

# FLOOD MONITORING AND EARLY WARNING IN THAILAND



**Thada Sukhapunnapan**  
ROYAL IRRIGATION DEPARTMENT

## Types of Flood in Thailand

### 1 Overbank flow inundation



### 2 Flash flood

## 2. Types of Floods in Northern Thailand

### Flash flood and debris flow



### 3. Causes and factors of flood and debris flow





# How to warning ?

Flooding →



Mudslides

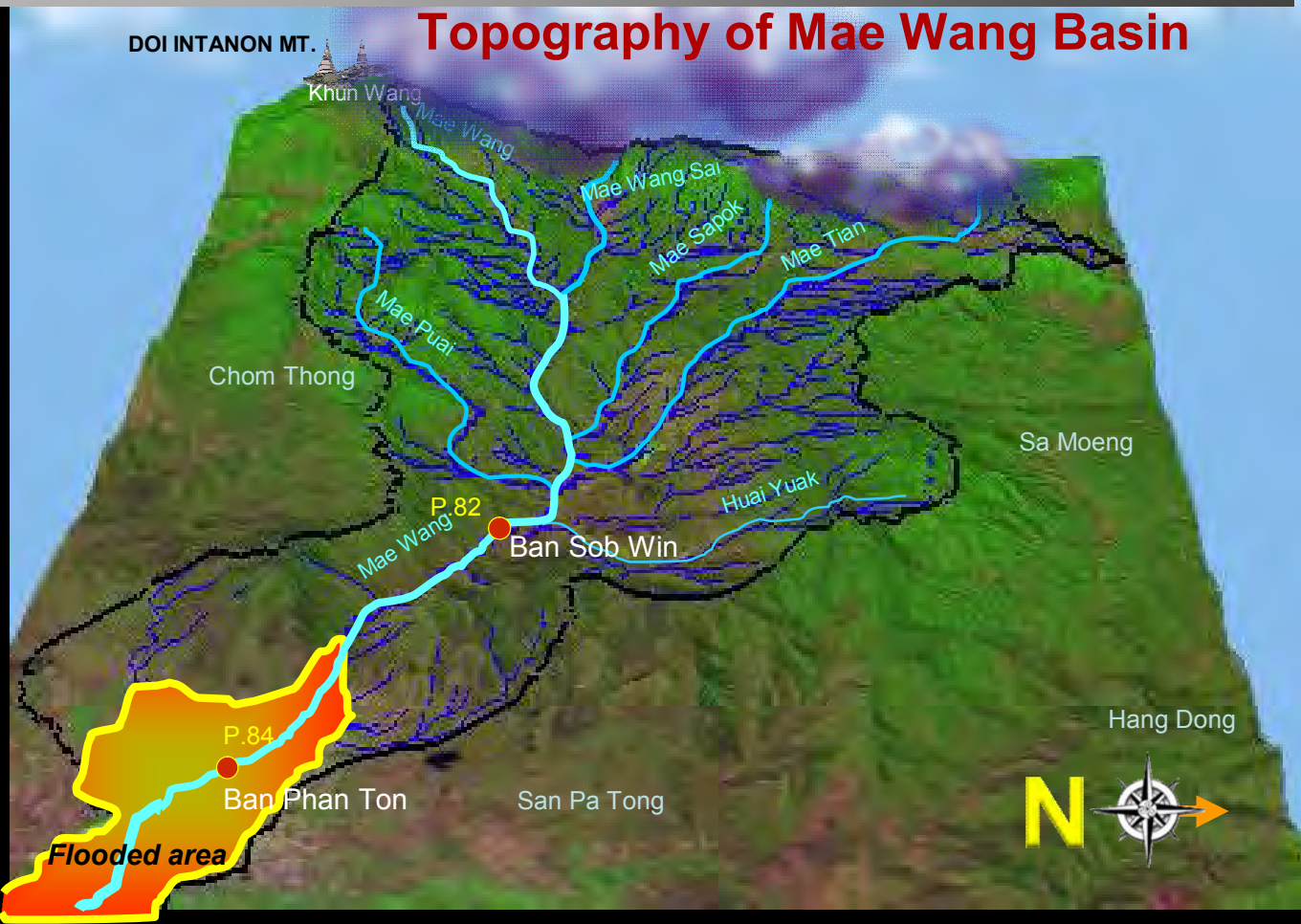


# Location and Physiological characteristics

Mae Wang Basin - Mae Wang Dist. Chiang Mai



# Topography of Mae Wang Basin



- River runoff and water level data

Mae Wang

P. 82

Ban Sob Win,  
Mae Wang Dist.

Distance  
18 Km.

