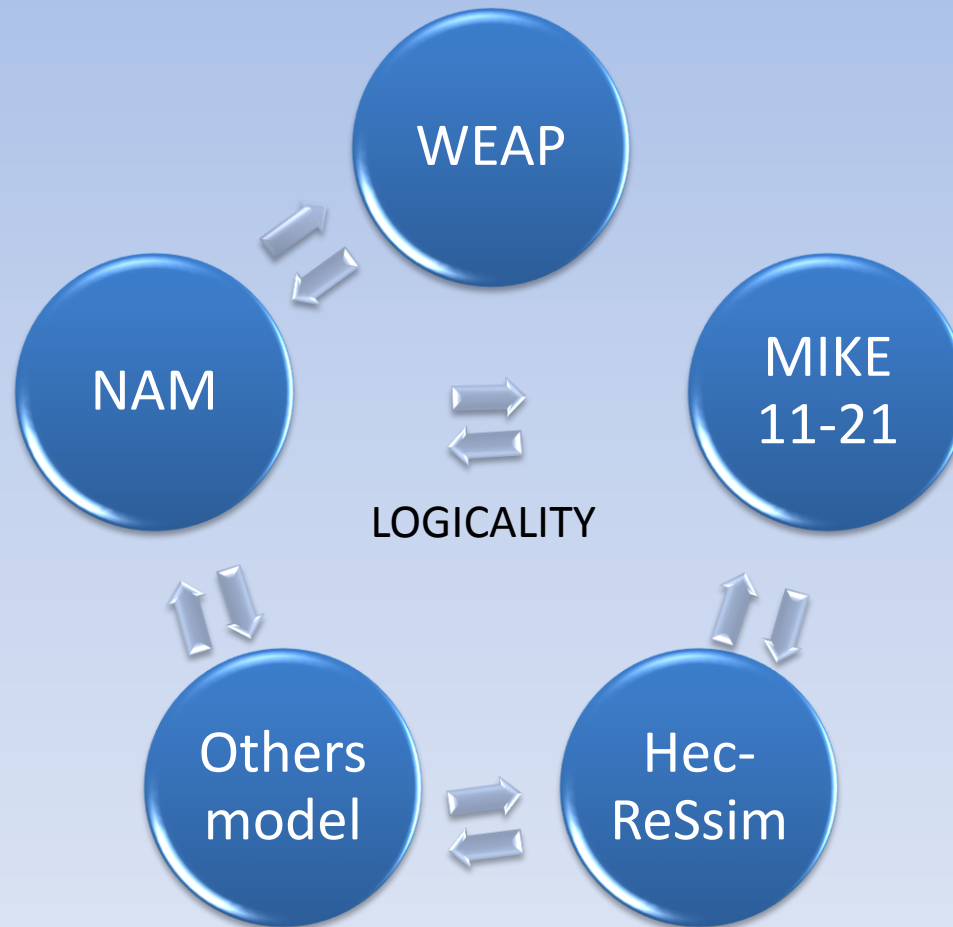


Diagram of WEAP model to calculate water balance



II. Identifying

There are two main issues including:

1. Flooding in raining season.
2. Drought in dry season.

III. Conceptualizing

- Flooding
- [Drought](#)

(we have to answer three questions where?, when? and why ?)

NARBO

Network of Asian River Basin Organizations



NARBO

Network of Asian River Basin Organizations



IV. Solutions and implementation

1. Works

- ✓ Building big reservoirs (Hoa Binh 9862 million m³, Son La 9260 million m³, Tuyen Quang 2260 million m³, Thac Ba 2940 million m³)



IV. Solutions

1. Works

- ✓ Building 3,000 km of river dykes and 1,500 km of sea dykes to protect Ha Noi



2. Non- structural works

- ✓ Strengthen the management and provide the knowledge to the people in order to improve efficiency in the exploitation and protection water resources.
- ✓ The development of those resources should be multi-purpose tasks associated with agricultural restructuring:
- ✓ Increased participation of the stakeholders
- ✓ Educational organizations to raise awareness sweeping the community, with specific activities

NARBO

Network of Asian River Basin Organizations



THANK FOR YOUR ATTENTION!