

Cambodia Country Report
for
Forth Annual Mekong Flood Forum



Flood Information in
Cambodia



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Summary

- Flood information: Main Stream; Great Lake; Flood Prone Areas; and Major Tributaries.
- Flood Situation of the current year characterized by its peak, runoff volume and frequency altogether with damage and losses as well as information on benefit from flood.

Summary ...

- Improvement of the forecasting, early warning and flood preparedness could be evaluated in the light of after flood intensive data collection.
- Data and Information have not been fully collected and standardized yet.
- It is hoping that such data and information would be made available by respective line agencies in the coming years and standard report format could be improved.

Summary ...

- Flood 2005- a mild flood which in normal terms bring benefit to the people living in the flood plain.
- Losses on properties and crop have been reported, with some 20 people killed, 9 of them are children.
- The loss could have been higher if there was no warning system put in place by MRC financed by OFDA and other donors in cooperation with NGOs, American and Cambodian Red Cross. Another reason might be the infrastructures which have been rehabilitated after the 2000s floods could resist flood of this magnitude.

Hydrological Characteristics-The Mekong Mainstream

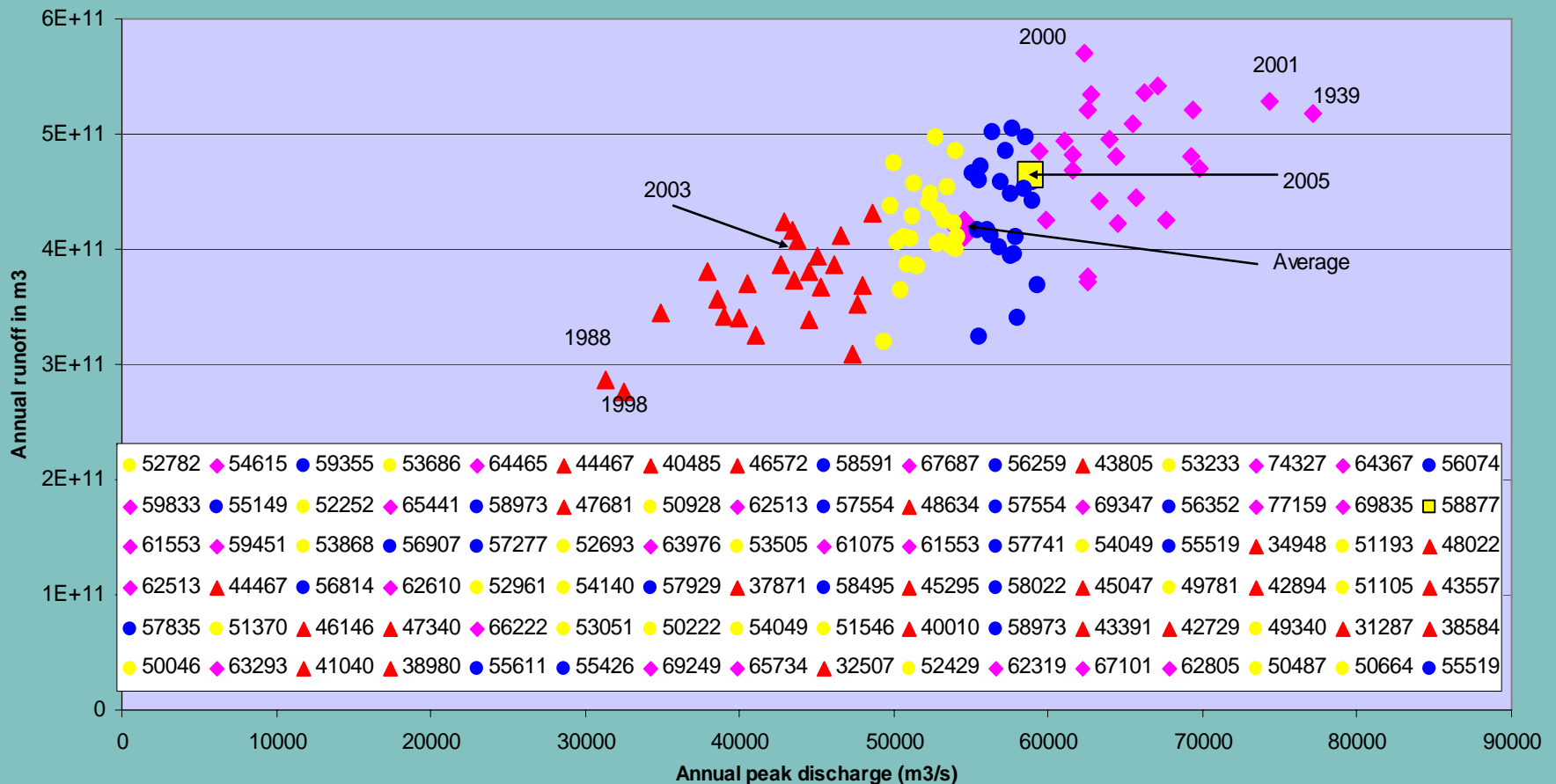
- Flood in Cambodia is dominated by the Mekong flow regime, under the influence of the monsoon (peaks: Aug. – Oct.).
- 3 types of flood affected: 1). The Mekong Flood; 2). By heavy rainfall in tributaries; and 3). Mekong flood high and heavy rainfall in tributaries.

Hydrological Characteristics-The Mekong Mainstream ...

- The Stung Treng station is the key station for flood forecasting on the Mekong mainstream and in the flood plain in Cambodia: total catchment 635,000 km²; 3 main tributaries (Se Kong, Se San, Srepok rivers; frequently affected by Typhoon from SCS).

