



# Current MRCS Flood Forecasting System and Plan for Improvement

Third Annual Flood Forum  
Vientiane, Lao PDR  
7-8 April 2005

# OBJECTIVE

To introduce to the current flood forecasting system in the MRC Secretariat and the plan for improvement

## Today's Topics

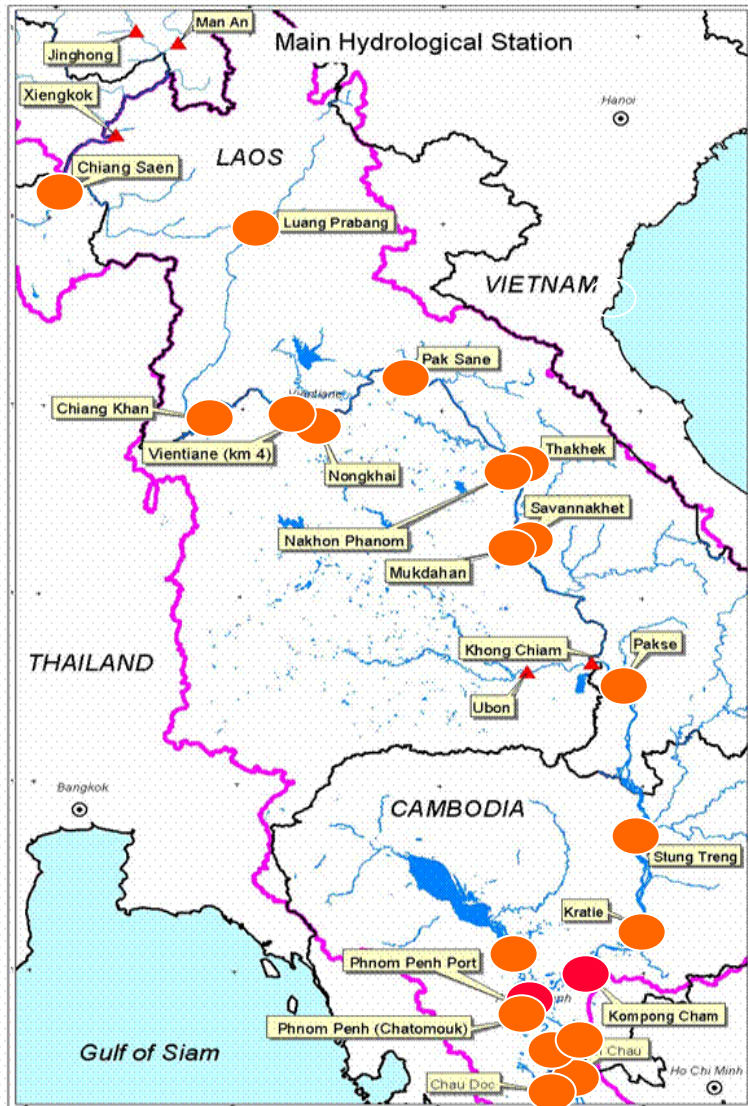
1. Background
2. MRCS Flood Forecasting System
3. Plan for Improvement

# 1 . Background

- ❖ **The basin-wide river forecast since 1970**, called by severe flood in 1966, carried out mainly by Hydrology Group
- ❖ **The Flood Forecasting Core Team (FFCT)** was established in June 2001, comprising of 7 staff, 4 advisors => 5 staff and 3 advisors

River Monitoring	Flood Forecasting
7-day River Monitoring	5-day Flood Forecasting
Nov. – Jun.	Jun. – Oct.
Weekly forecast	Daily forecast
Update weekly on MRC webpage	Update daily on MRC webpage, e-mail to NMCs and concerned line agencies

## 2. MRCS Flood Forecasting System



### Forecasting Stations

- Flood forecasting: 21 sta.
- River Monitoring: 19 sta.