P.84

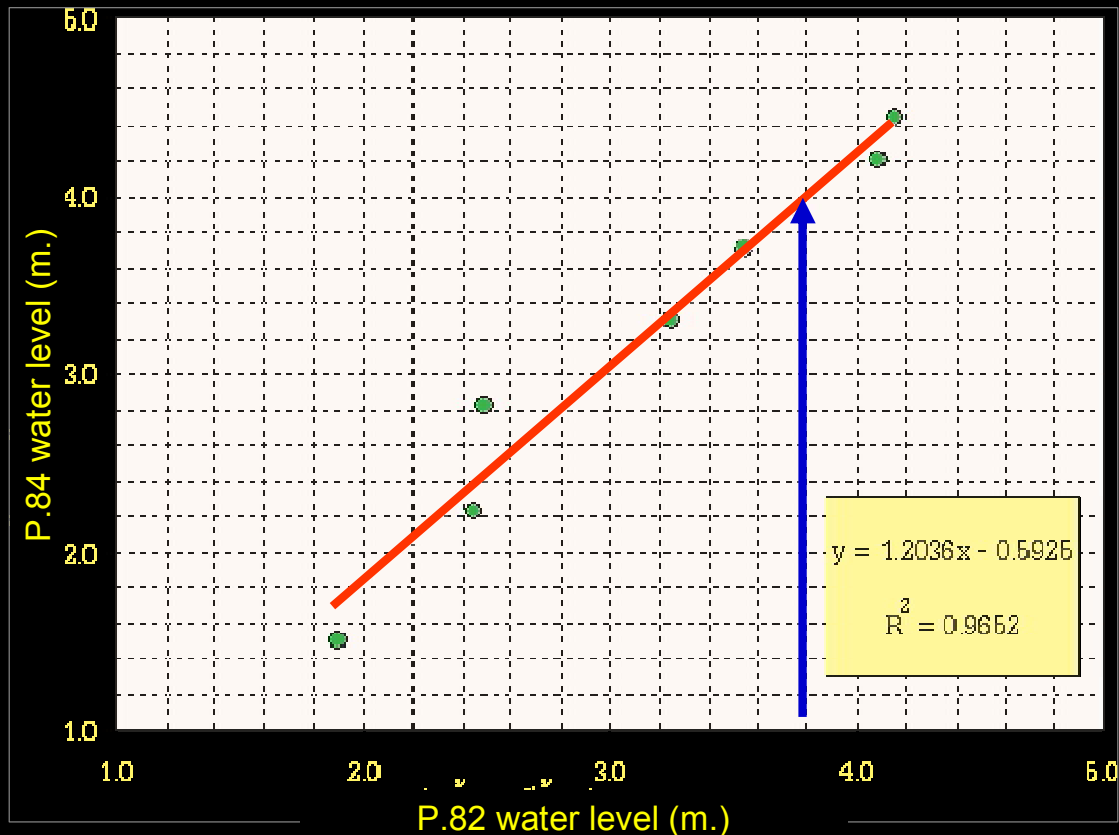
Ban Phan Ton,  
T. Thung Phi

## Water level time lag of Mae Wang River between station P.82 and P.84

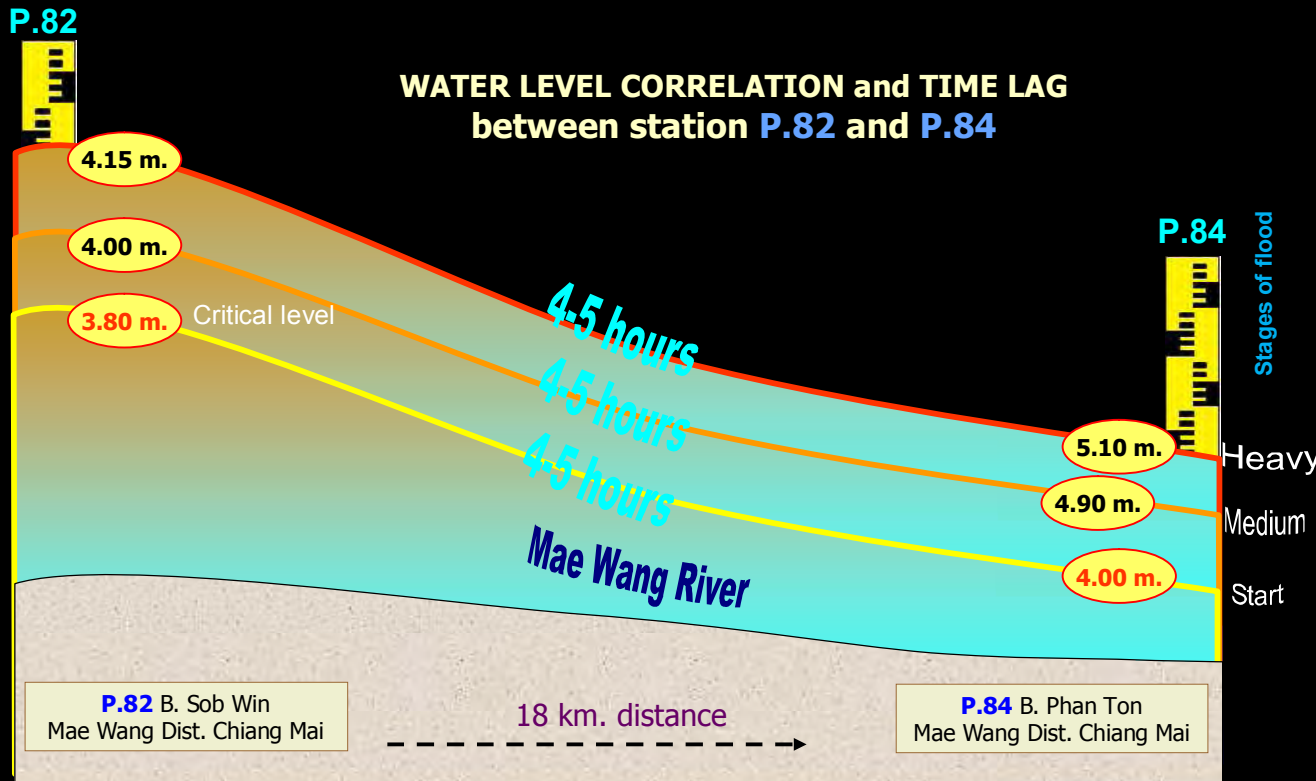




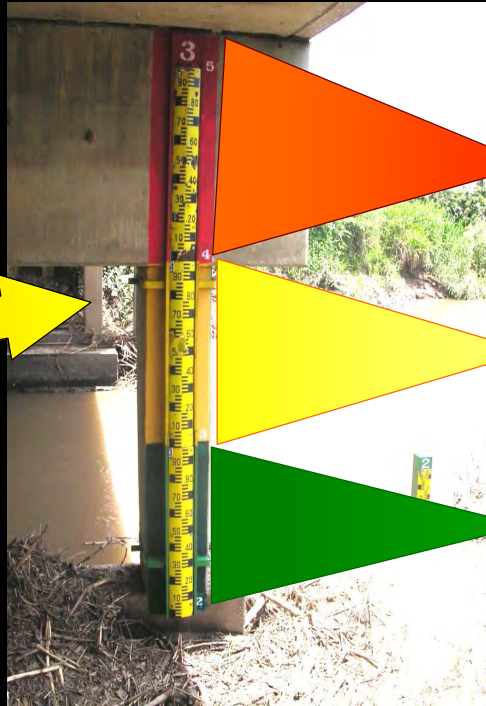
## Water level correlation between P.82 and P.84



- River runoff and water level data



- Public awareness

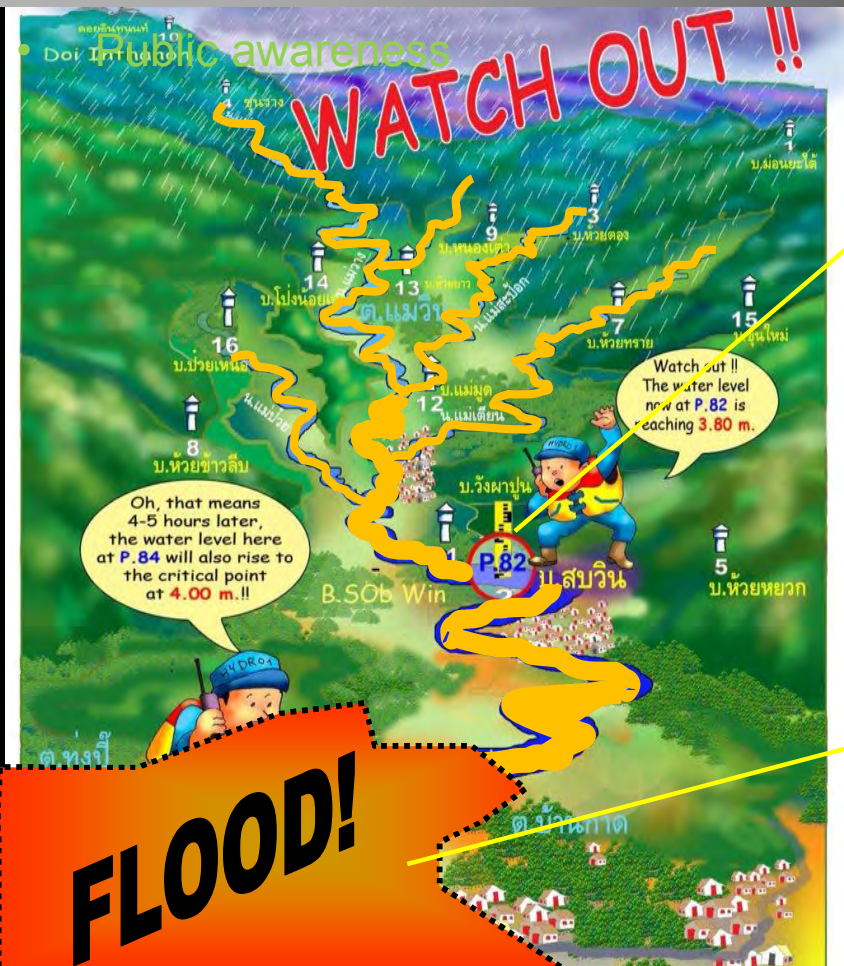


**Flood**

**Critical  
range**

**Normal**

River status indicated by colors on the staff gage



**station P.82  
BAN SOBWIN**

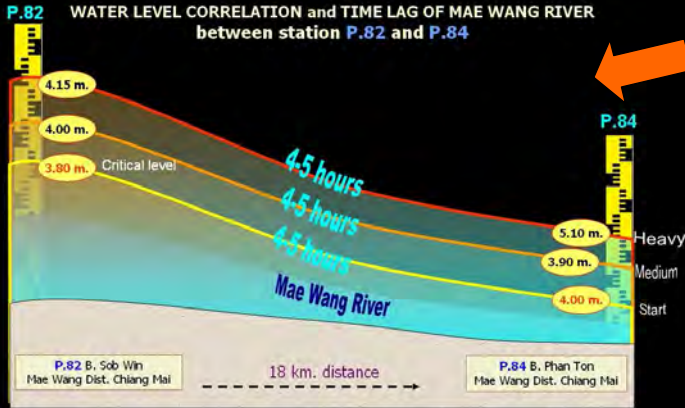
**water level  
3.80 m.**

**18  
km.**

**station P.84  
BAN PHANTON**

**water level  
4.00 m.**



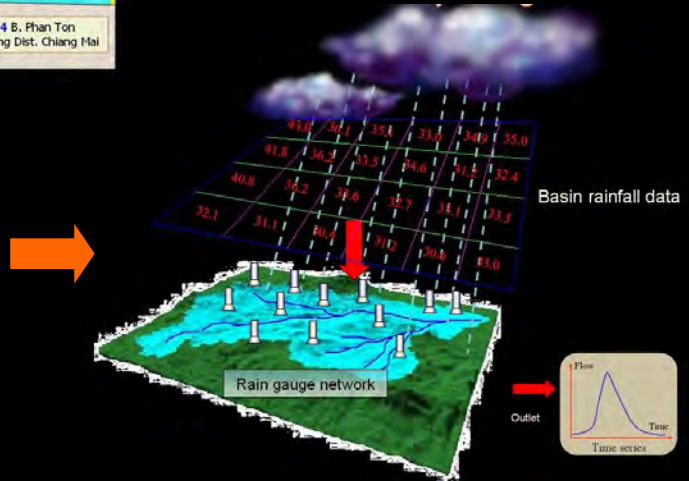


## Current warning system

Using river stage correlation between upstream station No.2 and downstream station No.6 for flood forecasting and early warning.

## Future planning

Rain gage network and distributed hydrological model for Mae wang and could be applied for the other flooding areas as well.