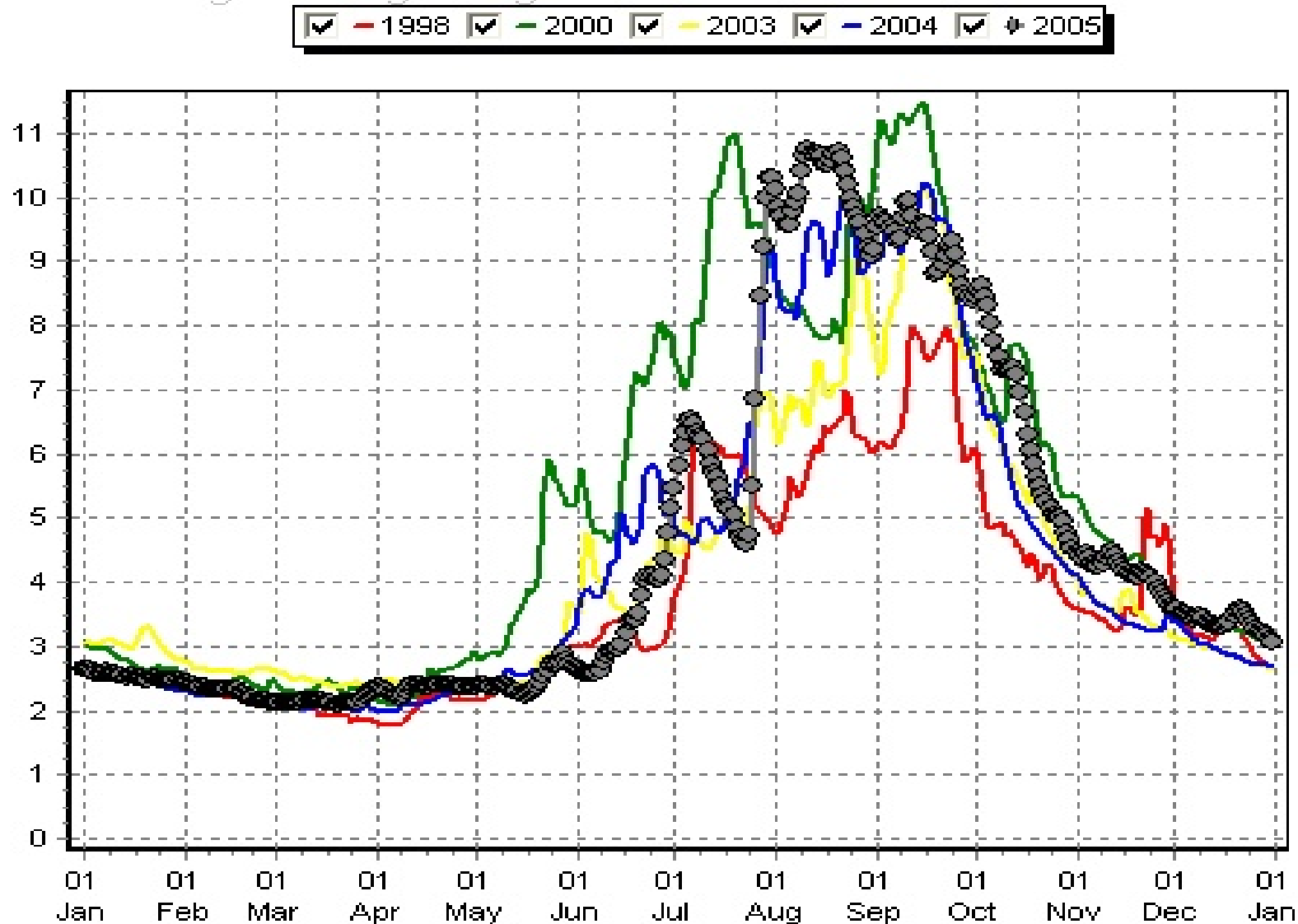
Hydrological Characteristics-The Mekong Mainstream ...

Flood Peaks and Flow Characteristics of the Mekong at Stung Treng (1910-2005)



Hydrological Characteristics-The Mekong Mainstream ...

The Mekong at Stung Treng



Maximum WL at the Mekong Mainstream

Stung Treng	1910-2005	Max:13.0m Min:7.8m Mean:10.56m STD:1.009	Flood in 2005: WL:10.76m T: 2.2 Years
Kratie	1934-2005	Max:24.28m Min:17.46m Mean:21.12 STD:1.24m	Flood in 2005 WL:21.62m T: 2.6 yeas
Kampong Cham	1934-2005	Max:16.11m Min:12.24m Mean:14.72m STD:0.803	Flood in 2005 WL:15.34m T: 4.2 years

Maximum WL at the Mekong Mainstream ...

Chrouy Changvar	1960-2005	Max: 11.21m Min: 7.96 m Mean: 10.02 m STD: 0.653 m	Flood in 2005 WL: 10.24 m T: 2.3 years
Neak Leung	1960-2005	Max: 8.43 m Min: 5.42 m Mean: 7.21 STD: 0.582 m	Flood in 2005 WL: 7.33 m T: 2.0 years