### Three main components:

Data collection/processing

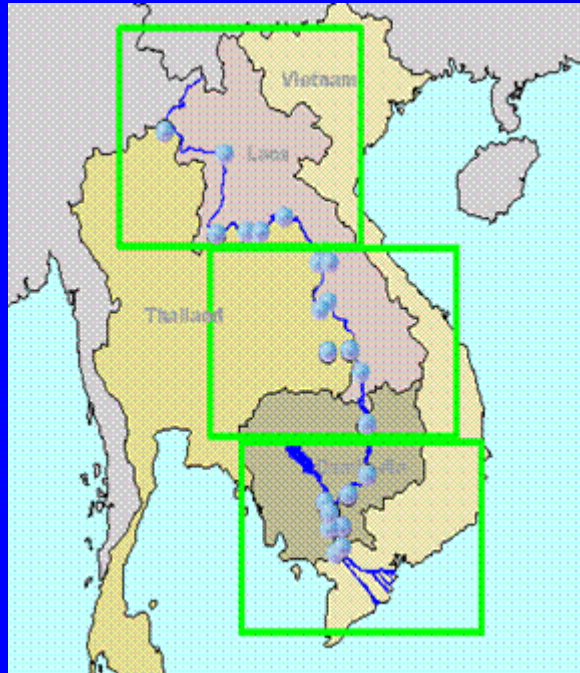


Forecast Preparation

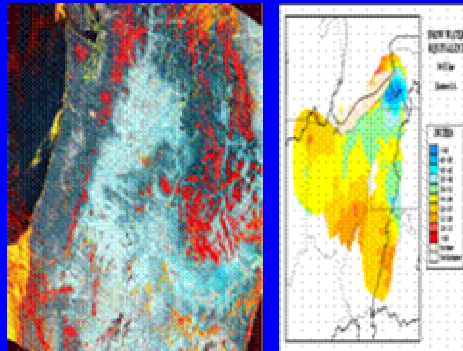


Forecast Dissemination

# Flood Forecasting System



Hydrological Stations



Rainfall Estimation/  
Forecast

Data collection,  
Analysis, Provision  
of Forecasts



Dissemination



Web site, bulletin, e-mail, fax, radio, telephone, etc.



## 2.1 Data collection, processing and transmission



### 1. *Historical data (hydro-met data)*

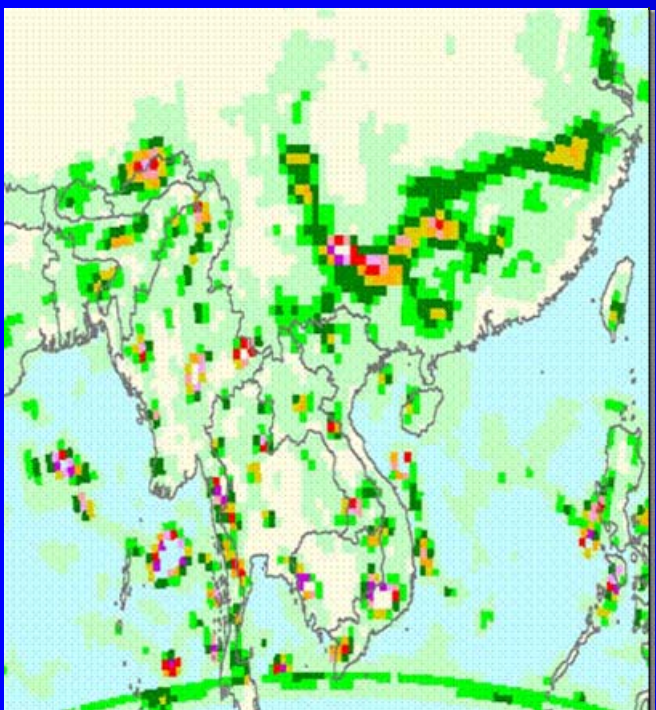
- Historical meteorological data in HYMOS database
- Historical hydrological data in HYMOS database



### 2. *Near real time data (water level and rainfall)*

- 43 stations in LMB and 2 stations in China, June-October, sending by e-mail to MRCS
- 19 stations in LMB, November-June, sending by email to MRCS
- Rainfall estimation and forecast from other sources; e.g. USGS/NOAA,

An interpretation and analysis of all available weather data like satellite images, rainfall estimation, forecasts from various sources, including those from USGS/NOAA, TRMM, TMD...