- Local weather information

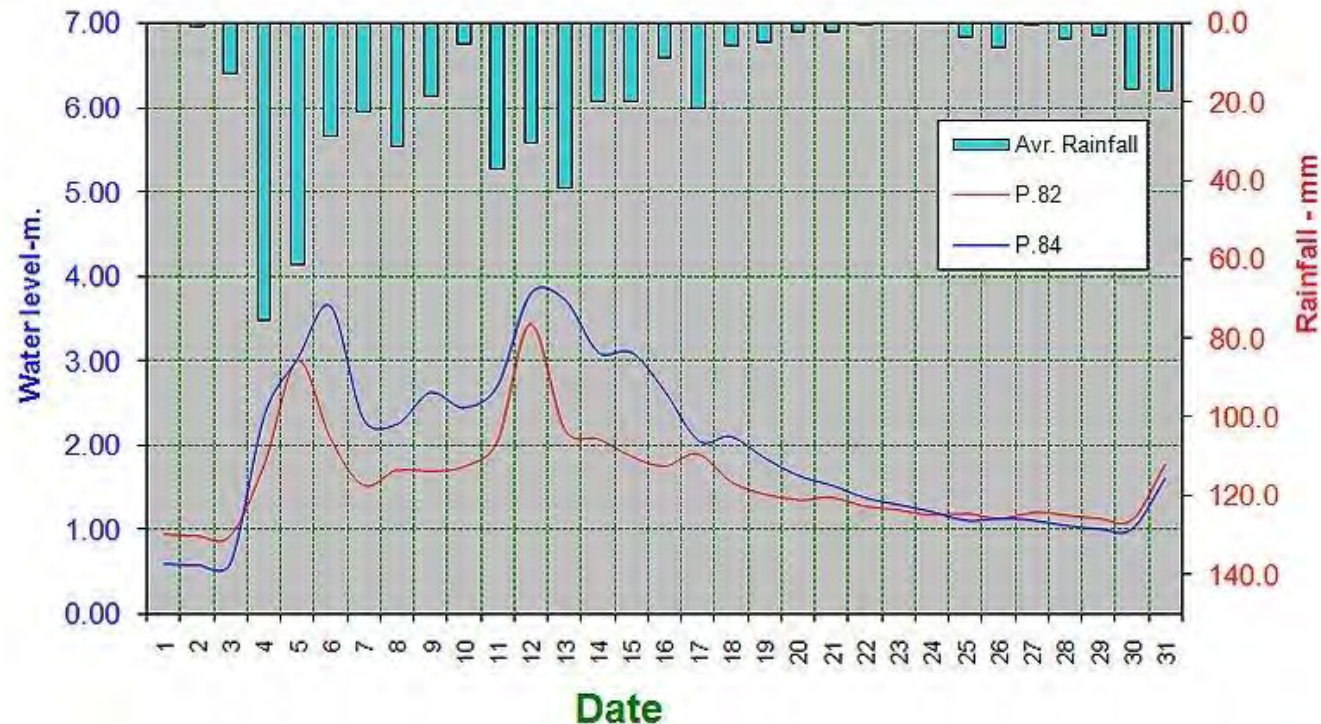
Rain gauge network daily report



- Local weather information

May 2007

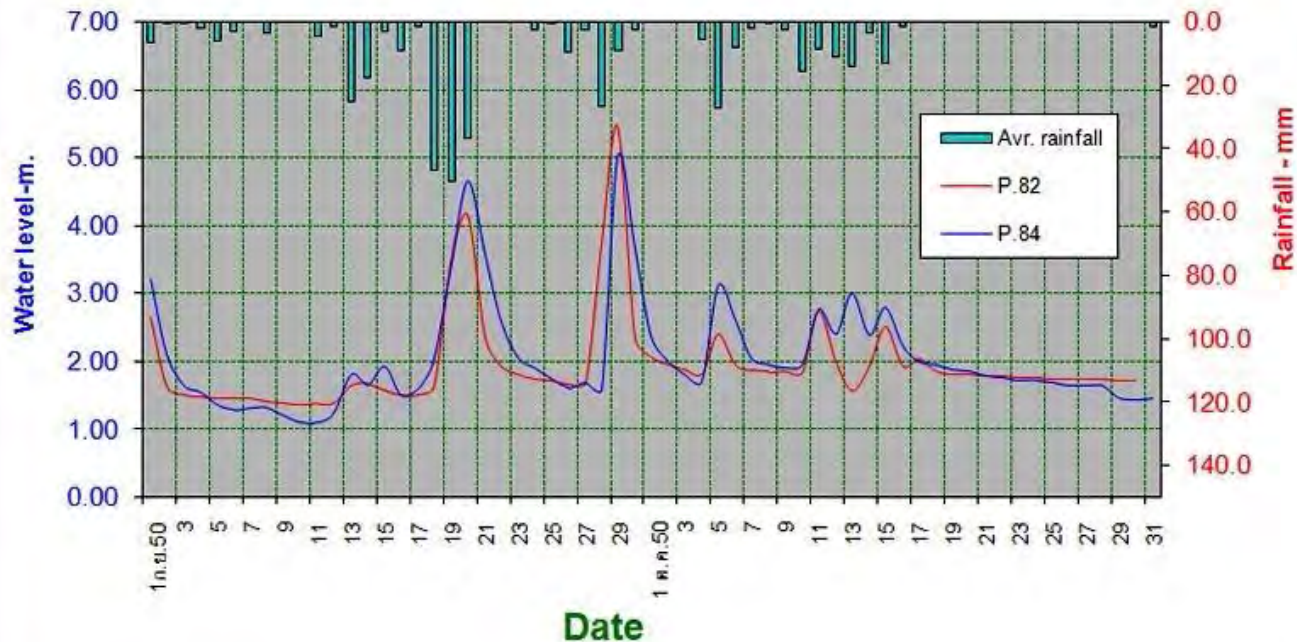
## Rainfall-water level correlation



- Local weather information

## Rainfall-water level correlation

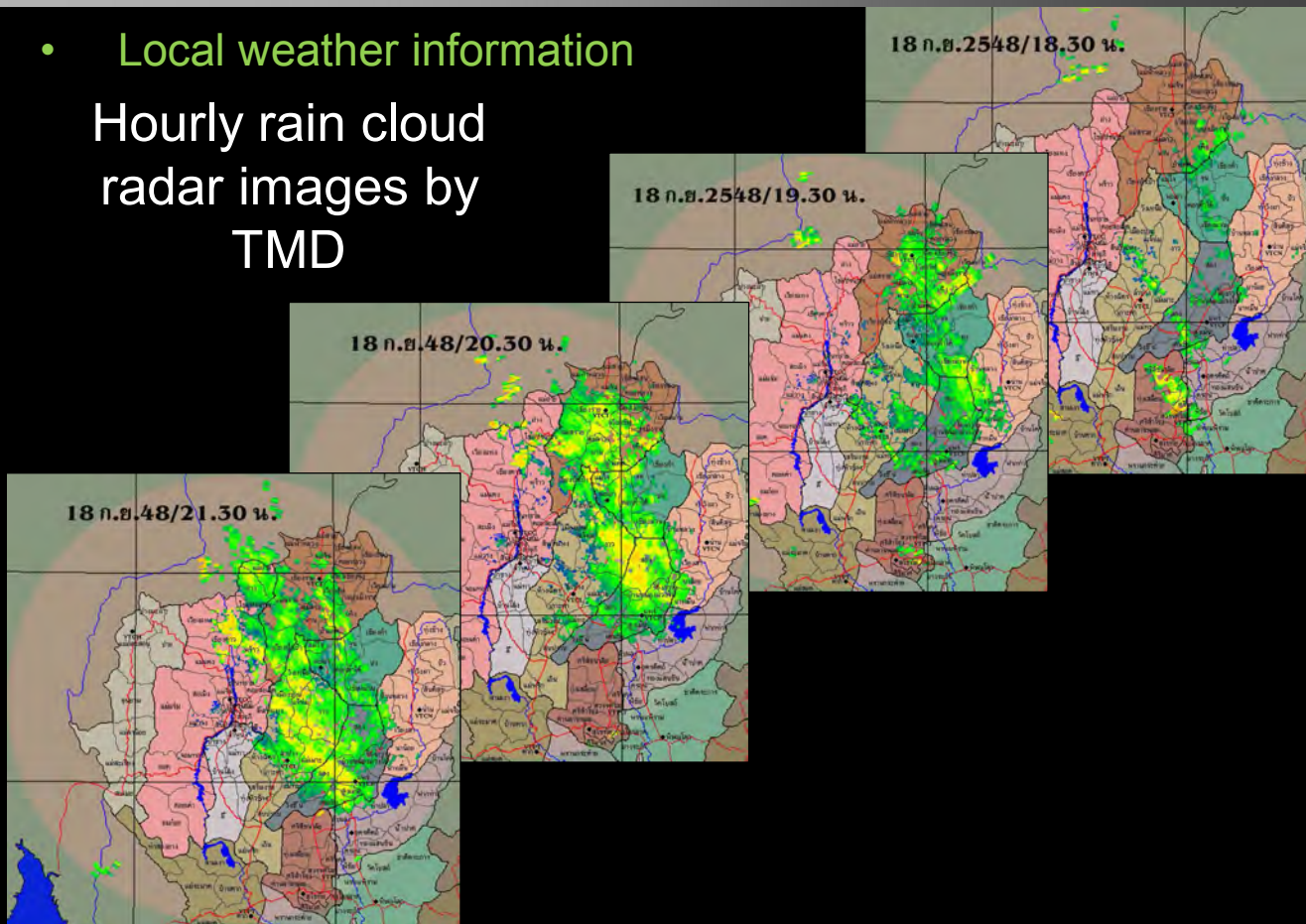
September-October 2007





- Local weather information

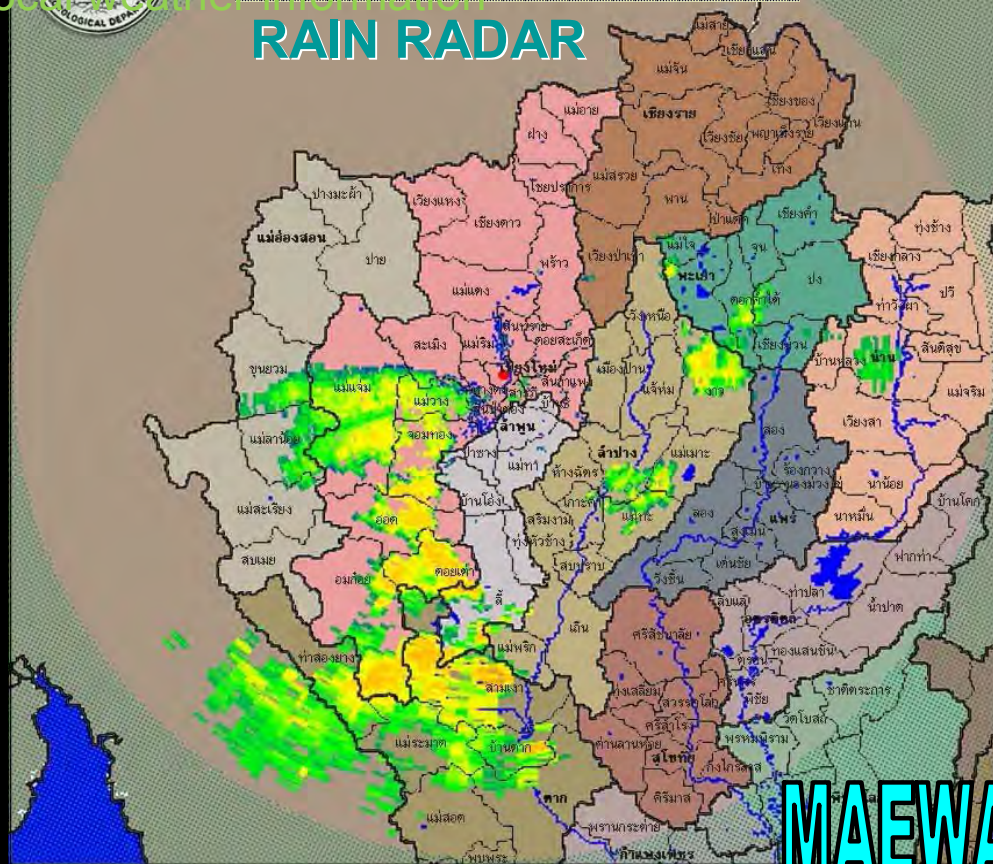
Hourly rain cloud  
radar images by  
TMD