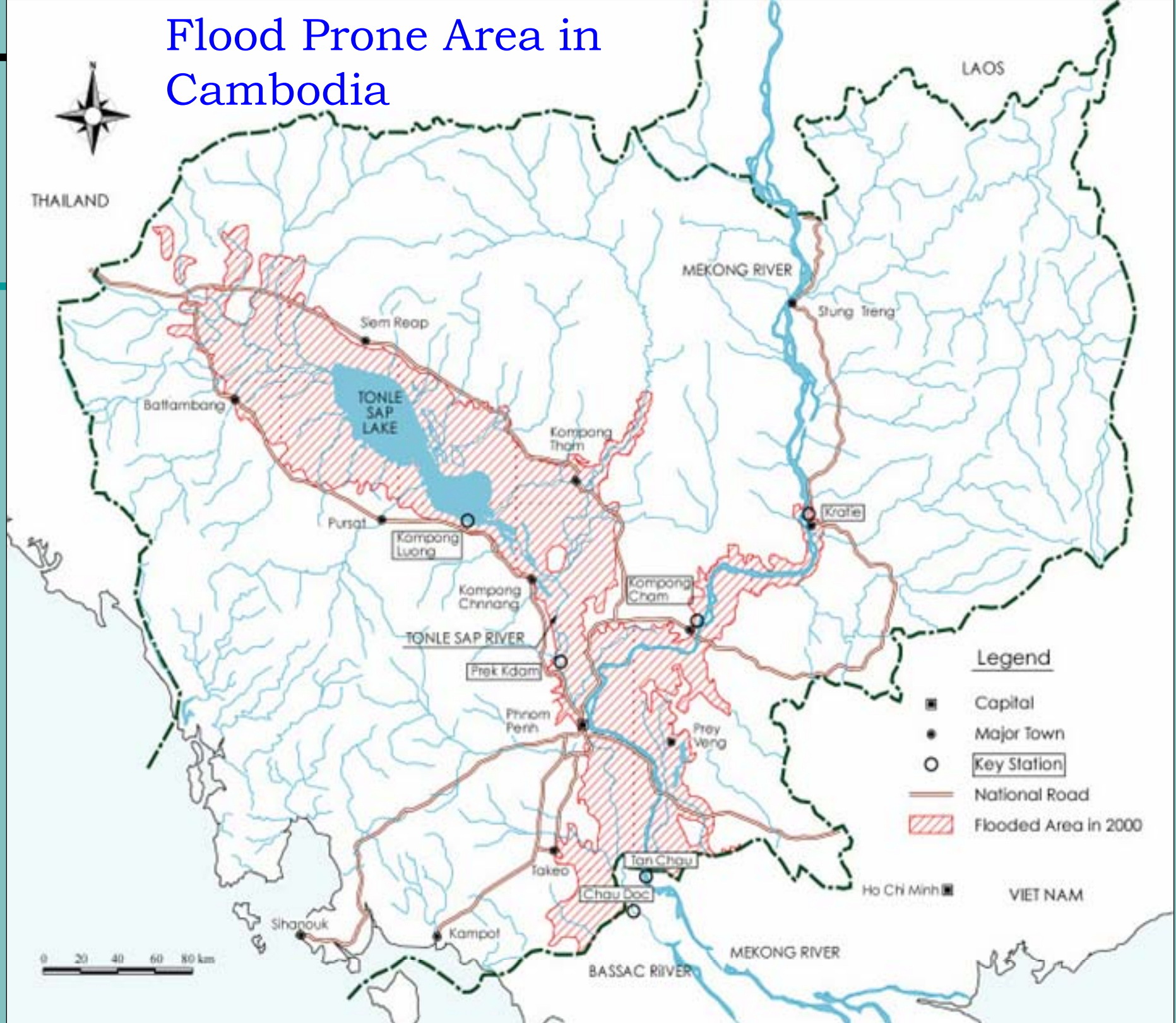
Maximum WL at the some Tributaries ...

Stung Sangker	1997-2005	Max: 13.40 m Min: 10.09 m Mean: 12.47 m STD: 1.122 m	Flood in 2005 WL: 13.39 m T: N/A
Stung Prek Thnot	1960-1973 and 1991-2005	Max: 8.88 m Min: N/A Mean: N/A STD: N/A	Flood in 2005 WL: N/A T: N/A