Rainfall estimation and forecast from USGS/NOAA



Mekong sub-basin

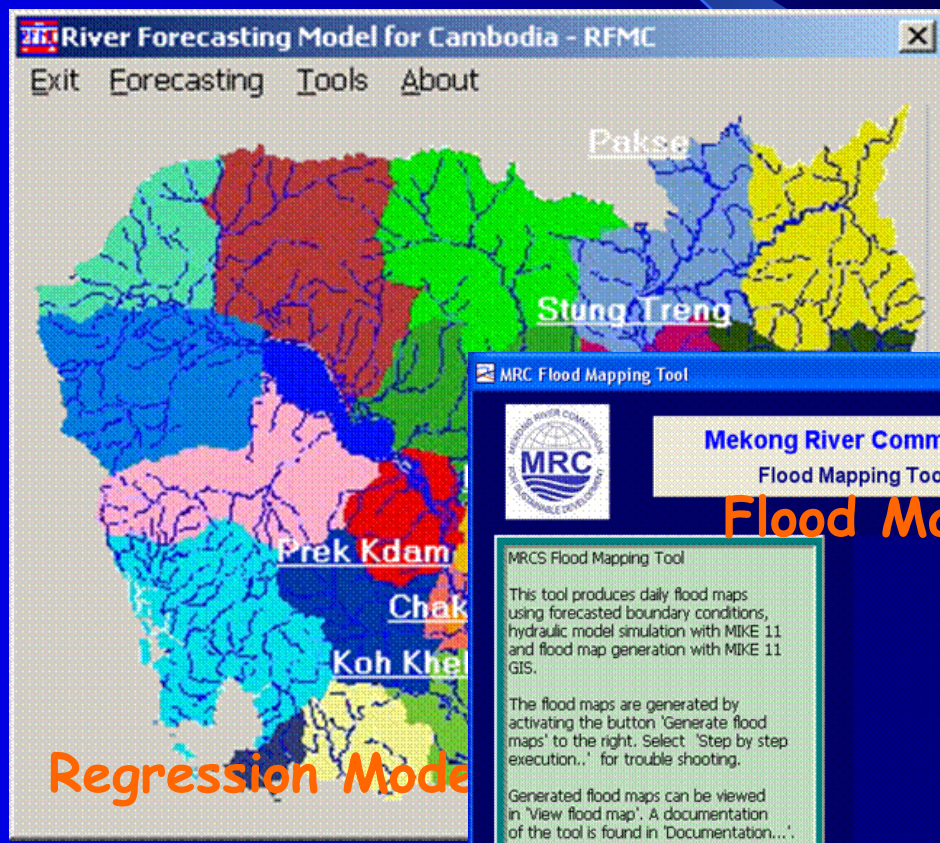
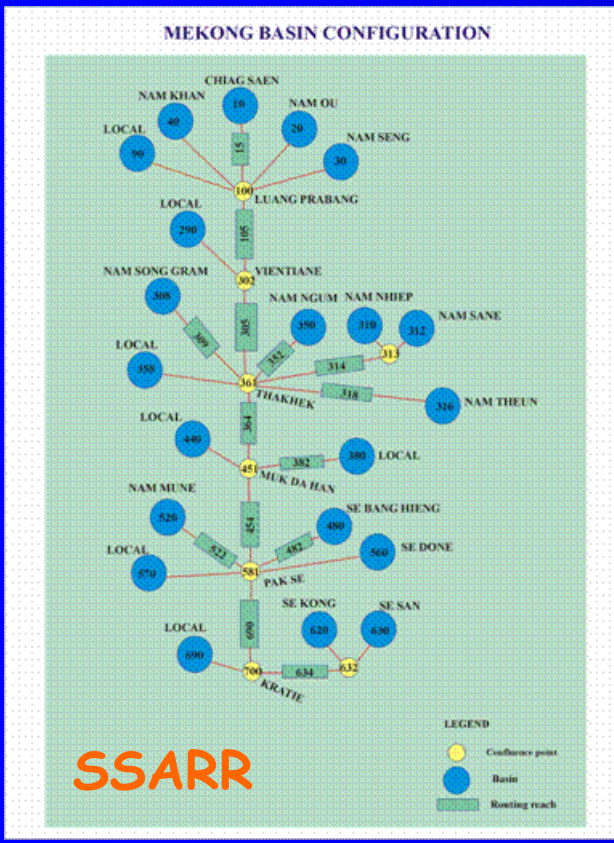
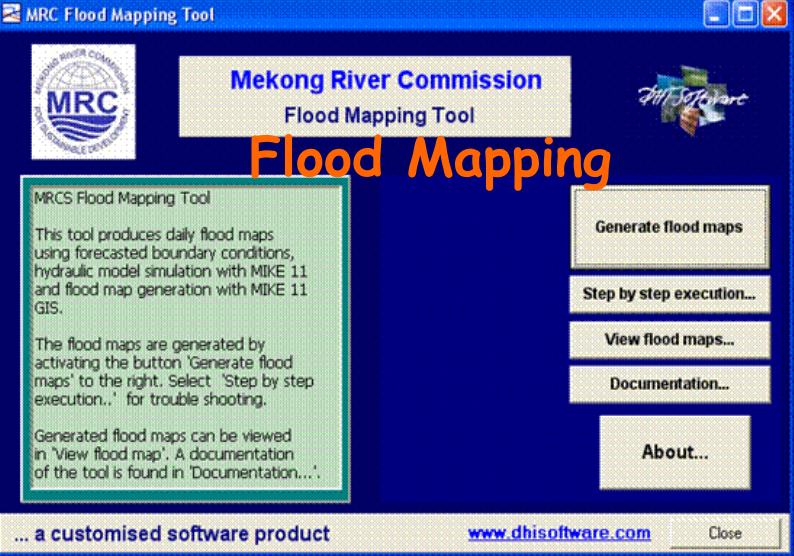