- Local weather information

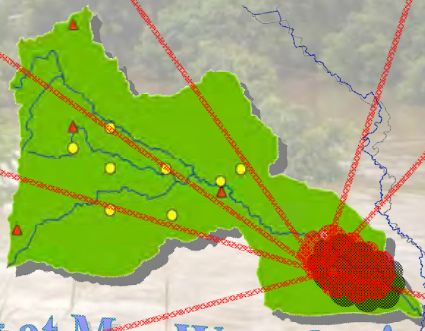


10 SEPTEMBER 2006  
RAIN RADAR



MAEWANG

- Local weather information



**Flooding at Mae Wang basin**  
**11 September 2006**



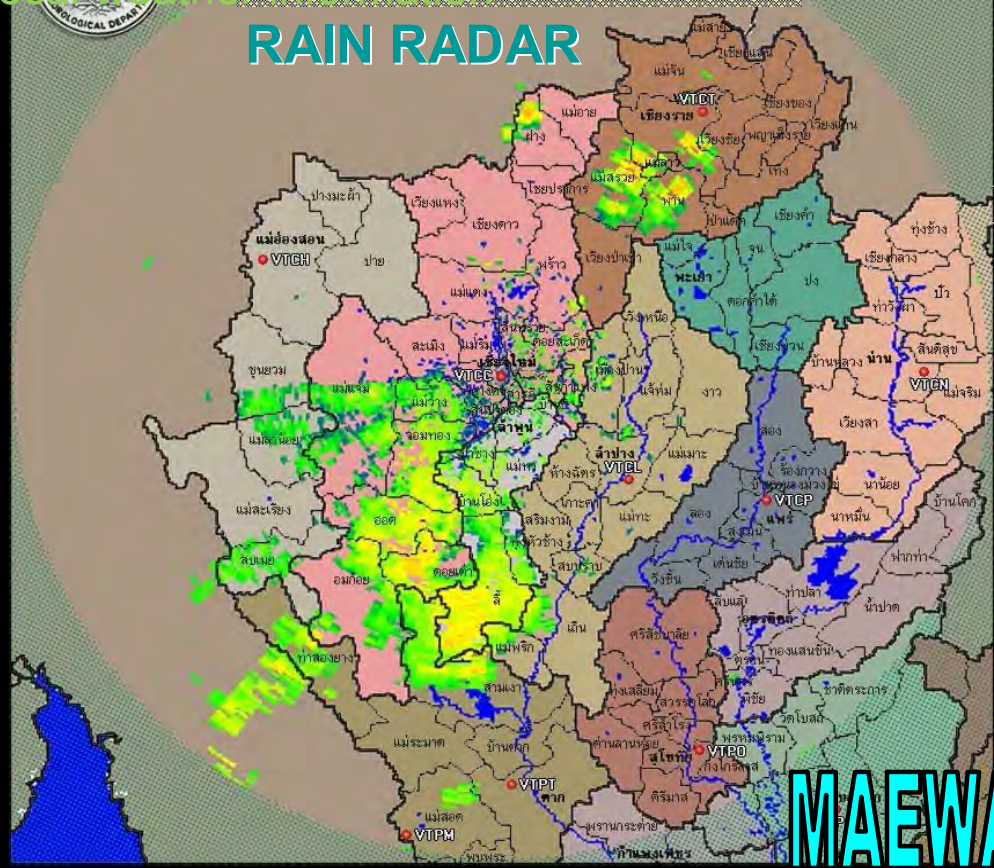


- Local weather information



28 SEPTEMBER 2007

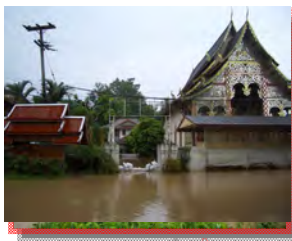
RAIN RADAR



MAEWANG



- Local weather information



**Flooding at Mae Wang basin**  
**29 September 2007**

## Location and physiological characteristics

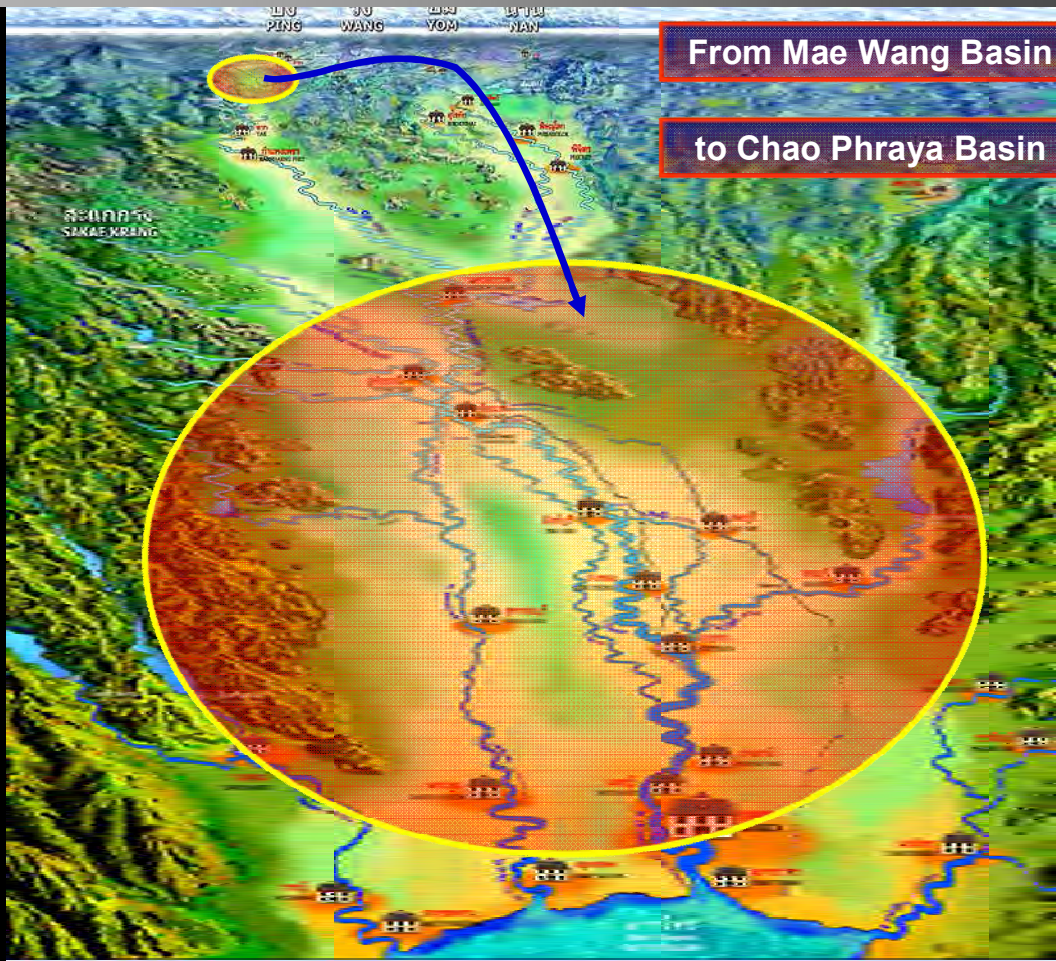


**Mae Wang Basin**

**Ping Basin**

**CHAO PHRAYA**

- Length** 372 km (231 mi)
- Basin area** 160,400 km<sup>2</sup> (61,931 sq mi)
- Source** Confluence of Ping River and Nan River
- location Pak Nam Pho, Nakhon Sawan province
  - elevation 25 m (82 ft)