Hydrological Characteristics-The Great Lake

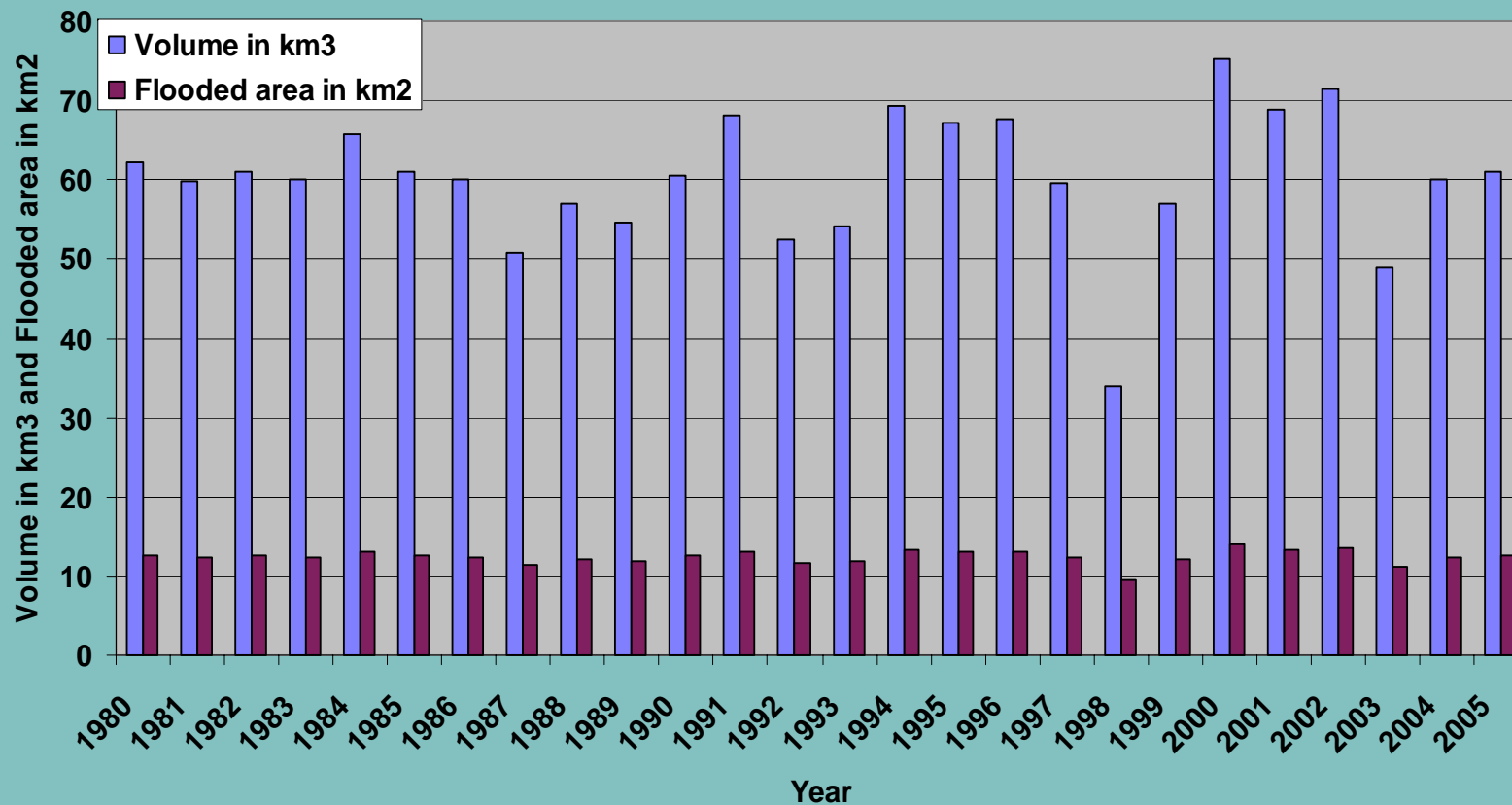
- The Great Lake is fed annually by the Mekong reverse flow and by its own tributaries.
- The Lake plays an important role in flood peak attenuation and flow control to the Mekong delta.
- The Mekong, Tonle Sap, Great Lake and the Bassac form a unique and complex rich inland ecosystem, one of the most productive in the world.

Flood Prone Area in Cambodia



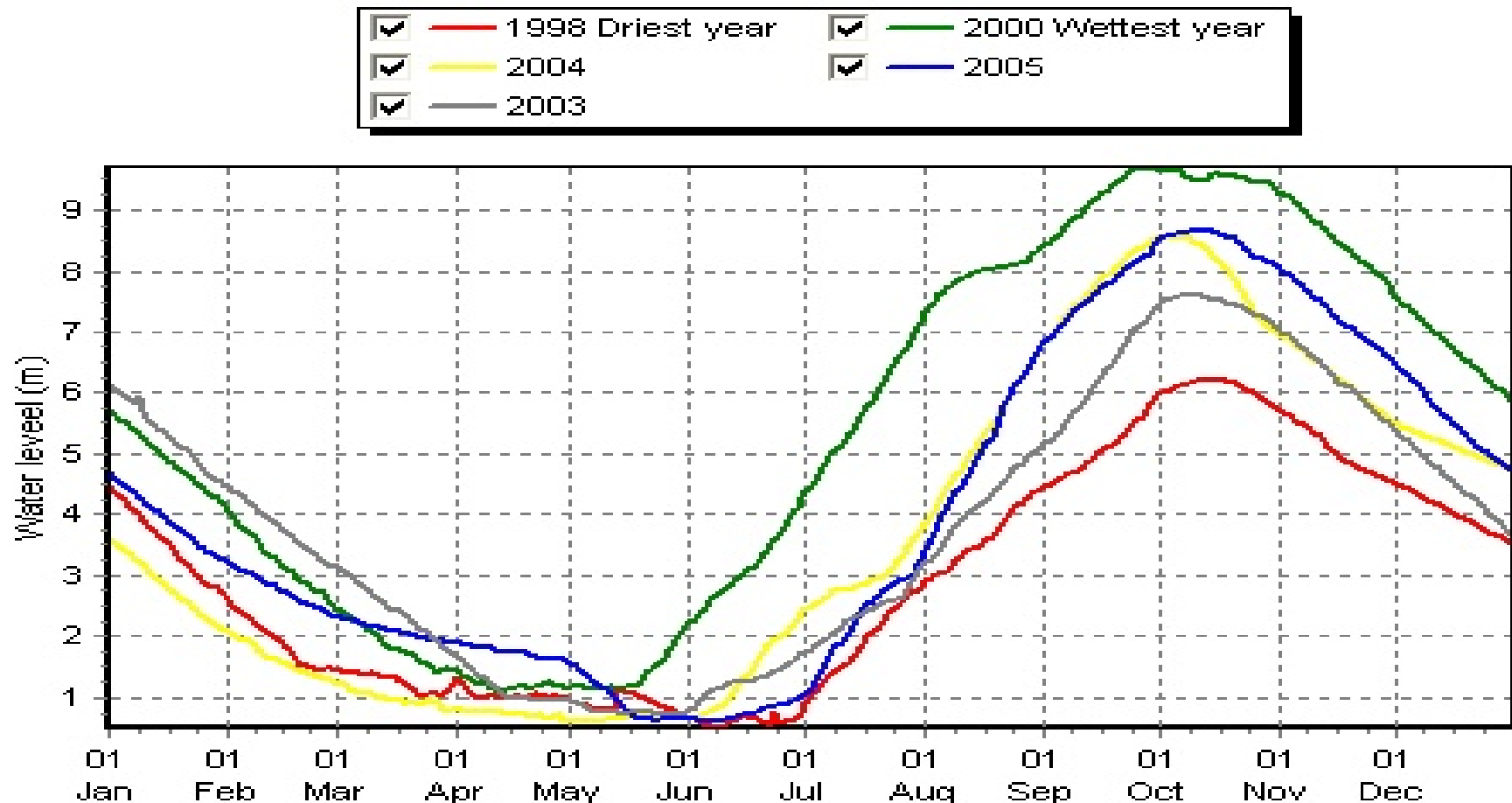
Hydrological Characteristics-The Great Lake ...

