Mekong River Commission

Weekly Wet Season Situation Report in the Lower Mekong River Basin

30 July – 05 August 2024

Prepared by
The Regional Flood and Drought Management Centre
05 August 2024

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Key Messages

Key messages for this weekly report are presented below.

Rainfall monitoring and forecast

- In the period of 30 July – 05 August 2024, light to very heavy rainfall has been observed over the LMB. In particular, very heavy rainfall has been observed in the center part of the LMB including Luang Prabang, Vang Vieng, Muong Mai, Muong Kao, and Paksane.
- From 06 – 12 August 2024, the accumulated rainfall over the entire Lower Mekong Basin is distributed with light to moderate rain and thunderstorms. Moderate rain is expected in some areas in the central part of the Lower Mekong Basin, the eastern part of Cambodia, and the 3S Basin of Sekong, Sesan, and Srepok.

Water level monitoring and forecast

- At 22 key monitoring stations along the Mekong mainstream from 30 July – 05 August 2024 water levels at all stations are in normal conditions, which do not reach alarm and flood levels. From Chiang Saen to Nongkhai and from Khong Chiam downward, water levels are above their LTAs. The total accumulated volume of the reverse flow to Tonle Sap Lake is 12.76 Km^3.
- In the period of 06 – 10 August 2024, water levels at upstream stations along Mekong mainstream from Chiang Saen to Nongkhai stations are expected to drop, while from Paksane to Phnom Penh Port stations, they will rise. However, from Koh Khel downward, water levels likely drop. From Vientiane to Kratie stations, water levels are also expected to be above their long-term averages (LTAs).

Drought condition and forecast

- During 30 July-5 August 2024, the LMB was generally normal in most parts of the region. No significant impact of drought was detected for the current work.
- August is expected to be abnormally dry over the central and lower parts. Eastern Cambodia and 3S area are likely the driest area of the region. The forecast also indicates that central and eastern Cambodia is likely at moderately dry during September. While no drought is anticipated for October. More rain is expected to come during October before the end of the rainy season.

1 Introduction

This Weekly Wet Season Situation Report presents a preliminary analysis of the weekly hydrological situation in the Lower Mekong River Basin (LMB) for **30 July** – **05 August 2024**. The trend and outlook for water levels are also presented.

This analysis is based on the daily hydro-meteorological data provided by the Mekong River Commission (MRC) Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – and on satellite data. The water level indicated in this report refers to an above zero gauge of each station.

The report covers the following topics that are updated weekly:

- General weather patterns, including rainfall patterns over the LMB.
- Water levels in the LMB, including in the Tonle Sap Lake.
- Flash flood and drought situation in the LMB.
- Weather, water level and flash flood forecast, and
- Possible implications.

Mekong River water levels are updated daily and can be accessed from:
http://ffw.mrcmekong.org/bulletin.php.

Drought monitoring and forecasting information is available at:
http://droughtforecast.mrcmekong.org

Flash flood information is accessible at: http://ffw.mrcmekong.org/ffg.php

2 General Weather Patterns

During 30 July – 05 August 2024, light to very heavy rainfall has been observed over the LMB. In particular, very heavy rainfall has been observed in the center part of the LMB including Luang Prabang, Vang Vieng, Muong Mai, Muong Kao, and Paksane.

Figure 1 presents the mean sea level pressure over the region. It is forecasted that the moderate southwest monsoon and the low pressure will be impacted on the Lower Mekong Basin from 06 - 12 August. Therefore, in the upcoming seven days, the Lower Mekong Basin is expected to experience light to moderate rainfall and isolated heavy rainfall that may occur in some areas in the central part of the Lower Mekong Basin, the eastern part of Cambodia, and the 3S Basin of Sekong, Sesan, and Srepok.

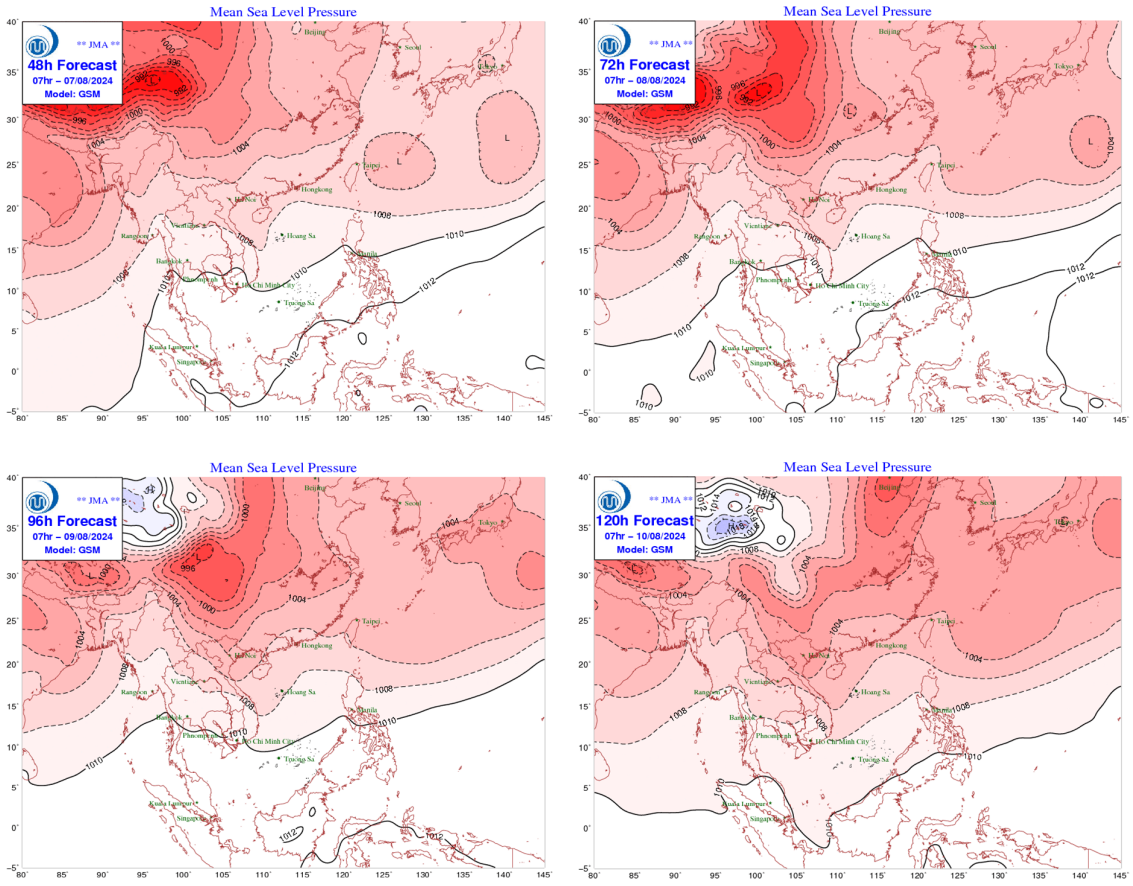


Figure 1: Weather conditions over the LMB

According to the ASEAN Specialised Meteorological Centre (ASMC, http://asmc.asean.org/home/), the subseasonal weather outlook (05 – 18 August 2024) indicates that drier condition is predicted in the lower part of Lower Mekong Basin (LMB), while wetter condition is predicted to be in the upper part. The warmer conditions will be expected in the lower part of LMB during abovementioned period. **Figure 2** shows the outlook of weather condition from

22 July – 04 August 2024 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

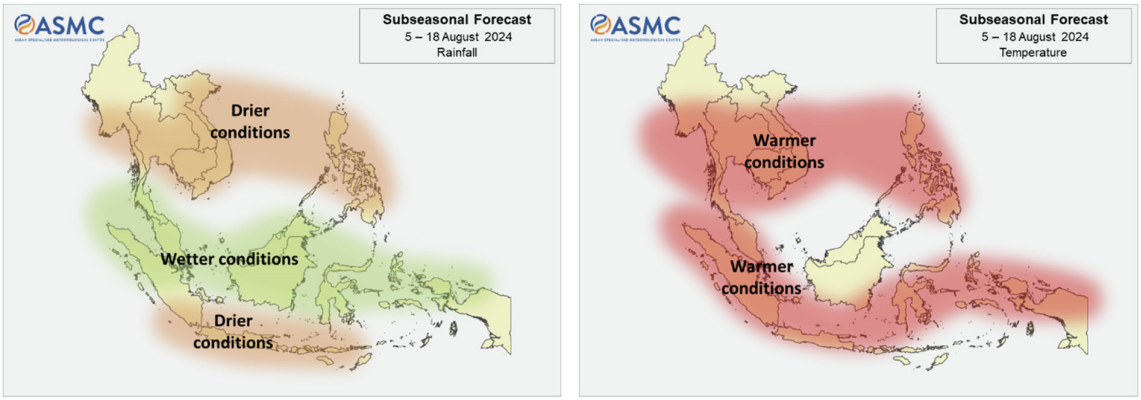


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

Based on the tropical storm risk (TS) (https://www.tropicalstormrisk.com/), there are two active NW pacific system as of 05 August 2024 as displayed in **Figure 3.**