Rainfall by sub-basin



# 2.2 Forecast preparation:

- **SSARR** (Streamflow Synthesis And Reservoir Regulation) model used for upper part (from Chiang Saen to Pakse)
- **Regression models** used for the lower reach of the delta with over bank flow (from Stung Treng to Tan Chau/Chau Doc)
- For flood mapping in Mekong Delta used **Mike-11**.

**MRC Flood Mapping Tool**

Mekong River Commission  
Flood Mapping Tool

**Flood Mapping**

MRC's Flood Mapping Tool

This tool produces daily flood maps using forecasted boundary conditions, hydraulic model simulation with MIKE 11 and flood map generation with MIKE 11 GIS.

The flood maps are generated by activating the button 'Generate flood maps' to the right. Select 'Step by step execution...' for trouble shooting.

Generated flood maps can be viewed in 'View flood map'. A documentation of the tool is found in 'Documentation...'.

Buttons: Generate flood maps, Step by step execution..., View flood maps..., Documentation..., About...

... a customised software product [www.dhisoftware.com](http://www.dhisoftware.com) Close



# 2.3 Forecast dissemination:



[www.mrcmekong.org](http://www.mrcmekong.org)

Mekong River Commission  
for sustainable development

Annual Report 2000  
Junior Riparian Professional Programme

To promote and co-ordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being

### Mekong Bulletin

Forecast issued 09.09 September

Date: 04 September 2001

LOCATION	Observed Rainfall (mm)	3-day Avg Rainfall (mm)	3-day Avg Rainfall (mm)	Observed level (m)	FORECASTED WATER LEVELS (m)																
					3-Sep	4-Sep	5-Sep	6-Sep	7-Sep	8-Sep	9-Sep	10-Sep	11-Sep	12-Sep							
Chiang Saen	5.2	307.110	11.83	11.50	8.30	8.43	8.60	8.71	8.96	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	
Loang Phakeng	7.8	307.490	18.40	17.90	10.78	11.26	11.61	11.70	11.53	11.59	12.71										
Chiang Khan	24.0	108.110	17.40	17.32	10.54	10.36	10.60	10.06	10.06	10.76	10.56										
Wongkhai	nr	102.040	19.80	19.60	7.72	7.40	7.65	7.60	8.42	7.70	7.40										
Bongkhai	nr	102.640	12.30	11.40	8.48	8.20	8.05	8.38	8.45	8.50	8.40										