The Tonle Sap Great Lake: Maximum annual volume and flooded area (1980-200)



Hydrological Characteristics-The Great Lake ...

The Great Lake at Kampong Luong
Water level (m)



Flood in 2005

- Base hydrographs at Stung Treng the driest year of 1998 and the previous years 2003 and 2004.
- The 2005 flood having received the residual flow from the year 2004 which is considered as one of the driest year with sharp and rapid recession due to early end of rainfall than normal throughout the whole Mekong Basin starts with a slow rise in water level until the 23th of July at water level of 4.58m that a spectacular rise to reach the first peak of 10.31m on 30th of July with a speed of rise of 0.95m per day. The second peak was reached on 11 August, earlier than other years (sometimes in September), the peak of the 2005 flood.

Flood in 2005

Max WL at Stung Treng

Year	Max WL	Date
2000	11.49	16/IX
2001	11.96	20/VIII
2002	11.53	23/VIII
2003	10.23	15/IX
2004	10.22	15/IX
2005	10.76	11/IX

Flood in 2005

Max WL at Chak Tomuk, Phnom Penh

Year	Max WL	Date
2000	11.20	21/IX
2001	10.75	19/IX
2002	10.65	29/IX
2003	9.41	22-23/IX
2004	9.97	25-26/IX
2005	9.95	01/X

Impact of 2005 Floods

- Stung Treng, Kratie , Kampong Cham and Kandal.
- At Kratie and Kampong Cham 361 and 429 people have been evacuated to safer place, this indicates the degree of severity at the affected location.
- Twenty people died from flood of which 9 are male children mostly from bath accidents.
- According to the 2005 MRC flood report there are houses damaged during flood and a number of houses destroyed reported, the destroyed house are mostly built on the river bank and they are washed away by bank erosion.

Impact of 2005 Floods...

- The impact on agriculture was estimated as 6.7% of cultivated areas have been destroyed.
- The 2005 fish catch was considered as relatively modest as compared to other years. With respect to 2004, the total catch of 2005 is estimated to have 26% increase totaling to 410,300 tons, in 2004 with a total catch of 325,560 tons.