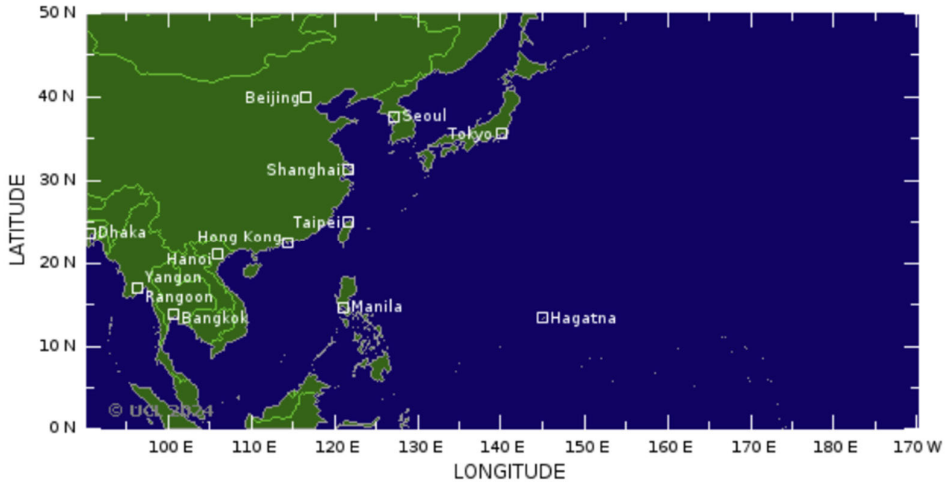


Figure 3: One tropical storm risk observed on 05 August 2024

3. Rainfall and Water Level Monitoring

3.1. Rainfall monitoring

The weekly accumulated rainfall is based on the observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 30 July – 05 August 2024 (**Figure 4**). Light to heavy rainfall has been observed over the LMB. Especially, heavy rainfall has been observed in the center part of the LMB and the 3S Basin, including Muong Kao, Nakhon Phanon, Mahaxai, Saravane, Veun Khen.

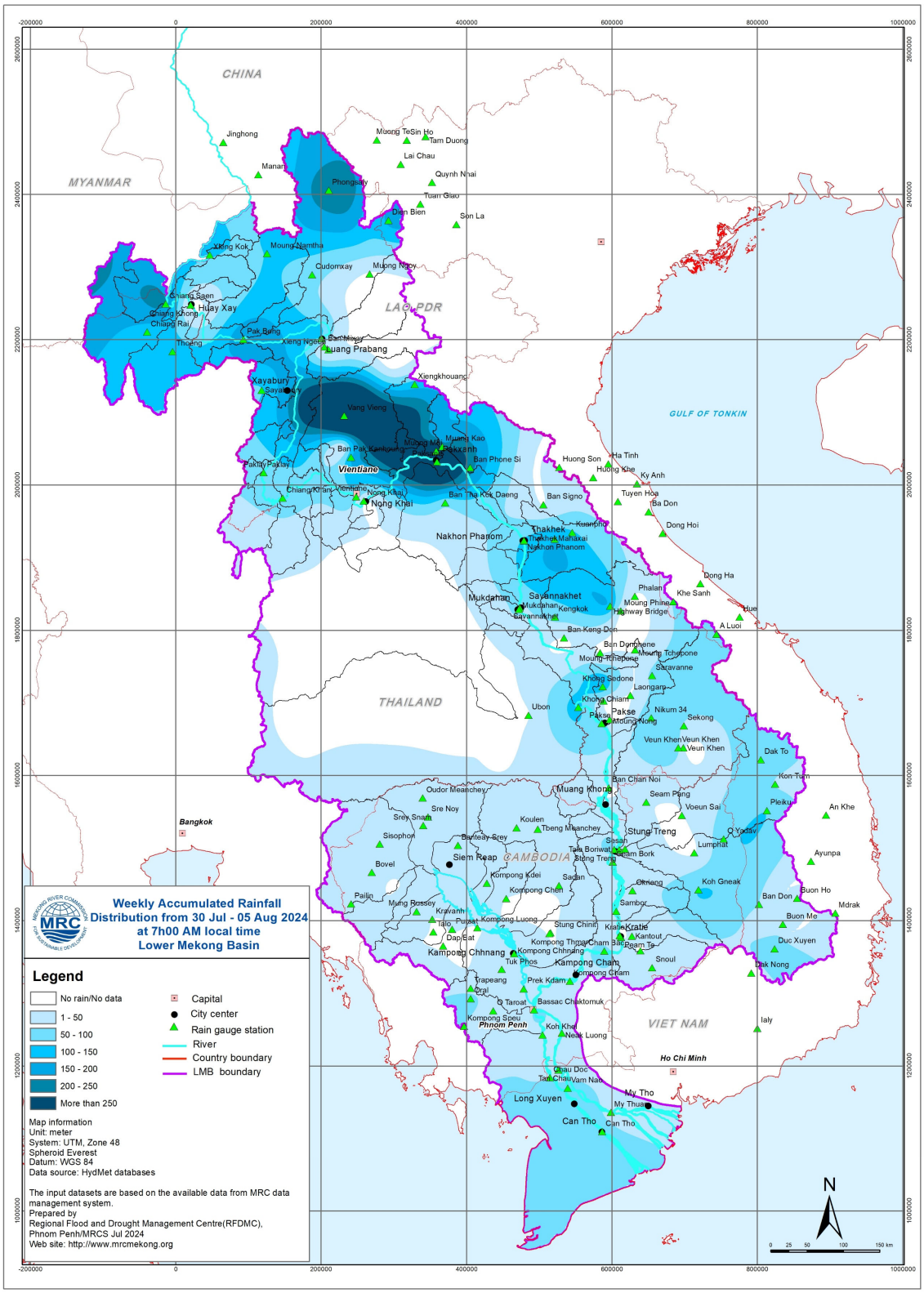


Figure 4: Weekly rainfall distribution over the LMB during 30 July – 05 August 2024

3.2. Water level monitoring

The hydrological regimes of the Mekong mainstream are illustrated by recorded water levels and flows at key mainstream stations: at Chiang Saen to capture mainstream flows entering from the Upper Mekong Basin (UMB); at Vientiane to present flows generated by climate conditions in the upper part of the LMB; at Pakse to investigate flows influenced by inflows from the larger Mekong tributaries; at Kratie in Cambodia to capture overall flows of the Mekong Basin; and at Viet Nam's Tan Chau and Chau Doc to monitor flows to the Delta.

The key stations along the LMB and their respective model application for River Flood Forecasting during the wet season from June to October and River Monitoring during the dry season from November to May are presented in **Figure 5**. The hydrograph for each key station is available from the MRC's River Flood Forecasting: http://ffw.mrcmekong.org/overview.php.

During 30 July– 05 August 2024, the observed water level (WL) at Jinghong hydrological station[1], was almost constant and ranges between 537.48 m and 537.09 m, which are corresponding to the outflow between 2,570.00 m^3/s to 2,230.00 m^3/s (recorded on 7:00 am), respectively (**Figure 6**). The water level in Chiang Saen station also indicated a fluctuation ranging from 3.89 m to 6.54 m. At the same period, the water level in Luang Prabang station also slightly increased with an approximate value of 4.0 m from 10.28 m to 14.28 m as compared to the previous week.

During the same period, the water levels observed at the upper stretch from Chiang Khan to Pakse have been increased. At Chiang Khan, Vientiane, Nongkhai, Paksane, Nakhon Phanom, Thakhek, Mukdahan, Savannakhet, Khong Chiam, and Pakse, water levels have increased from 8.25 m to 12.86 m, 6.34 m to 8.68 m, 6.25 m to 9.36 m, 7.76 m to 9.32 m, 7.2 m to 8.22 m, 8.22 m to 8.95 m, 7.12 m to 8.22 m, 5.38 m to 6.68 m, 8.84 m to 9.91 m, and 7.38 m to 8.12 m, respectively. However, water levels at Stung Treng, Kratie, kampong Cham Phnom Penh Bassac, Phnom Penh Port, Koh Khel, Neak Luong and Prek Kdam have decreased from 5.05 m to 7.32 m, 17.98 m to 17.0 m, 11.06 m to 10.56 m, 6.78 m to 6.56 m, 5.5 m to 5.37 m, 6.05 m to 6.04 m, 4.78 m to 4.62 m, and 5.49 m to 5.48 m, respectively.

Similar to the previous week, the water levels from 30 July to 05 August 2024 at Viet Nam's Tan Chau and Chau Doc, water levels have also increased from 1.84 m to 1.66 m and from 1.74 m to 1.49 m, respectively.

[1] Near-real time data of hydro-meteorological monitoring at the Jinghong hydrological station is available at https://portal.mrcmekong.org/monitoring/river-monitoring-telemetry.