- Tributaries**
- left Pa Sak River
  - right Sakae Krang River
- Discharge** for Nakhon Sawan
- average 718 m<sup>3</sup>/s (25,356 cu ft/s)
  - max 5,960 m<sup>3</sup>/s (210,475 cu ft/s)
- Mouth**
- location Gulf of Thailand, Samut Prakan Province
  - elevation 0 m (0 ft)





# FLOOD MONITORING AND WARNING FOR CHAO PHRAYA BASIN FLOOD RISK AREAS





Traveling time duration of water volume  
when the discharge is higher than **1,500**  
**m<sup>3</sup>/sec** at the Chao Phraya Dam



Chao Phraya Dam

**10 hrs.**

สิงห์บุรี

**18 hrs.**

อ่างทอง

**24 hrs.**

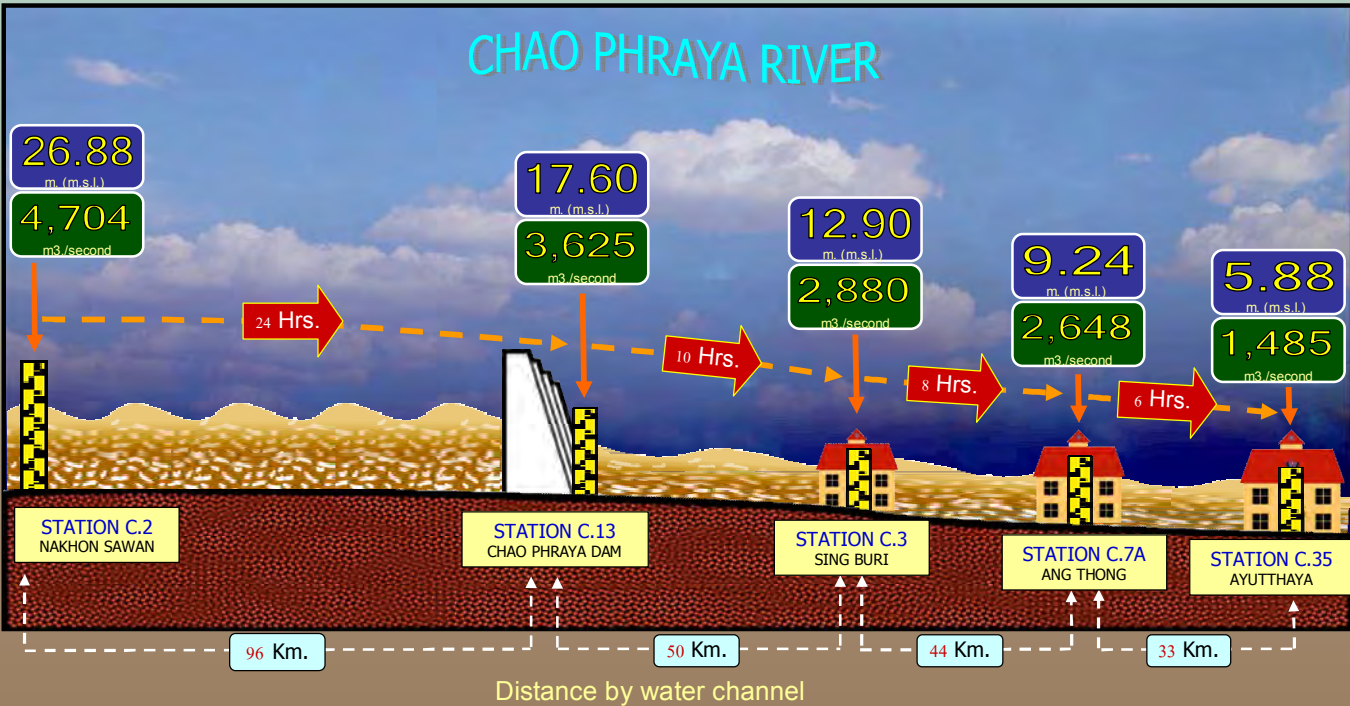
อยุธยา

# CHAO PHRAYA RIVER MONITORING

13 October 2011 / TIME 07:00 A.M.

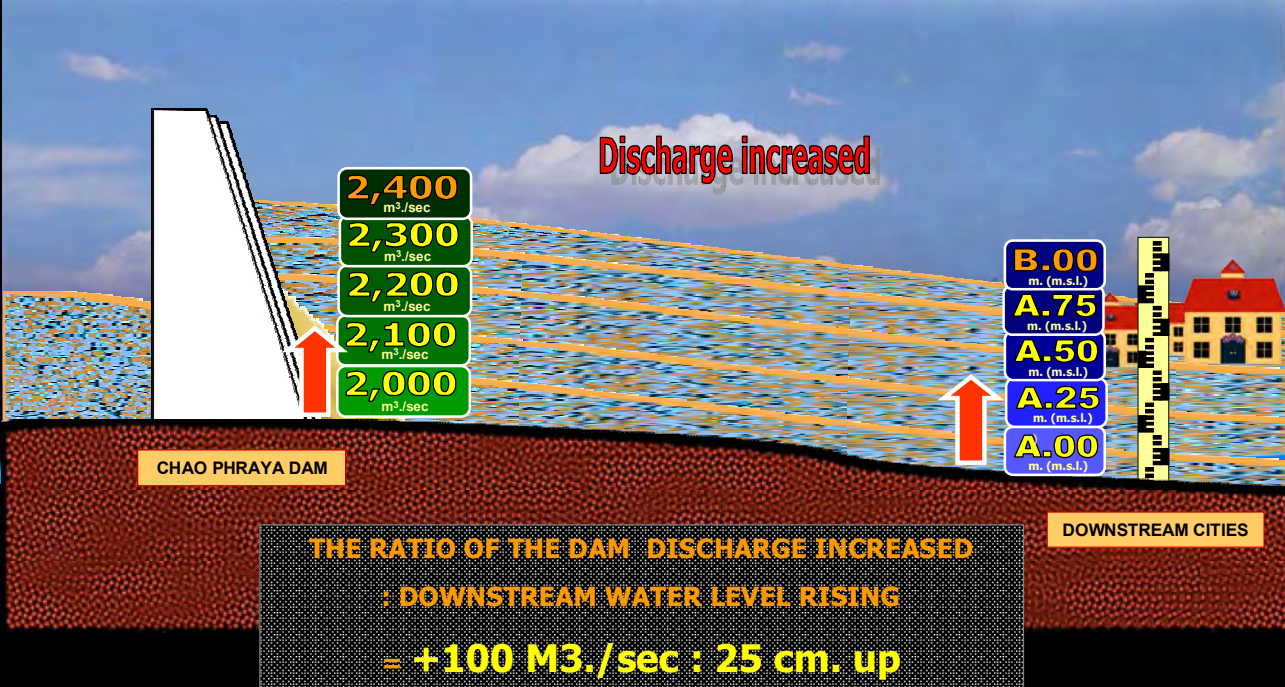
WATER LEVEL : m. (m.s.l.)  
DISCHARGE :  
m<sup>3</sup>/second