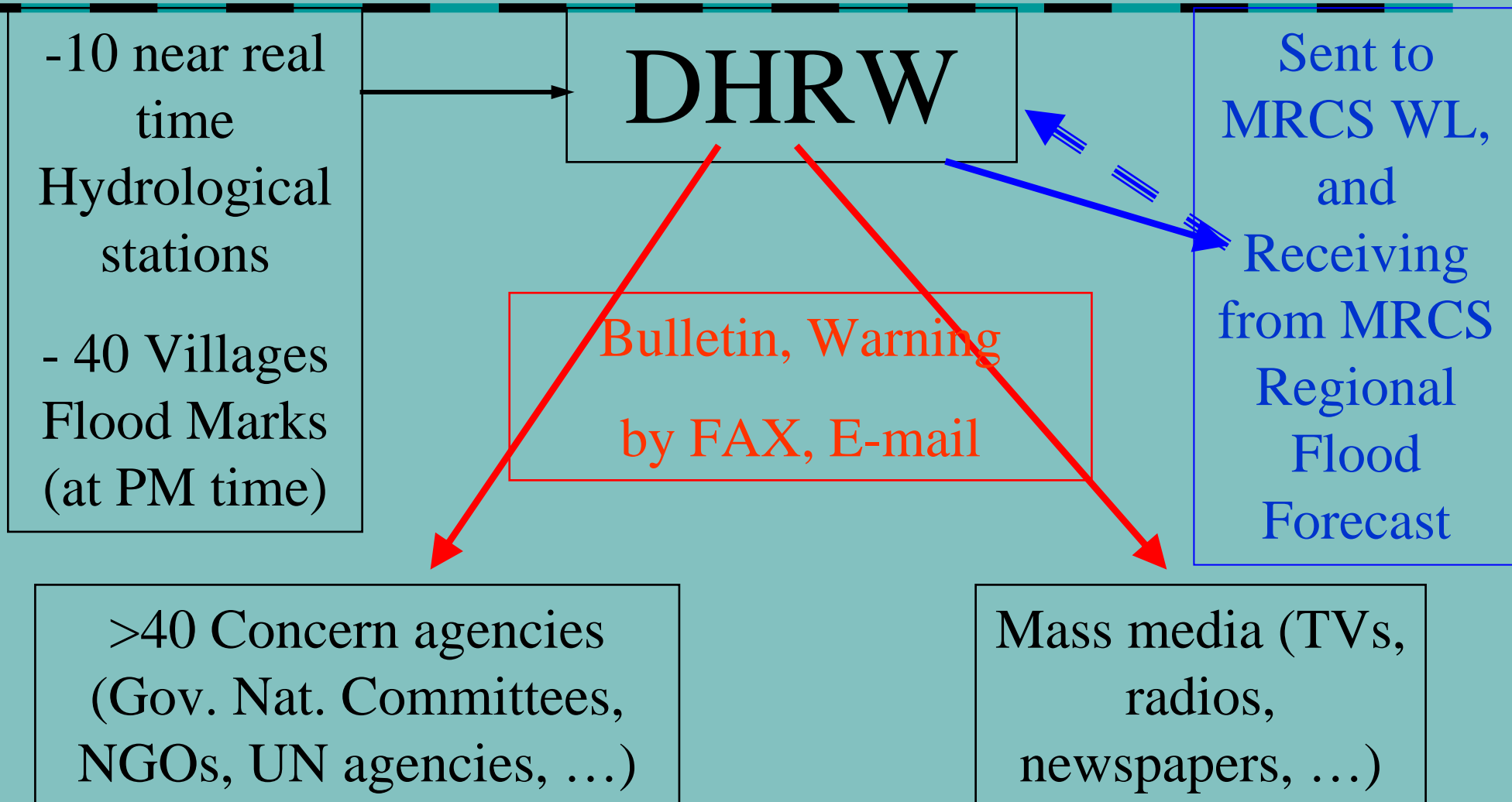
Models for River Forecasting

- The river forecasting of the DHRW is in charge of the forecasting-3days forecast in collaboration with the RFMMC.
- During the 2005 the forecast has been expanded from the provision of the forecast of water level for stations along the Mekong mainstream to cover 40 villages in the flood plain to support the joint effort for providing warning to flood prone communities along the Mekong River from Stung Treng to Kampong Cham and in the flood plain on the left hand site of the Mekong between Kampong Cham and Neak Leung (support by FMMP).

Models for River Forecasting...

- Most field works was implemented by the American Red Cross in collaboration with the Cambodia Red Cross and a NGO, Action Contre la Faim.
- A regression model was developed and used for a three days forecast using observed water level data at reference stations along the Mekong mainstream and reference stations in each of the vulnerable village.

Flow Data Info. and Flood Forecast Bulletin





Flood in Tributaries

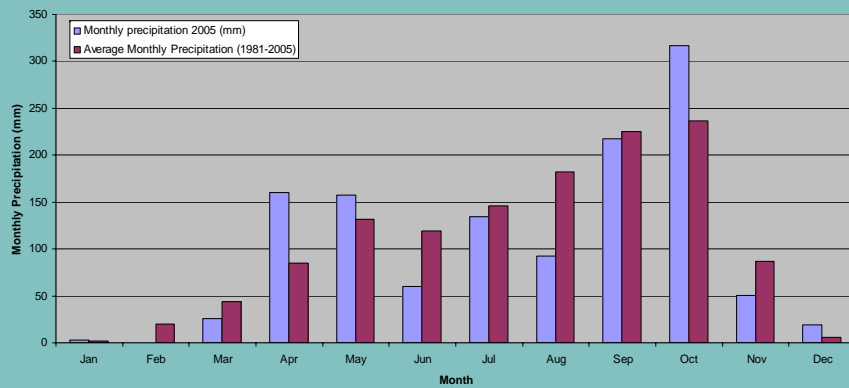
- Only limited data has been provided for the analysis, the flood in Battambang has occurred in August.

Precipitation in 2005

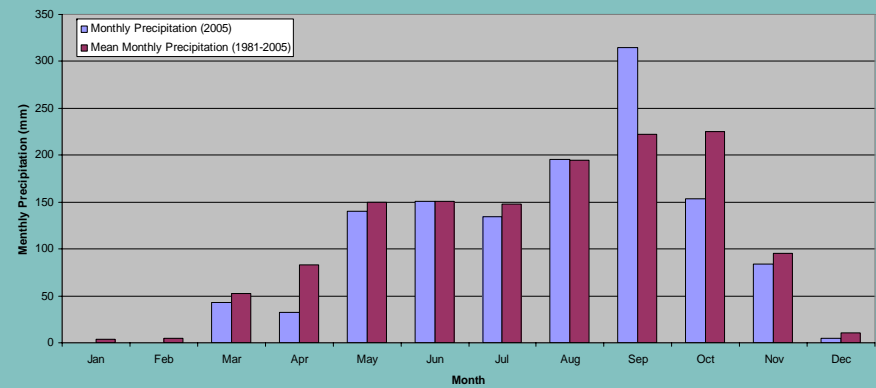
- In 2004 many parts of the country are affected by severe droughts.
- In 2005 rainfall seems relatively well distributed, except some provinces namely Prey Veng and Svay Rieng, Battambang, Kampong Chhnang and Kampong Speu where deficits have been observed in the mid of cropping season but have received good rainfall near the end.

Precipitation in 2005...