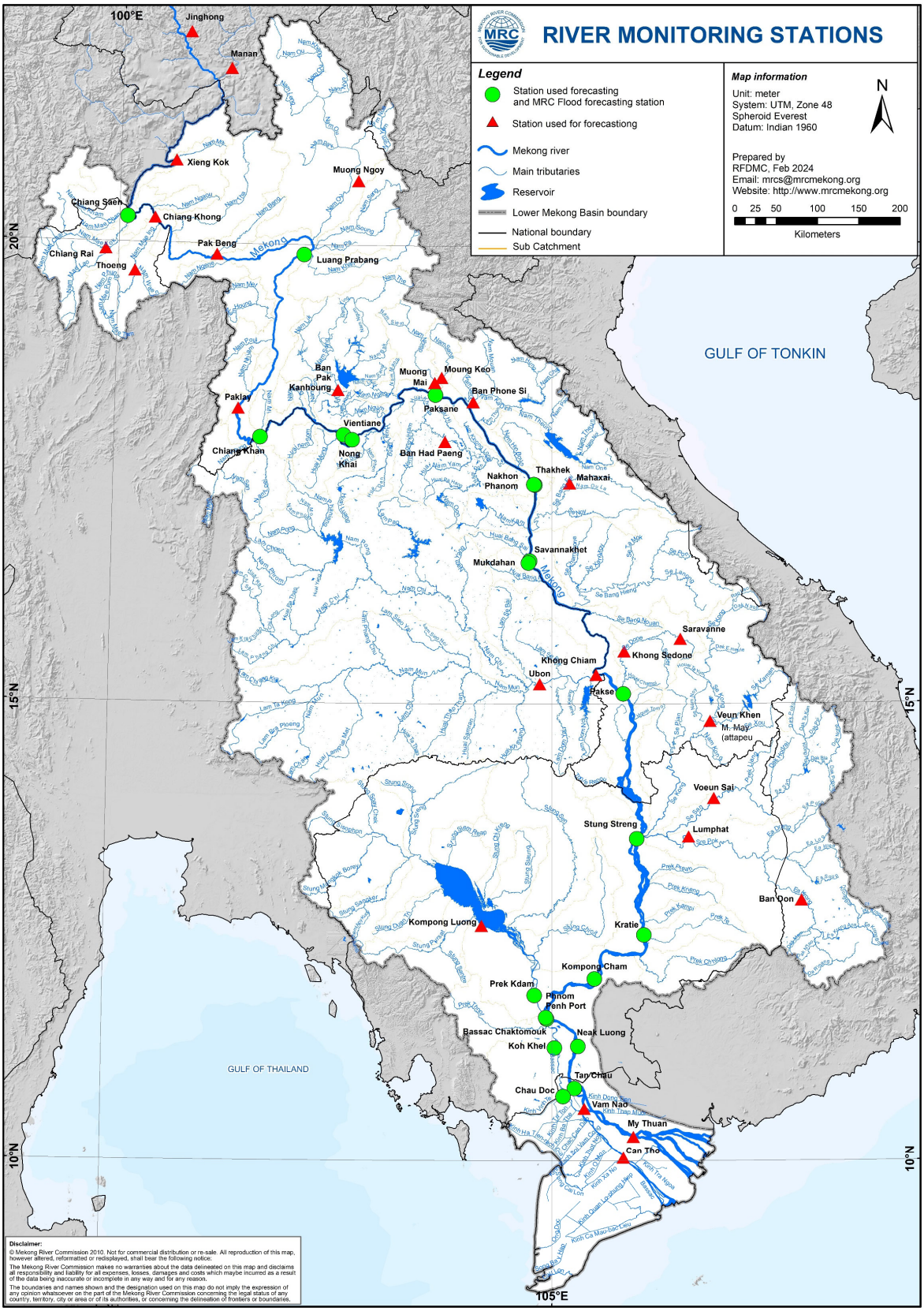


Figure 5: The key stations along LMB for river flood forecasting

The water levels in key monitoring stations on 05 August, water levels at all stations are in normal conditions, which do not reach alarm and flood levels. From Chiang Saen to Nongkhai and from Khong Chiam downward, water levels are above their LTAs. Moreover, all stations with available PMFM (Article 6C) thresholds are in normal conditions. The graphics of water level monitoring in all key stations are presented in **Annex A** and the weekly water levels and rainfall at each key station are summarised in **Annex B**.

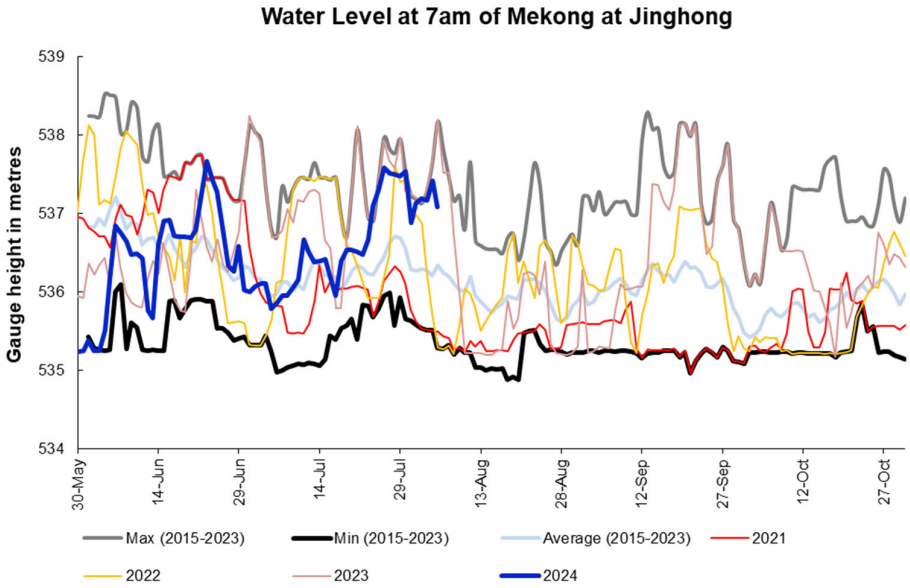


Figure 6. Water level at the Jinghong hydrological station up to 05 August 2024.

At the end of the wet season, when water levels along the Mekong River subside, the outflow of the Tonle Sap Lake (TSL) returns to the Mekong River and then to the Delta. This phenomenon normally takes place between September and October. Based on flow observation at Prek Kdam monitoring station, the inflow/reverse of the Tonle Sap Lake took place since 29 June 2024.

The outflow flow is calculated based on a formula of rating-curves using by difference of water levels at Kompong Luong and Phnom Penh Port stations for slop and Prek Kdam as cross-section of the Lake. The formula of flow is as follows:

$$Flow = WL_{Prek\ Kdam}^{1.2} \times \sqrt{|WL_{Phnom\ Penh\ Port} - WL_{Kampong\ Luong}|}$$

Where, WL is water level in m (msl).

The seasonal changes of the inflow/reverse flow and the outflow of the TSL at Prek Kdam in comparison with the flows of 2020, 2021 and 2022, 2023 and their LTA level (1997-2023) are illustrated in **Figure 8**. Up to 05 August 2024, it was observed that the main outflow to Tonle Sap Lake decreased due to limited rainfall and less inflows from upstream **(Figure 8)**. This decreased outflow of Tonle Sap Lake was most likely caused by low inflows from its tributaries.

The seasonal changes in monthly flow volumes up to 05 August 2024 for the TSL compared with that in 2020, 2021, 2022, 2023 and their LTAs, and the fluctuation levels (1997–2023) are presented in **Table 8**. The mean monthly water volume of the Tonle Sap Lake in July 2024 is lower than its LTA (about 52.56 %) and 2022 but higher than that in 2019, 2020, 2021 and 2023 during the same period **(Figure 8 and Table 1)**.

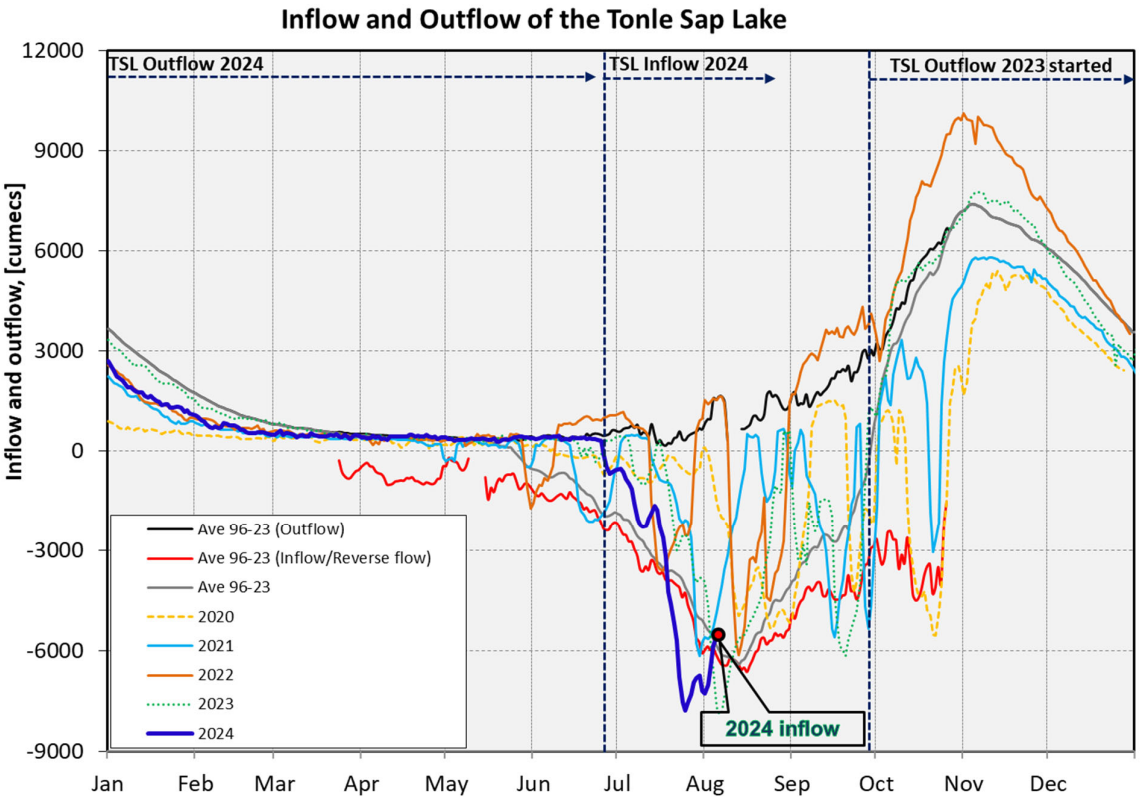


Figure 7: Seasonal change of inflows and outflows of Tonle Sap Lake.