### Sub basin and Rainfall maps

Sub basin map

**Flood Warning & Forecasting**  
Actual and forecasted water levels

Overview	Station list	Latest News
Upper Mekong	Map Centre	About this site
Central Mekong	Partners	New features
Lower Mekong	Weather	Email comments
Tabular data	Rainfall data	Disclaimer

**Phnom Penh (Bassac)**

**No Warning**

here the datelevel text

For an explanation of the water level and alarm stages [click here](#)

### Flood Warning & Forecasting Overview

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This page was last updated on Tuesday, 18 September, 2001 08:46

Legend

Flowing stage	Rising	Falling	Stable	Unknown
Warning stage	↑	↓	□	□
No warning	↑	↓	□	□
No data available	□	□	□	□

For an explanation of the water level and alarm stages [click here](#)

Click on an area to zoom in to a part of the Mekong basin. These maps show the location and status of various hydrological stations. Clicking on a station will bring you to page with station information: observed and forecasted water levels, as well as yearly observations. Alternatively, you can click on a station name on the bottom of this page to go directly to the station information page.

The color of the square in this map indicates the highest warning level in that area.

This page was last updated on Tuesday, 18 September, 2001 08:46

### Available maps for the area around Phnom Penh (Bassac)

Topographic	Land use	Flood Extent
50 x 50 km	50 x 50 km	50 x 50 km
100 x 100 km	100 x 100 km	100 x 100 km
200 x 200 km	200 x 200 km	200 x 200 km

Topographic: These maps show the features like relief, road network, rivers and river names, major cities and station location.

Land use: Land use based on forest cover data from 1993 and 1997.

Flood extent: These maps show areas that are prone to flooding. These maps do not depict actual flood situations nor forecasted flood extents. It is based on the maximum historical flood extent of the combination of the 1995, 1996 and the year 2000 floods.

Flood Risk: Shows flood risk area and basin boundary.

Legend: Station, Major City, Road, Highway, Main Road, Other roads, Railroad.

Ubun (Nam Mun)

### Water level over the last 7 days and 5 day forecast

Phnom Penh (Bassac)

Observed water level (m)

Water level (m)

Observed

Forecast

Legend: Observed water level (m), Flood level, Alarm level, Flood year 2000, Dry year 1992.

### Observed water level this season

Phnom Penh (Bassac)

Water level (m)

Observed

Legend: Observed water level (m), Flood level, Alarm level, Flood year 2000, Dry year 1992.

# 3. Plan for Improvement



## 3.1. Improved operational forecasting:

- Review of existing system: problems encountered and measures to cope with
- Re-calibration and modification of existing models with new updated additional real-time data
- Increasing accuracy and lead time by incorporation of real time data from main tributaries, rainfall estimation/forecast and by use of appropriate methods, techniques in an integrated way.
- Probabilistic forecast and medium, long term (10 day - monthly) forecast
- Flood forecasting in the tributaries
- New forecasting tools

## 3. Plan for Improvement (con't)



### 3.2. Improved monitoring:

- Review the basin-wide station network for flood forecasting/river monitoring system
- Improve the quality and coverage of hydro-met input data and real-time data transmission (more frequent in flood season, e.g. 2 - 4 readings/day)
- Develop standard format to automate the data exchange, transmission, processing and operational database (AHNIP and Mekong-HYCOS, etc.)
- Improve capacity for acquisition and processing of satellite weather information, forecast from various sources



## 3. Plan for Improvement (con't)



### 3.3 Improved dissemination:

- Provide flood forecasts: river, flood plain water level, flow, inundation map, etc. by fax, email, web pages, radio (RANET from AFN)
- Warning messages related to evacuation, protection, using all available tools, including MRC-OFDA flood-related project, ECHO and other projects.

**Thank you for your attention!**