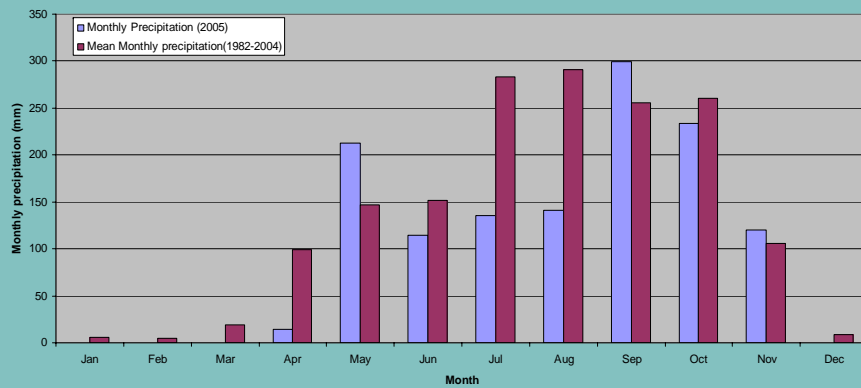
Monthly Precipitation at Battambang



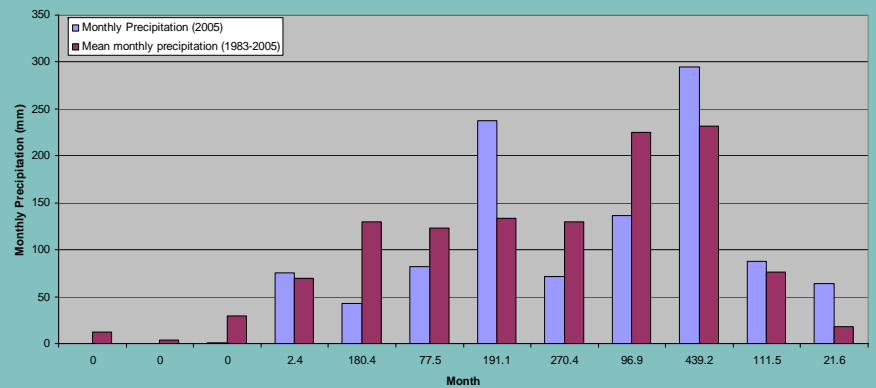
Monthly Precipitation at Pursat (mm)



Monthly Precipitation at Kampong Chhnang (mm)

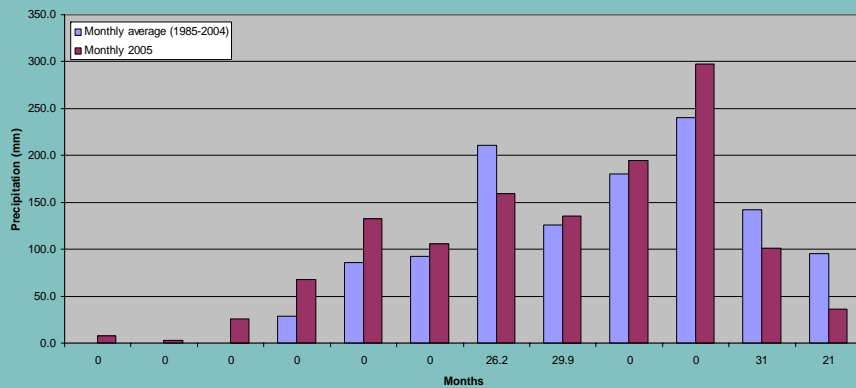


Monthly Precipitation at Kampong Speu (mm)

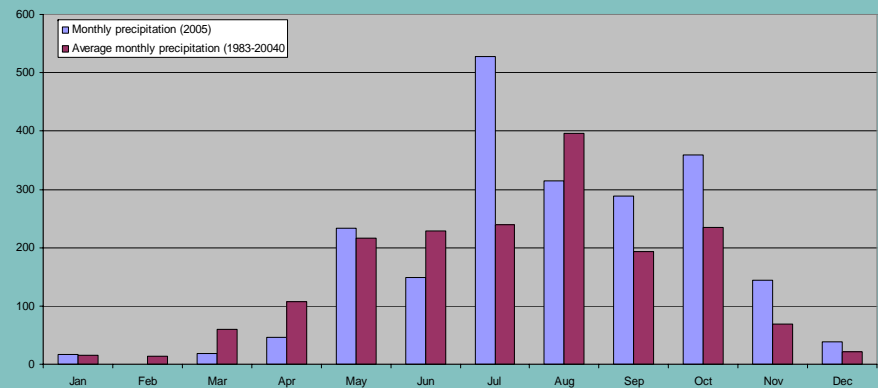


Precipitation in 2005...

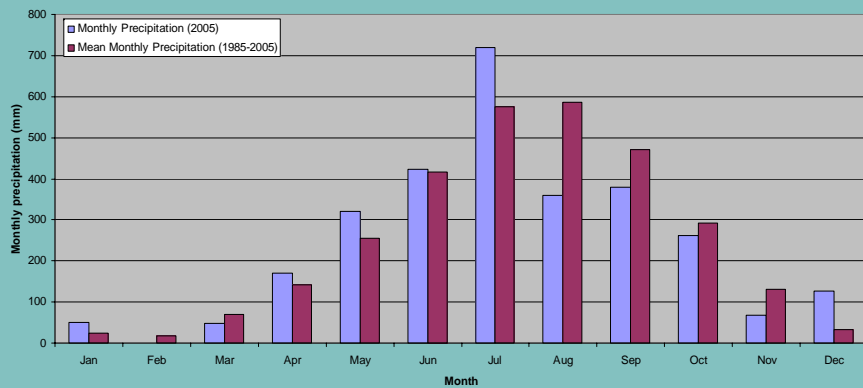
Monthly Precipitation at Takeo (mm)



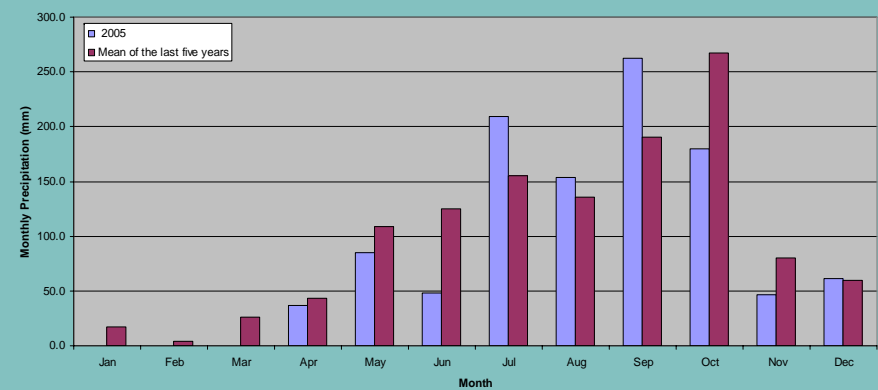
Monthly Precipitation at Kampot (2983-2005)