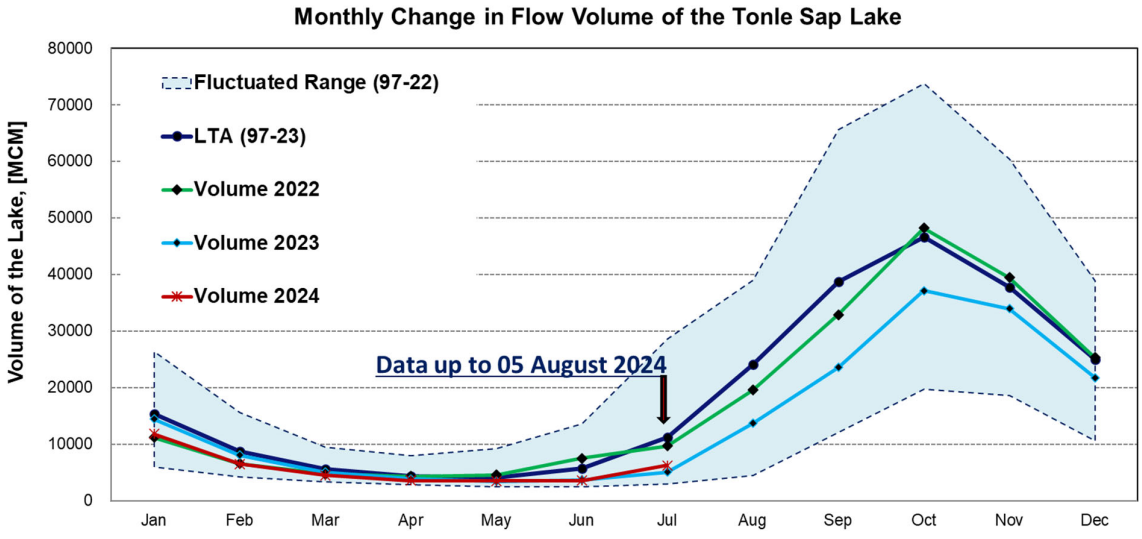


Figure 8. The seasonal change in monthly flow volume of Tonle Sap Lake.

Table 1. The monthly change in the flow volume of Tonle Sap Lake.

Month	LTA (97-22) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]	Volume 2023 [MCM]	Volume 2024 [MCM]	Volume in 2024 [%], compared with its LTA
Jan	15322.86	26357.53	5906.80	10285.31	5906.80	9923.80	11214.32	14422.11	11824.86	77.17
Feb	8723.39	15596.22	4198.60	6019.30	4264.19	5832.97	6558.79	8069.29	6505.88	74.58
Mar	5602.68	9438.24	3347.07	4354.62	3553.99	4264.88	4736.52	5080.64	4488.23	80.11
Apr	4327.36	8009.14	2866.91	3667.47	2992.61	3556.68	4288.31	3884.16	3569.01	82.48
May	4027.82	9176.93	2417.81	3266.43	2594.92	3240.78	4556.83	3438.66	3517.79	87.34
Jun	5699.50	13635.01	2468.70	3517.06	2641.88	3798.29	7489.04	3689.97	3586.07	62.92
Jul	11188.79	28599.56	2925.86	4001.99	2925.86	5346.73	9703.79	5062.21	5880.92	52.56
Aug	24070.98	39015.12	4433.46	7622.71	5941.07	10547.80	19554.70	13694.57		
Sep	38787.47	65632.35	12105.31	24194.19	12105.31	16382.34	32860.34	23550.60		
Oct	46562.09	73757.23	19705.50	30358.38	20799.13	27318.21	48199.12	37141.40		
Nov	37739.30	60367.33	18534.61	19112.65	27546.80	28982.93	39452.53	33929.52		
Dec	25009.52	38888.95	10563.49	10577.29	18251.65	20170.76	25346.65	21757.70		
	Critical situation: lower than long-term minimum values (LTMIN)									
	Normal condition: within the range of long-term min (LTMIN) and max (LTMAX) values									
	Low volume situation: lower than long-term average (LTA)									
Unit: Million Cubic Meter (1 MCM= 0.001 Km^3)										

Remarks: the volume of Tonle Sap Lake in 2024 is updated untill 05 August 2024.

4. Flash Flood in the Lower Mekong Basin

During the weekly monitoring period from 30 July – 05 August, the LMB received light to very heavy rain and thunderstorms in some areas in the upper and central part of the LMB and the 3S Basin of Sekong, Sesan, and Srepok.

According to the Southeast Asian Flash Flood Guidance System (SEAFFGS) and analysis, flash flood guidance was detected high level in the next 1, 3, and 6 hours in some areas of Lao PDR, during this period, the reporting period as shown in Figure 14 and Table 2.

Table 2. Detected moderate to high-risk flash flood in Lao PDR on 02 August

FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Attapeu	Sanxay	moderate	Champasak	Paksong	moderate	Champasak	Paksong	moderate
Attapeu	Sanamxay	moderate	Khammuane	Hinboon	moderate	Khammuane	Hinboon	moderate
Bolikhamxay	Khamkheut	moderate	Khammuane	Nakai	moderate	Khammuane	Bualapha	moderate
Champasak	Paksong	moderate	Khammuane	Bualapha	moderate	Khammuane	Nhommalat	moderate
Khammuane	Hinboon	moderate	Khammuane	Nhommalat	moderate	Khammuane	Mahaxay	moderate
Khammuane	Nakai	moderate	Khammuane	Mahaxay	moderate	Khammuane	Xaybouath	moderate
Khammuane	Nhommalat	moderate	Khammuane	Xaybouath	moderate	Khammuane	Thakhek	moderate
Khammuane	Bualapha	moderate	Khammuane	Thakhek	moderate	Khammuane	Nongbok	moderate
Khammuane	Mahaxay	moderate	Khammuane	Nongbok	moderate	Luangprabang	Ngoi	high
Khammuane	Xaybouath	moderate	Luangprabang	Ngoi	moderate	Vientiane	Xanakham	high
Khammuane	Thakhek	moderate	Vientiane	Xanakham	moderate			
Khammuane	Nongbok	moderate	Xayaboury	Paklai	moderate			
Luangprabang	Nambak	moderate	Xaysomboun	Phoun	moderate			

FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Luangprabang	Ngoi	high						
Luangprabang	Viengkham	moderate						
Oudomxay	Xay	moderate						
Oudomxay	Nga	moderate						
Phongsaly	khoua	moderate						
Vientiane	Xanakham	moderate						
Vientiane	Xanakham	high						
Xayaboury	Paklai	moderate						
Xaysomboun	Phoun	moderate						
Xiengkhuang	Morkmay	moderate						

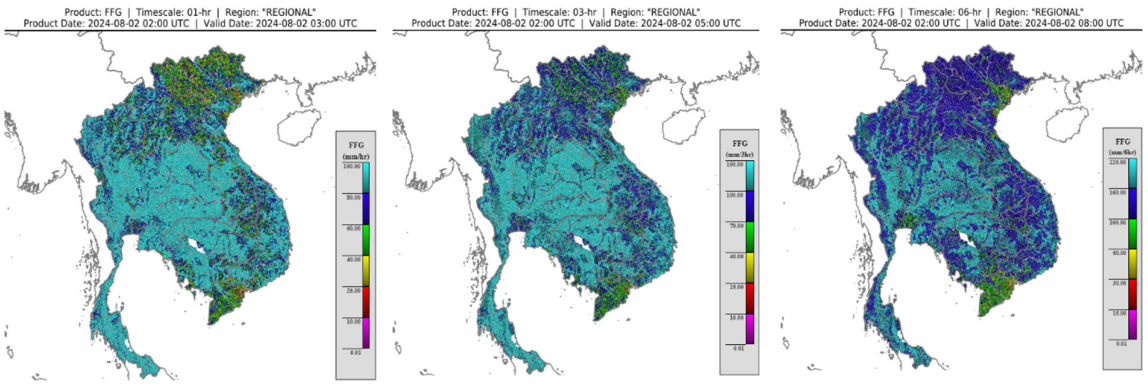


Figure 9. Flash Flood Guidance for the next 1-hr, 3-hr, and 6-hr on 02 August

5. Drought Monitoring in the Lower Mekong Basin

5.2. Weekly drought monitoring from 30 July to 5 August 2024

Drought monitoring data for 2024 are available from Monday to Sunday every week; thus, the reporting period is normally delayed by one day compared to Flood and Flash Flood reports. We adopt the Index of Soil Water Fraction (ISWF) data obtained from FFGS to represent soil moisture of agricultural indicator for both dry and wet seasons.

- **Weekly Standardised Precipitation Index (SPI1)**

As indicated in **Figure 10** below, during July 30 to August 5, the LMB was facing some moderate and severe meteorological droughts in the northern part. Severe meteorological drought was taking place in Chiang Mai, Chiang Rai, Phayao, and Louangnamtha provinces.