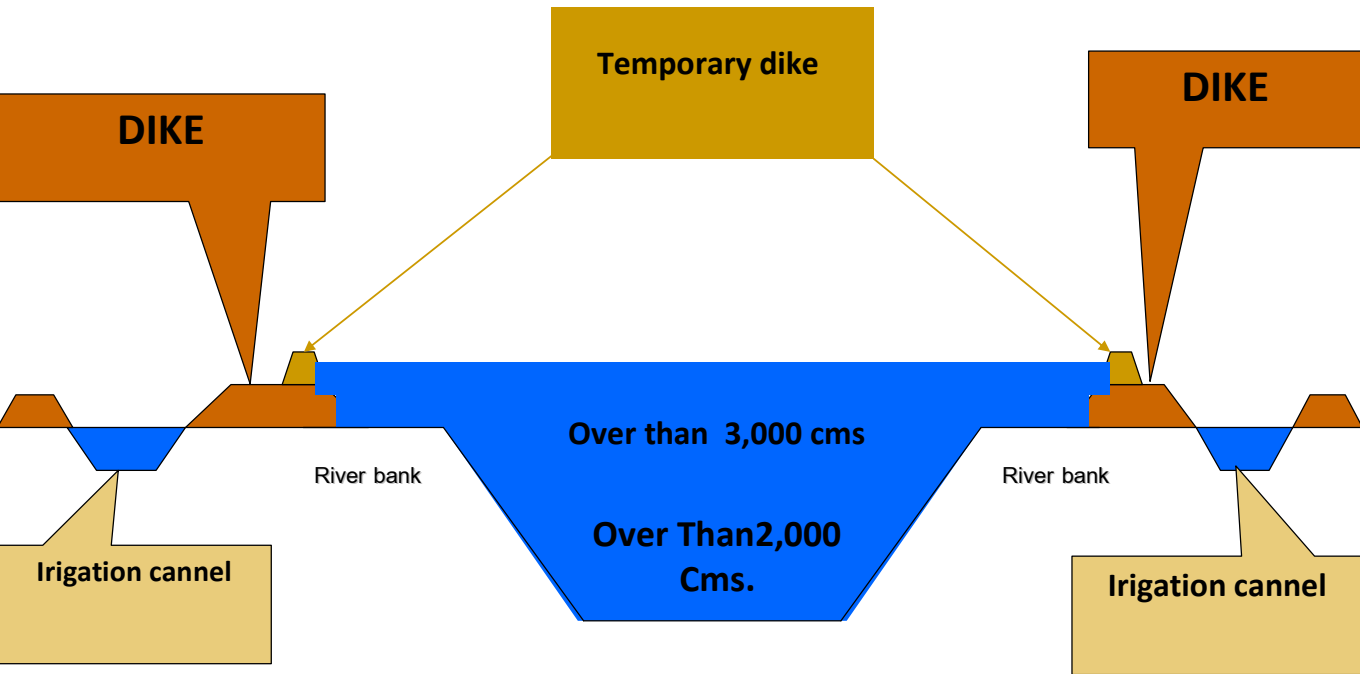
STATION C.2 - CHAO PHRAYA DAM- SING BURI - ANG THONG - AYUTTHAYA



CORRELATION BETWEEN  
CHAO PHRAYA DAM DISCHARGE  
AND DOWNSTREAM WATER LEVELS

*Downstream cities = Sing Buri, Ang Thong and Ayutthaya*





Water level information could help in decision making for flood prevention



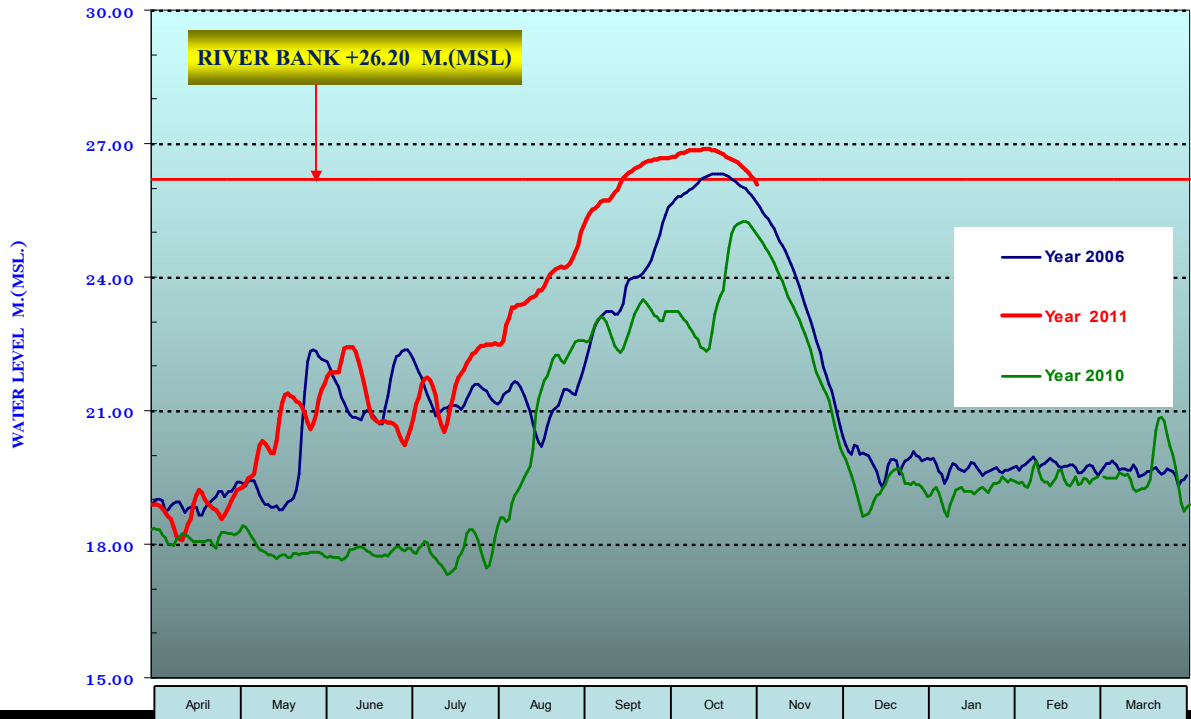


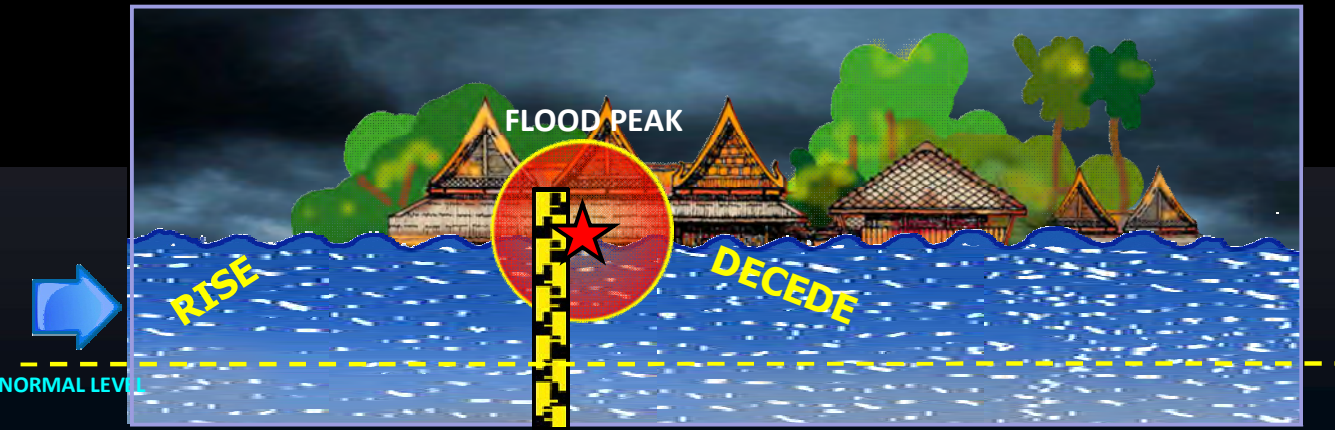
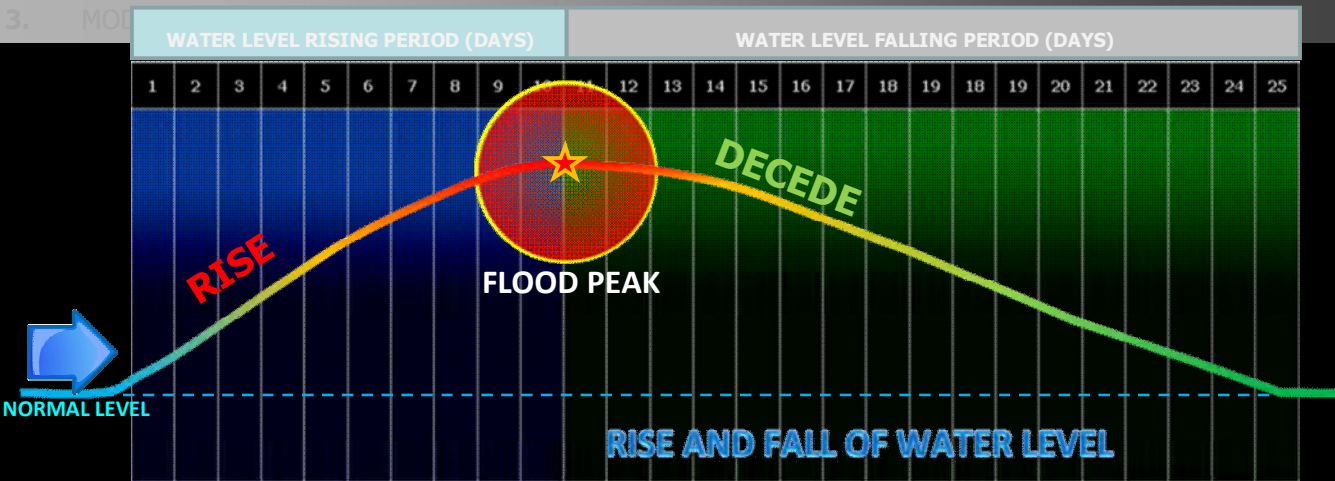
# Water level information could help in decision making for flood prevention