Monthly Precipitation at Sihanoukville

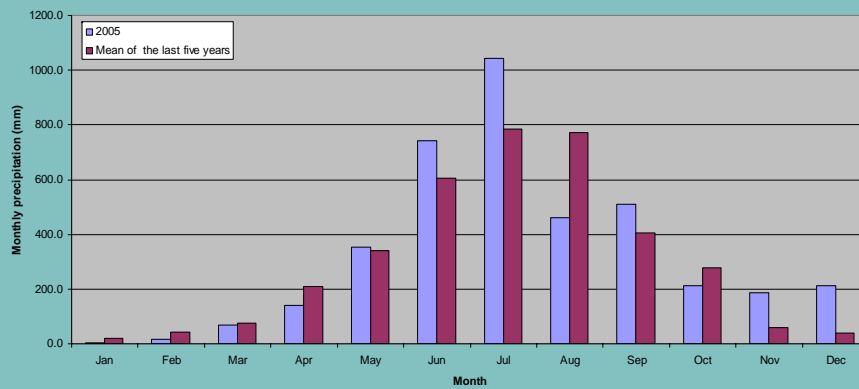


Monthly Precipitation at Kandal (mm)

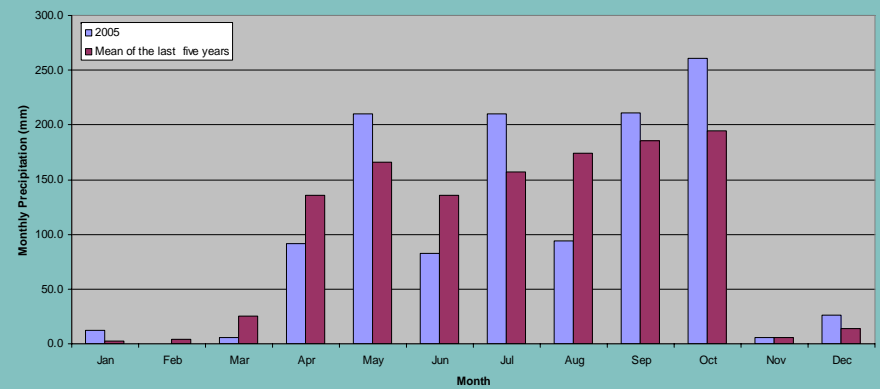


Precipitation in 2005...

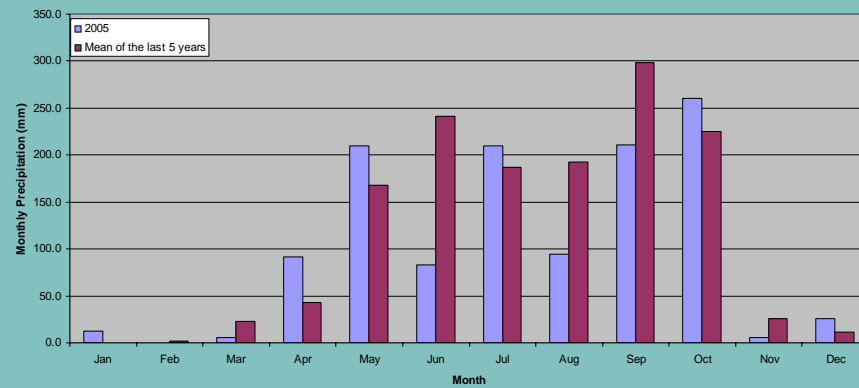
Monthly Precipitation at Koh Kong



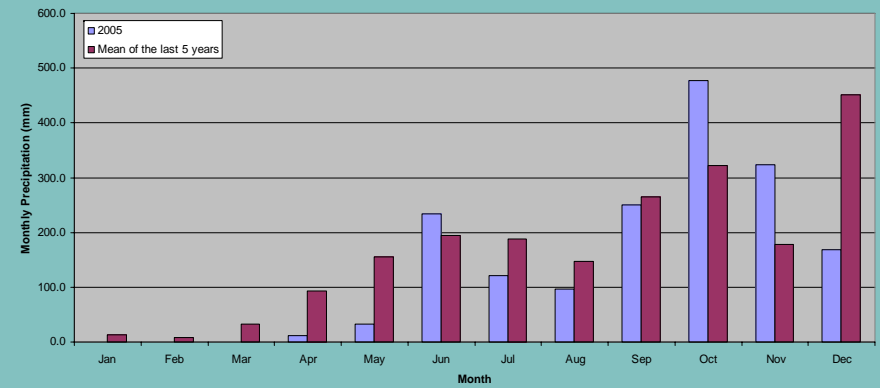
Monthly Precipitation at Banteay Mean Chey



Monthly Precipitation at Siemreap



Monthly Precipitation at Svay Rieng



Conclusion and Recommendations

- For Cambodia, the need is huge covering from structural and non-structural measures of flood management and mitigation to capacity building at all level from forecasting and warning at national, provincial to commune level, from data collection, processing to model development and operation. Financial capacity for data collection and forecasting operation are limited.
- Establishment NFFC: DHRW & DOM & other concerned.

■ Conclusion and Recommendations

- For the mainstream forecasting, a joint effort should be made with the RFMMC to make the Stung Treng forecast to be the most accurate as possible for the mainstream forecast.
- For flood plain forecast a comprehensive review is required for the referencing data collection system including additional water level station along the mainstream.



■ Thank you very much for your
kind attention !