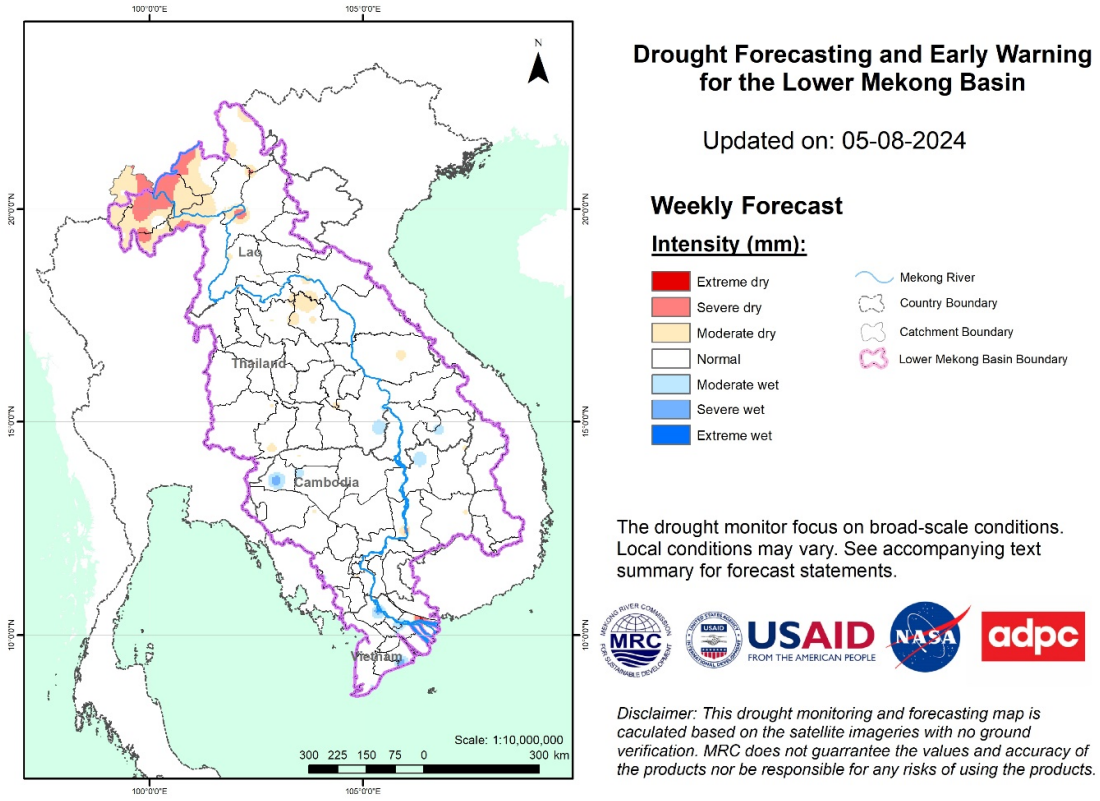


Figure 10: Weekly standardized precipitation index from July 30 to August 5.

- **Weekly Index of Soil Water Fraction (ISWF)**

There was no agricultural drought taking place during the monitoring week from July 30 to August 5, see **Figure 10**.

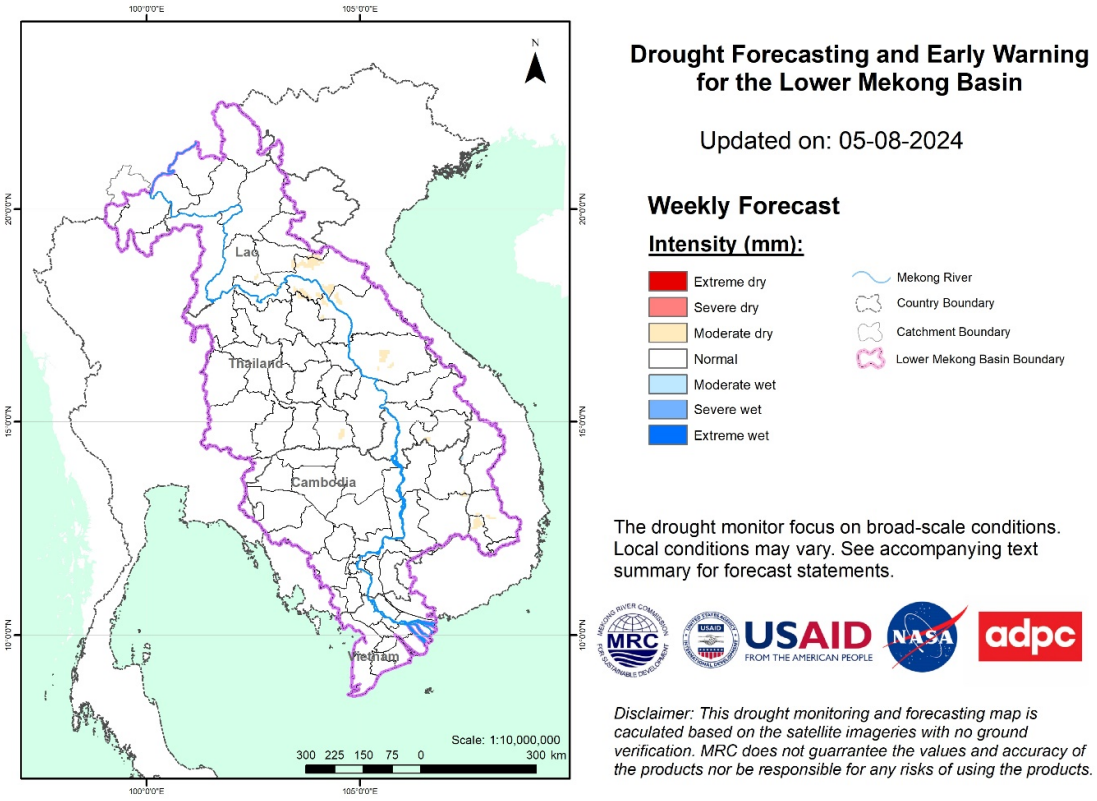


Figure 11: Weekly Index of Soil Water Fraction from July 30 to August 5.

- **Weekly Combined Drought Index (CDI)**

The combined drought indicator, **Figure 11**, shows that the LMB was generally normal in most parts of the region during July 30-Aug 5 No significant impact of drought was detected for the current work.

The impacted areas are listed below:

Country	Province	Mderate	Severe	Extreme	Exceptiona	Number	Country	Province	Mderate	Severe	Extreme	Exceptiona	Number	Country	Province	Mderate	Severe	Extreme	Exceptiona
Cambodia	Battamabang					24	Lao PDR	Oudomxai					47	Thailand	Udon Thani				
Cambodia	Banteay Meanchey					25	Lao PDR	Loungprabang					48	Thailand	Sakon Nakhon				
Cambodia	Kampong Cham					26	Lao PDR	Xayaburi					49	Thailand	Bueng Kan				
Cambodia	Pursat					27	Lao PDR	Xiengkhouang					50	Thailand	Nakhon Phanom				
Cambodia	Kampong Chhnang					28	Lao PDR	Vientiane					51	Thailand	Kalasin				
Cambodia	Otdar Meanchey					29	Lao PDR	Vientiane Capital					52	Thailand	Mukdahan				
Cambodia	Preah Vihear					30	Lao PDR	Xaisomboun					53	Thailand	Roi Et				
Cambodia	Kampong Thom					31	Lao PDR	Borikhamxai					54	Thailand	Yasothon				
Cambodia	Kratie					32	Lao PDR	Khammouan					55	Thailand	Amnat Charoen				
Cambodia	Mondulkiri					33	Lao PDR	Savanakhet					56	Thailand	Ubon Ratchathani				
Cambodia	Ratanakiri					34	Lao PDR	Salavan					57	Thailand	Si Sa Ket				
Cambodia	Tbong Khmum					35	Lao PDR	Xekong					58	Thailand	Surin				
Cambodia	Prey Veng					36	Lao PDR	Attapu					59	Thailand	Buri Ram				
Cambodia	Kampot					37	Lao PDR	Champasack					60	Thailand	Nakhon Ratchasima				
Cambodia	Takeo					38	Thailand	Chiang Mai					61	Viet Nam	Kon Tum				
Cambodia	Svai Rieng					39	Thailand	Chiang Rai					62	Viet Nam	Gia Lai		S		
Cambodia	Stung Treng					40	Thailand	Payao					63	Viet Nam	Dak Nong				
Cambodia	Kampong Speu					41	Thailand	Loei					64	Viet Nam	Dak Lak				
Cambodia	Kandal					42	Thailand	Nong Bua Lam Phu					65	Viet Nam	Dong Thap				
Cambodia	Siem Reap					43	Thailand	Khon Kaen					66	Viet Nam	Tien Giang				
Lao PDR	Bokeo					44	Thailand	Nong Khai					67	Viet Nam	An Giang				
Lao PDR	Luangnamtha					45	Thailand	Chaiyaphum						Other provinces of the Mekong Delta of Viet Nam have no data					
Lao PDR	Phongsali					46	Thailand	Maha Sarakham							Moderate		Severe		
															Severe		Exceptional		

Note: S: short-term drought, less than 1 months; L: long-term drought, more than 1 month