## C.2 CHAO PRAYA RIVER A.MUANG NAKLONSAWAN

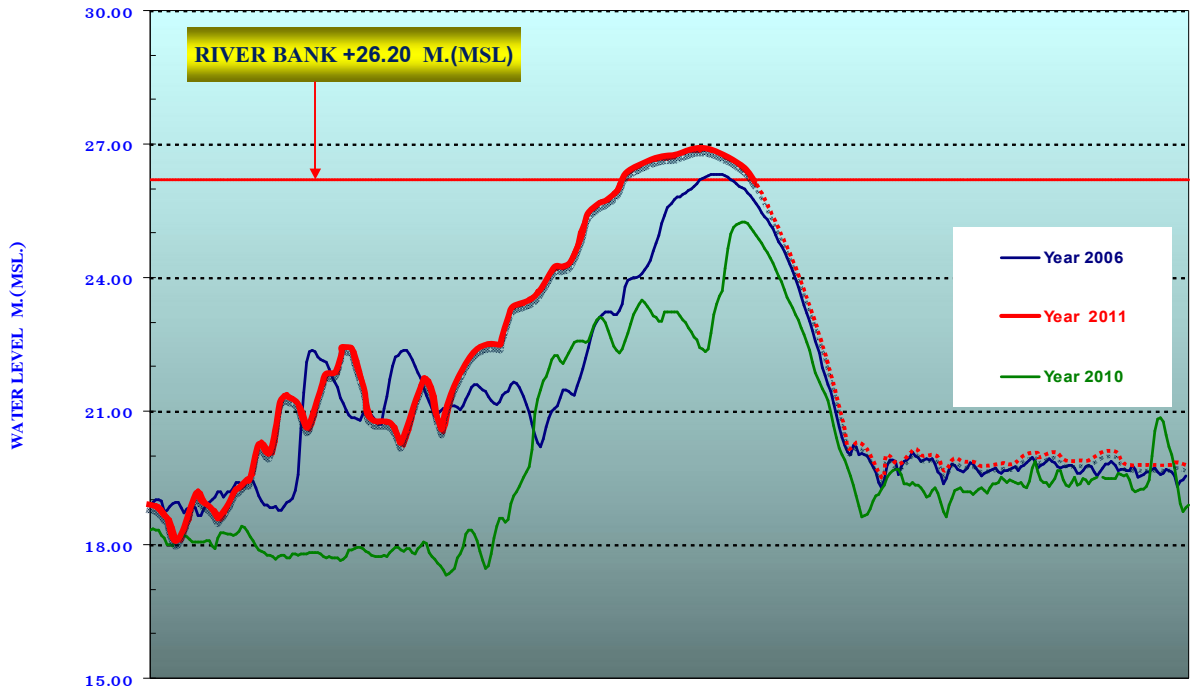
### DAILY MAXIMUM WATER LEVEL YEAR 2011





## C.2 CHAO PRAYA RIVER A.MUANG NAKLONSAWAN

### DAILY MAXIMUM WATER LEVEL YEAR 2011



April

May

June

July

August

September

October

November

December

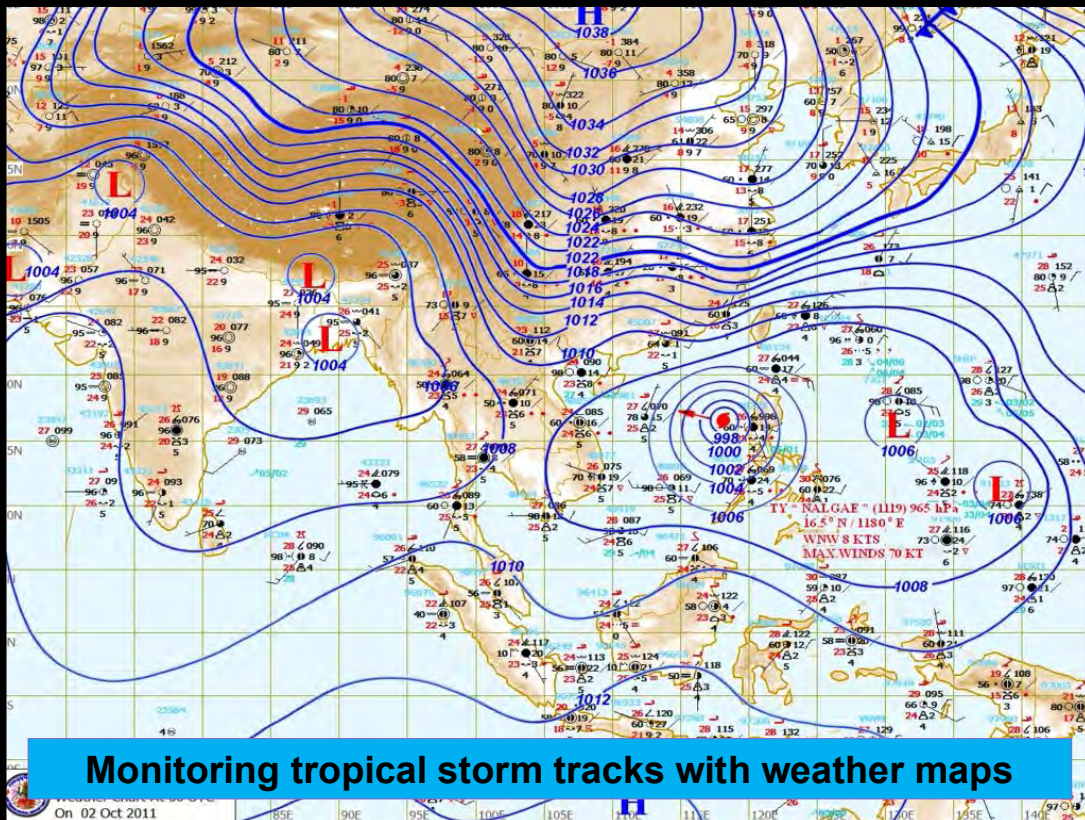
January

February

March

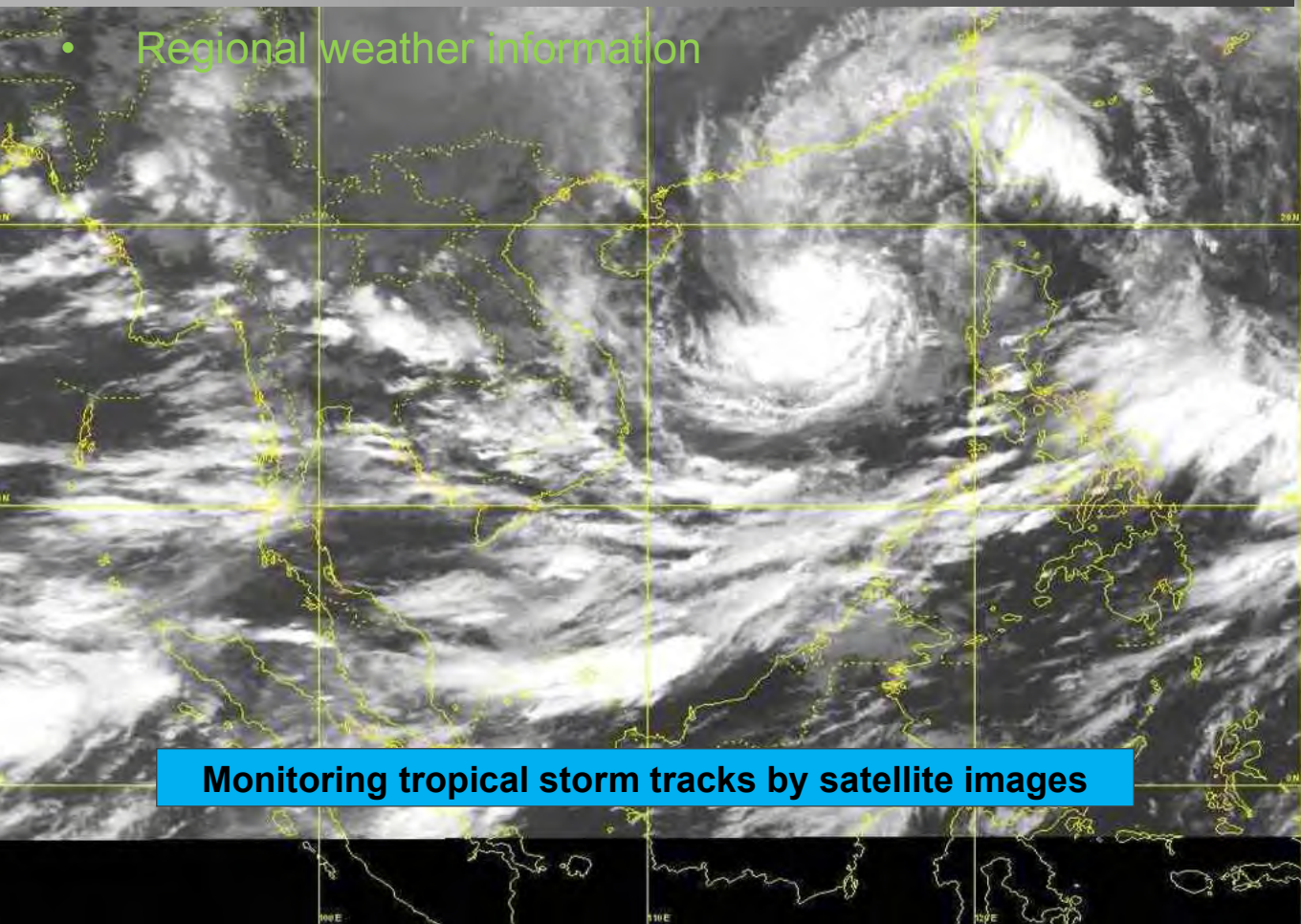


- Regional weather information





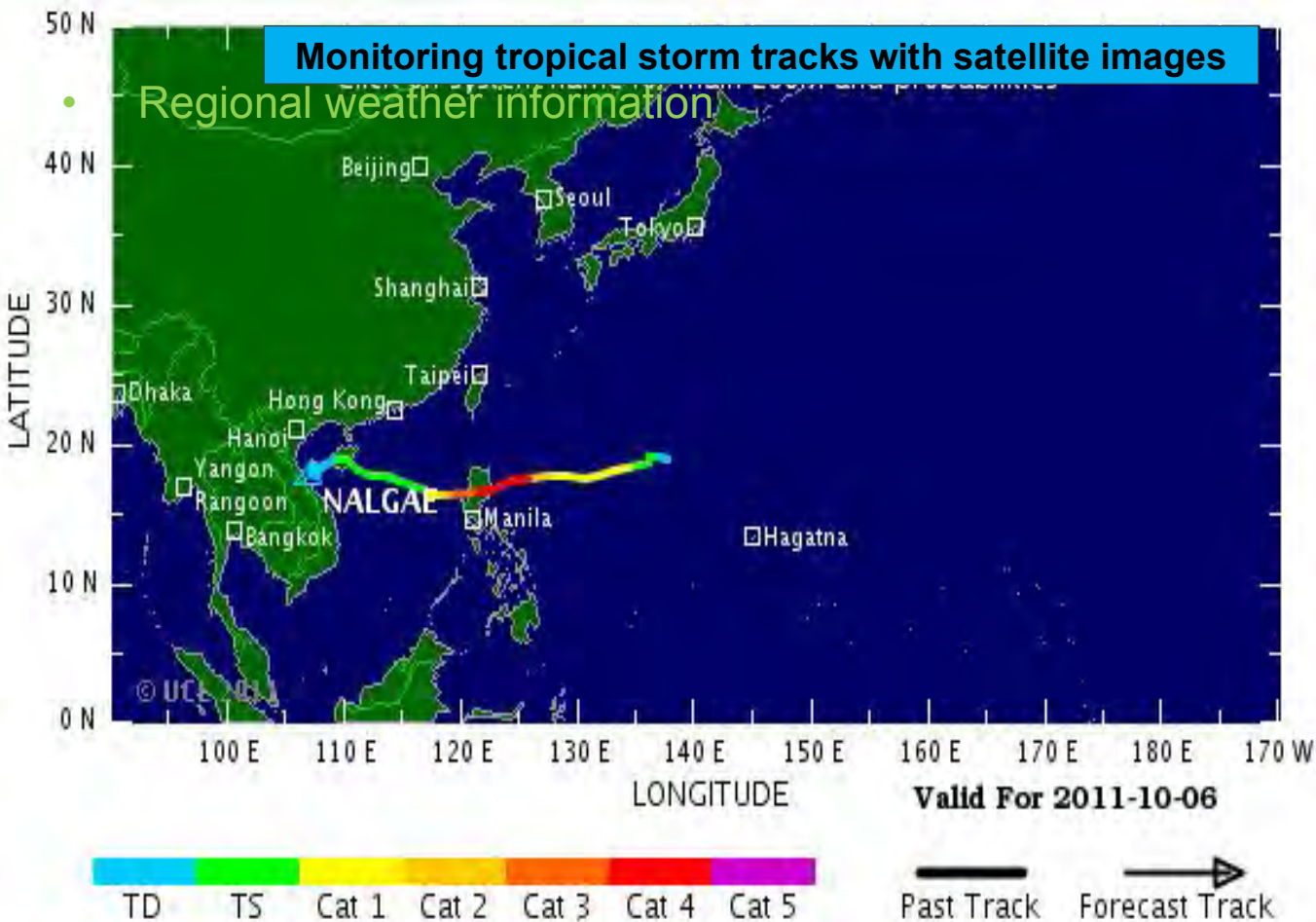
- Regional weather information



**Monitoring tropical storm tracks by satellite images**

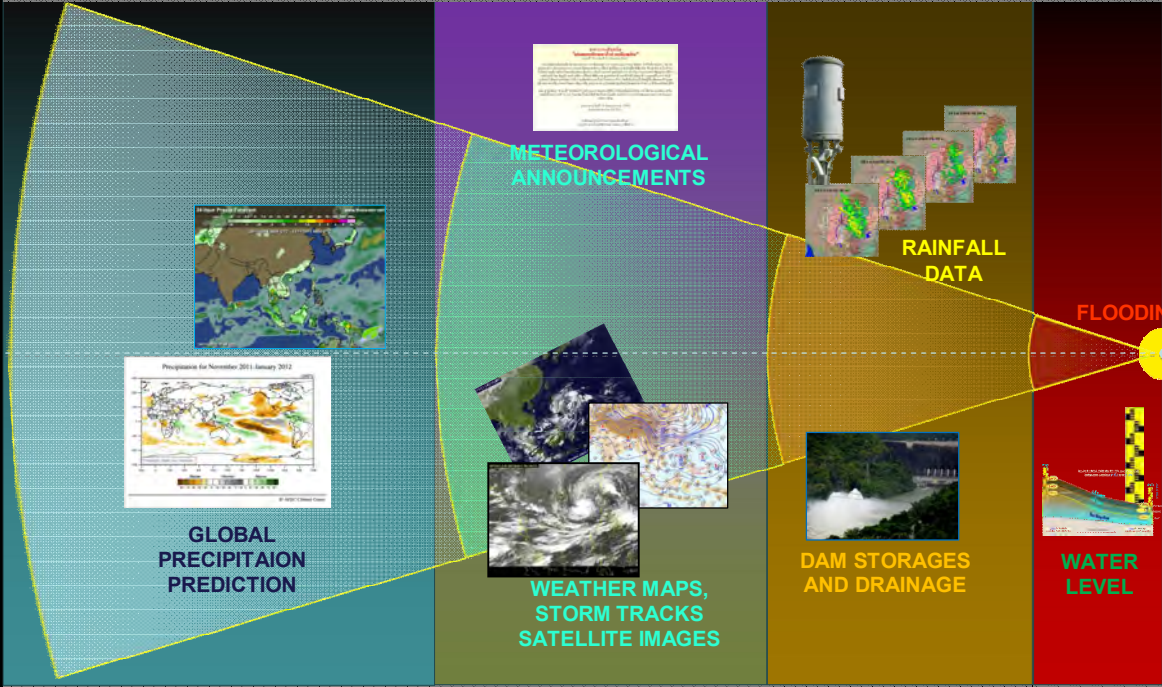
## Monitoring tropical storm tracks with satellite images

### Regional weather information



EXTENDED RANGES OF EARLY WARNING IN  
ADVANCE  
WITH OUTSOURCE INFORMATION

Long range forecast





- Public awareness

Hourly  
water level  
data board



Water level digital board



Pamphlets



Flood warning pamphlets



Flood warning poster

Posters



## Public awareness

### GOOD INFORMATION DISSEMINATION

Flood information disseminated by various forms such as pamphlets, posters, normal boards or digital boards, presentation CDs as the data access channels for public now applied for another basins as well.



Three coloured flags



Water level normal board



LED moving sign board



Alarm lights



River monitoring board at the city landmark where people can follow the flood situation during the critical period

- Public awareness



People were following the water level board at the riverside during the critical period

## 4. conclusion

Flood disasters have increased astoundingly in frequency and severity almost every year lately so it is necessary to find various approaches for flood losses prevention and mitigation and one of the approaches is flood early warning system. To success in the objective of early warning system we should to proceed it with:

1. **Good Information Preparation**
2. **Good Respond and Perception**
3. **Good Communication**

**QUICK, CLEAR** and **ACCURATE**





**Thank you for your attention**