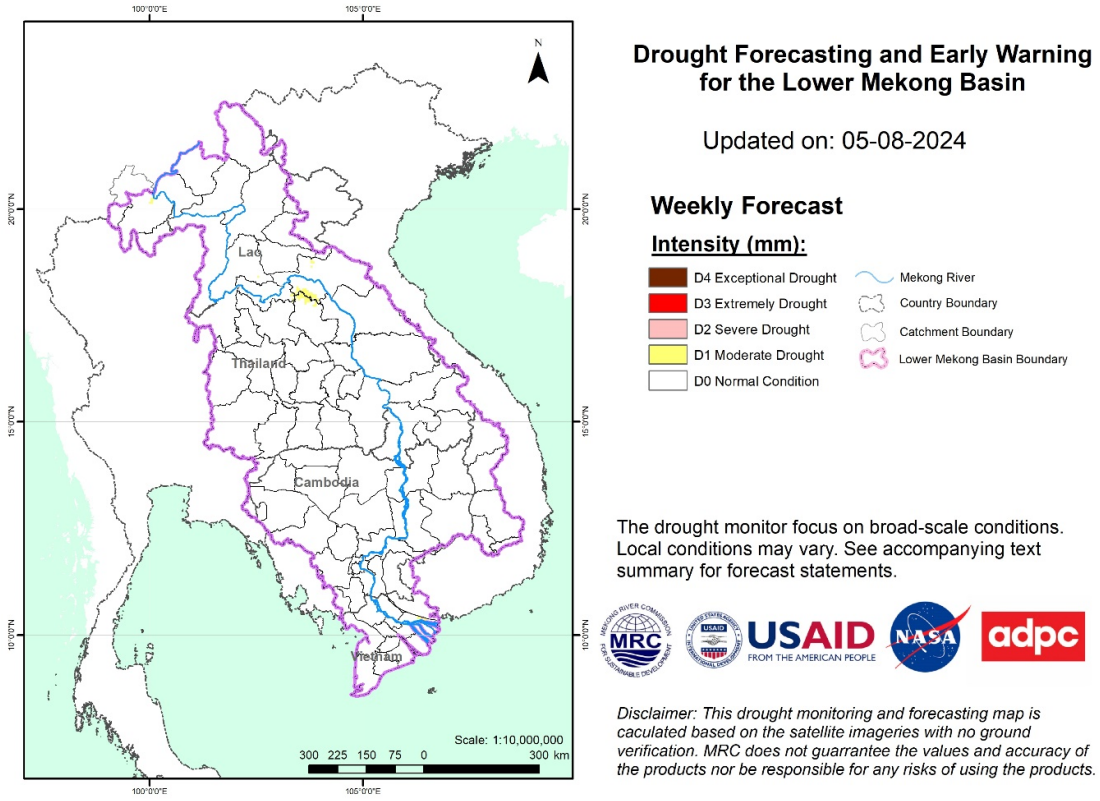


Figure 12: Weekly Combined Drought Index from July 30 to August 5.

More information on Drought Forecasting and Early Warning (DFEW) as well as the explanation is available here: http://droughtforecast.mrcmekong.org/templates/view/our-product. DFEW provides not only weekly monitoring and forecasting information but also a three-month forecast of drought indicators with seasonal outlook which are updated every month based on international weather forecast models. Details on drought forecast are described in section 6.4 of this report.

6 Weather and Water Level Forecast and Flash Flood information

6.1 Rainfall forecast

From 06 to 10 August 2024, the accumulated rainfall over the entire Lower Mekong Basin is distributed with light to heavy rain based on CHIRPS-GFS (**Figure 12**). The accumulated rainfall over the entire Lower Mekong Basin is distributed with light to moderate rain and thunderstorms. Moderate rain is expected in some areas in the central part of the Lower Mekong Basin, the eastern part of Cambodia, and the 3S Basin of Sekong, Sesan, and Srepok.

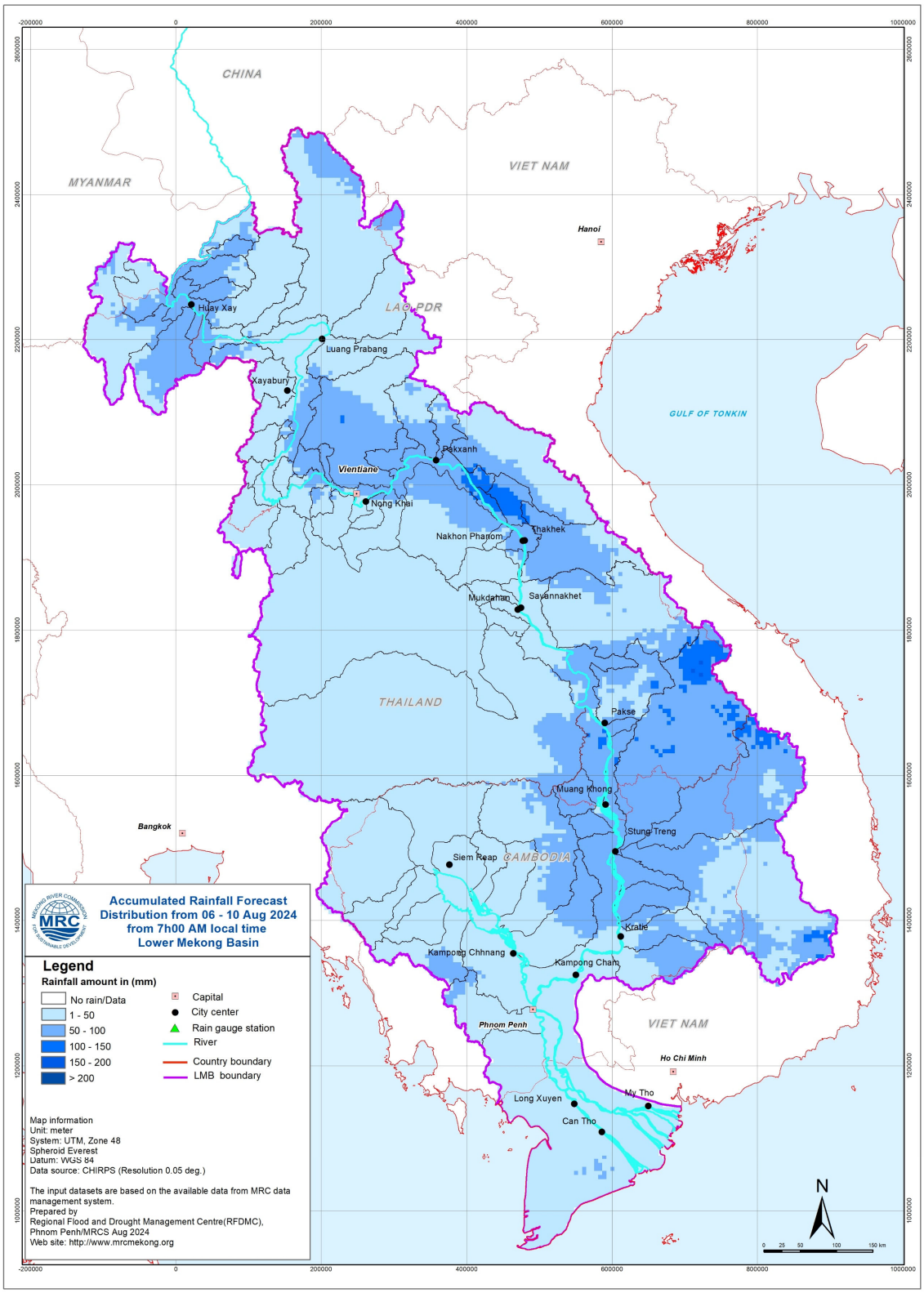


Figure 13: Accumulated rainfall forecast from CHIRPS-GFS (06 – 10 August 2024)

6.2 Water level forecast

In Chiang Saen monitoring station, the water level is expected to be fluctuated over the forecasting period of 06 – 10 August 2024. However, it will increase from 6.08 m to 5.32 m. The water levels in Luang Prabang affected by backwater is likely decreasing approximately -2.10 m.

Along the Mekong mainstream, the water levels at all forecasting stations at upper stretch are expected to decrease. At Chiang Khan, Vientiane, and Nongkhai, water levels are expected to decrease approximately, -1.86 m, -0.20 m, -0.93 m, respectively. In addition, From Paksane to Phnom Penh Port, water levels are likely rise. At Paksane, Nokhon Phanom, Thakhek, Mukdahan, Savannakhet, Khong Chiam, Pakse, Stung Treng, Kratie, Kampong Cham, Phnom Penh (Bassac), and Phnom Penh Port, water levels are likely rise with approximately value of 1.90 m, 2.28 m, 2.52 m, 2.53 m, 2.41 m, 2.34 m, 2.34 m, 1.35 m, 0.90 m, 0.39 m, 0.03 m, and 0.04 m, respectively as compared to the previous week. However, at Koh khel, Neak Luong, and Prek Kdam, water level is likely decreasing -0.01 m, -0.21 m, and 0.03 m, respectively.

For the Tan Chau station on the Mekong River and Chau Doc station on the Bassac River, water levels will be also decreasing as well from 1.87 to 1.67 m and 1.71 to 1.43 m, respectively.

The water levels at key stations are forecasted to be above their LTAs from Vientiane to Kratie stations during 06-10 August 2024.

The weekly River Monitoring Bulletin and forecasting issued on 05 August 2024 can be found in **Table 2.** Results of the weekly river monitoring and forecasting bulletin are also available at http://ffw.mrcmekong.org/bulletin.php

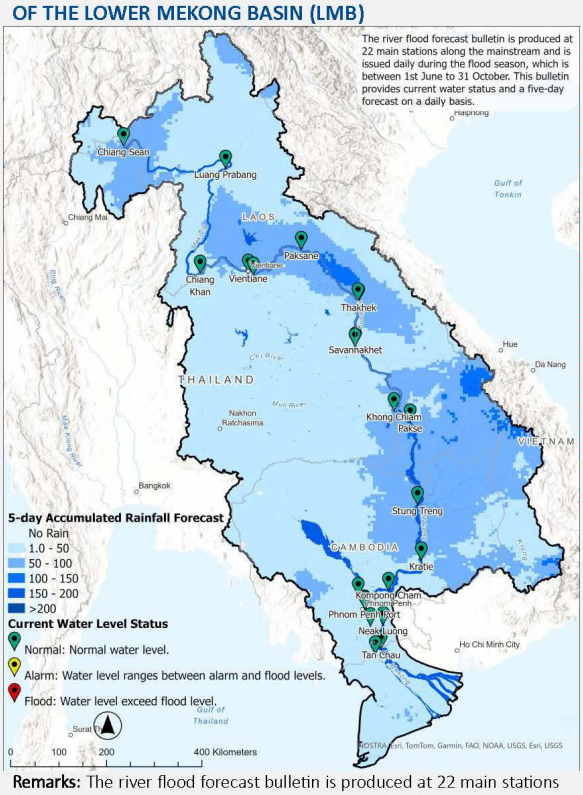
Table 3. River Monitoring and Forecasting Bulletin

MEKONG RIVER MONITORING AND FORECASTING BULLETIN

Monitoring on 05 August 2024

Highlights: *Today's water levels in all mainstream stations are "normal", and the flow thresholds (PMFM 6C) are under "normal conditions". The accumulated volume of reverse flow to Tonle Sap Lake is* ***12.76 km³****.*

THE FORECASTING HYDROLOGICAL STATION MAP OF THE LOWER MEKONG BASIN (LMB)



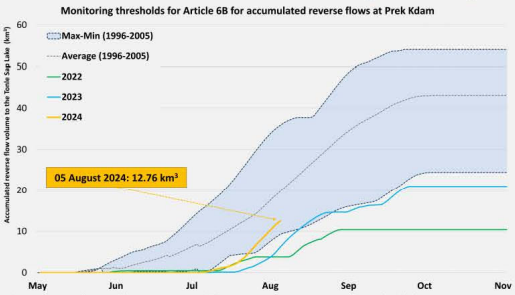
CURRENT WATER LEVEL STATUS

Monitoring Station	Water Level	Flow Threshold (PMFM*6C)
Jinghong	-	
Chiang Saen	Normal	Normal
Luang Prabang**	Normal	-
Chiang Khan	Normal	-
Vientiane	Normal	Normal
Nongkhai	Normal	-
Paksane	Normal	-
Nakhon Phanom	Normal	-
Thakhek	Normal	-
Mukdahan	Normal	-
Savannakhet	Normal	-
Khong Chiam	Normal	Normal
Pakse	Normal	Normal
Stung Treng	Normal	Normal
Kratie	Normal	Normal
Kompong Cham	Normal	-
Phnom Penh (Bassac)	Normal	-
Phnom Penh Port	Normal	-
Koh Khel	Normal	-
Neak Luong	Normal	-
Prek Kdam	Normal	-
Tan Chau	Normal	-
Chau Doc	Normal	-

** Procedures for Maintenance of Flows on the Mainstream*

*** Luang Prabang station is influenced by hydropowers at its upstream and downstream*

REVERSE FLOW VOLUME PREK KDAM (PMFM*6B)



Remarks: The river flood forecast bulletin is produced at 22 main stations along the mainstream and is issued daily during the flood season, which runs from 1st June to 31st October. This bulletin provides information on the current water level status and a five-day forecast on a daily basis.

WATER LEVEL STATUS DEFINITIONS

Normal	Normal water level.
Alarm	Alarm when the water level ranges between alarm and flood levels.
Flood	Flood is when the flood level exceeds. A flood level is determined by member countries.

Accumulated reverse flow volume at Prek Kdam

Flow volumes on 05 August 2024:	12.76 Km³
Minimum reverse flow volume (1996-2005):	23.848 Km³
Average reverse flow volume (1996-2005):	42.84 Km³
Maximum reverse flow volume (1996-2005):	54.046 Km³

**Procedures for Maintenance of Flows on the Mainstream*

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http://www.mrcmekong.org/
http://ffw.mrcmekong.org/bulletin_wet.php
http://ffw.mrcmekong.org/reportflood.php
https://pmfm.mrcmekong.org/

MEKONG RIVER MONITORING AND FORECASTING BULLETIN

Forecasting from 06 to 10 August 2024

Highlights: *In the next five days, it is forecasted that water levels at all the mainstream stations will not reach the "alarm" levels.*

Forecasting Station	24 h Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Observed Water Level againt zero gauge (m)		Forecasted Water Level (m)					Alarm Level (m)	Flood Level (m)	Forecasted Water Levels Change in 5 days (m)	Max. Water levels change within next 5 days (m)	Min. distance to alarm level within next 5 days (m)	Min. distance to flood level within next 5 days (m)
	04-Aug		04-Aug	05-Aug	06-Aug	07-Aug	08-Aug	09-Aug	10-Aug						
Jinghong	2.0	-	537.42	↓ 537.09	-	-	-	-	-	-	-	-	-	-	-
Chiang Saen	8.6	357.110	6.93	↓ 6.54	→ 6.48	↓ 6.16	↓ 5.79	↓ 5.48	↓ 5.32	11.50	12.80	↓ -1.22	-1.22	5.02	6.32
Luang Prabang	0.0	267.195	14.24	→ 14.28	↓ 13.56	↓ 13.01	→ 12.96	↓ 12.63	↓ 12.18	17.50	18.00	↓ -2.10	-2.10	3.94	4.44
Chiang Khan	15.0	194.118	11.74	↑ 12.86	↑ 13.01	↓ 12.88	↓ 12.10	↓ 11.31	↓ 11.00	14.50	16.00	↓ -1.86	-1.86	1.49	2.99
Vientiane	28.0	158.040	7.28	↑ 8.68	↑ 9.35	↑ 9.53	↓ 9.38	↓ 8.73	↓ 8.48	11.50	12.50	↓ -0.20	0.85	1.97	2.97
Nongkhai	14.6	153.648	6.88	↑ 9.36	↑ 10.17	↑ 10.74	↓ 10.48	↓ 9.29	↓ 8.43	11.40	12.20	↓ -0.93	1.38	0.66	1.46
Paksane	64.5	142.125	8.27	↑ 9.32	↑ 10.49	↑ 11.68	↑ 11.99	↓ 11.86	↓ 11.22	13.50	14.50	↑ 1.90	2.67	1.51	2.51
Nakhon Phanom	0.0	130.961	7.97	↑ 8.22	↑ 8.77	↑ 9.66	↑ 10.38	↑ 10.55	→ 10.50	11.50	12.00	↑ 2.28	2.33	0.95	1.45
Thakhek	0.0	129.629	8.90	→ 8.95	↑ 9.30	↑ 10.32	↑ 11.23	↑ 11.56	→ 11.47	13.00	14.00	↑ 2.52	2.61	1.44	2.44
Mukdahan	0.0	124.219	7.94	↑ 8.22	↑ 8.85	↑ 9.58	↑ 10.40	↑ 10.73	→ 10.75	12.00	12.50	↑ 2.53	2.53	1.25	1.75
Savannakhet	0.0	124.219	6.39	↑ 6.68	↑ 7.18	↑ 7.87	↑ 8.76	↑ 9.09	→ 9.09	12.00	13.00	↑ 2.41	2.41	2.91	3.91
Khong Chiam	46.1	89.030	9.82	→ 9.91	→ 10.00	↑ 10.49	↑ 11.18	↑ 11.96	↑ 12.25	13.50	14.50	↑ 2.34	2.34	1.26	2.26
Pakse	1.4	86.490	7.94	↑ 8.12	↑ 8.47	↑ 8.91	↑ 9.46	↑ 10.16	↑ 10.46	11.00	12.00	↑ 2.34	2.34	0.54	1.54
Stung Treng	0.0	36.790	7.65	↓ 7.54	→ 7.58	↑ 7.82	↑ 8.12	↑ 8.46	↑ 8.89	10.70	12.00	↑ 1.35	1.35	1.81	3.11
Kratie	0.0	-0.101	17.54	↓ 17.29	↓ 17.15	↑ 17.20	↑ 17.45	↑ 17.79	↑ 18.19	22.00	23.00	↑ 0.90	0.90	3.81	4.81
Kompong Cham	1.5	-0.930	10.98	↓ 10.80	↓ 10.63	↓ 10.58	↑ 10.71	↑ 10.92	↑ 11.19	15.20	16.20	↑ 0.39	0.39	4.01	5.01
Phnom Penh (Bassac)	69.5	-1.020	6.80	↓ 6.70	↓ 6.61	↓ 6.55	→ 6.54	↑ 6.62	↑ 6.73	10.50	12.00	↑ 0.03	-0.16	3.77	5.27
Phnom Penh Port	nr	0.070	5.56	↓ 5.49	↓ 5.41	↓ 5.35	→ 5.34	↑ 5.42	↑ 5.53	9.50	11.00	↑ 0.04	-0.15	3.97	5.47
Koh Khel	0.0	-1.000	6.26	↓ 6.15	→ 6.13	↓ 6.07	→ 6.07	→ 6.09	↑ 6.14	7.90	8.40	→ -0.01	-0.08	1.76	2.26
Neak Luong	11.4	-0.330	4.78	↓ 4.70	↓ 4.61	↓ 4.53	↓ 4.48	→ 4.47	→ 4.49	7.50	8.00	↓ -0.21	-0.22	2.89	3.39
Prek Kdam	0.0	0.080	5.64	↓ 5.57	↓ 5.50	↓ 5.45	↑ 5.48	↑ 5.54	↑ 5.60	9.50	10.00	→ 0.03	-0.12	3.90	4.40
Tan Chau	2.0	0.000	2.00	↓ 1.87	↓ 1.79	↓ 1.72	↓ 1.67	→ 1.65	→ 1.67	3.50	4.50	↓ -0.20	-0.22	1.71	2.71
Chau Doc	0.1	0.000	1.89	↓ 1.71	↓ 1.60	↓ 1.52	↓ 1.47	↑ 1.44	→ 1.43	3.00	4.00	↓ -0.28	-0.28	1.40	2.40

WATER LEVEL FORECASTING DEFINITIONS

↑	Rising water level.
→	Stable water level: stable water level is defined as a daily change of less than 10cm from Chaing Saen to Savannakhet; less than 5cm at Pakse and Stung Treng; and no more than 3cm from Kratie downstream.
↓	Falling water level.
X	No data available.
Alarm stage	Alarm stage is when the water level ranges between alarm and flood levels.
Flood stage	Flood stage is when the flood level exceeds. A flood level is determined by member countries.

NOTES

- On **05 August**, water levels at all stations are in normal conditions, which do not reach alarm and flood levels. From Chiang Saen to Nongkhai and from Khong Chiam downward, water levels are above their LTAs. The total **accumulated volume** of the **reverse flow to Tonle Sap** Lake is **12.76 Km³**.
- During **06-10 August**, moderate rainfall is expected to sparely occur across central LMB, eastern Cambodia and the 3S Basins. However, heavy rainfall is likely occurring in the upper part of the 3S basins during 06-07 August.
- For **06 -10 August,** water levels at upstream stations along Mekong mainstream from Chiang Saen to Nongkhai stations are expected to drop, while from Paksane to Phnom Penh Port stations, they will rise. However, from Koh Khel downward, water levels likely drop.
- At the same period (**06-10 August**), From Vientiane to Kratie stations, water levels are also expected to be above their long-term averages (LTAs).

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http://www.mrcmekong.org/
http://ffw.mrcmekong.org/bulletin_wet.php
http://ffw.mrcmekong.org/reportflood.php
https://pmfm.mrcmekong.org/

6.3 Flash Flood Information

With the predicted rainfall for the coming week, flash floods might be detected in some areas in the LMB. Local heavy rain in a short period of time is possible with unpredictable short flash floods.

Further detailed information on Flash Flood Guidance Information, as well as its explanation, is available for download here.

6.4 Drought forecast

There are several climate-prediction models with different scenarios in the upcoming months. The MRC's DFEWS adopts the global scale of North America Multi-Model Ensemble (NMME) for the seasonal outlook of rainfall.

Figure 13 below shows the monthly rainfall anomaly from August to October 2024 over the LMB area.

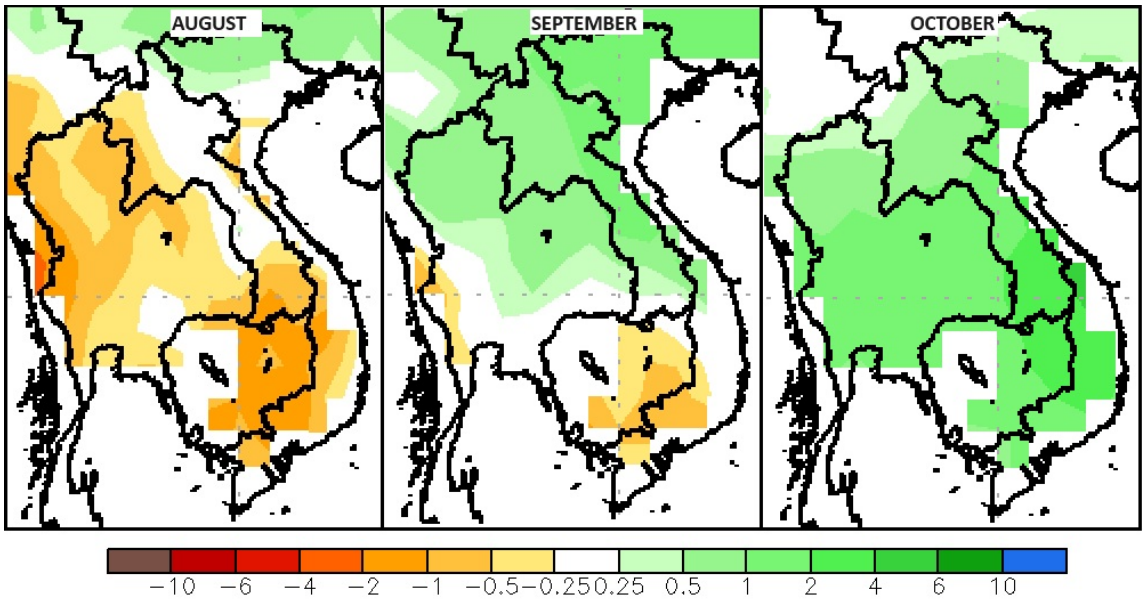


Figure 14. Monthly rainfall anomaly forecast for August, September and October 2024.

Figure 14 shows that August is expected to be abnormally dry over the central and lower parts. Eastern Cambodia and 3S area are likely the driest area of the region. The forecast also indicates that central and eastern Cambodia and Mekong Delta of Viet Nam are likely at moderately dry during September. While no drought is anticipated for October. More rain is expected to come during October before the end of the rainy season.

7 Summary and Possible Implications

7.1. Rainfall and its forecast

In the period of 30 July – 05 August 2024, light to very heavy rainfall has been observed over the LMB. In particular, very heavy rainfall has been observed in the center part of the LMB including Luang Prabang, Vang Vieng, Muong Mai, Muong Kao, and Paksane.

From 06 – 12 August 2024, the accumulated rainfall over the entire Lower Mekong Basin is distributed with light to moderate rain and thunderstorms. Moderate rain is expected in some areas in the central part of the Lower Mekong Basin, the eastern part of Cambodia, and the 3S Basin of Sekong, Sesan, and Srepok.

7.2. Water level and its forecast

At 22 key monitoring stations along the Mekong mainstream from 30 July-05 August 2024 water levels at all stations are in normal conditions, which do not reach alarm and flood levels. From Chiang Saen to Nongkhai and from Khong Chiam downward, water levels are above their LTAs. The total accumulated volume of the reverse flow to Tonle Sap Lake is 12.76 Km^3.

In the period of 06 – 10 August 2024, water levels at upstream stations along Mekong mainstream from Chiang Saen to Nongkhai stations are expected to drop, while from Paksane to Phnom Penh Port stations, they will rise. However, from Koh Khel downward, water levels likely drop. From Vientiane to Kratie stations, water levels are also expected to be above their long-term averages (LTAs).

7.3. Flash flood and its trends

A flash flood event occurred in Vang Vieng district, Vientiane (Lao PDR) on 03 August.

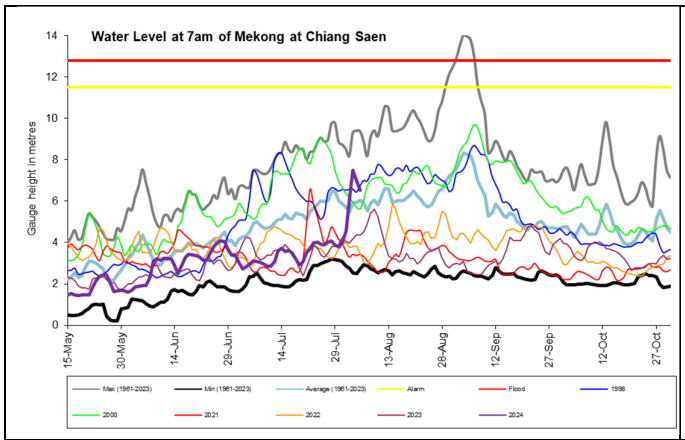
With the predicted of rainfall for the coming week as mentioned earlier in part 2, the flash flood guidance at a low to high level will likely be detected in some areas of the LMB.

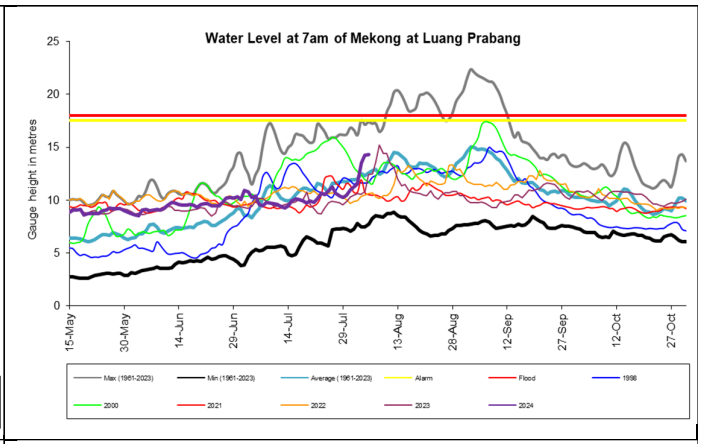
7.4. Drought condition and its forecast

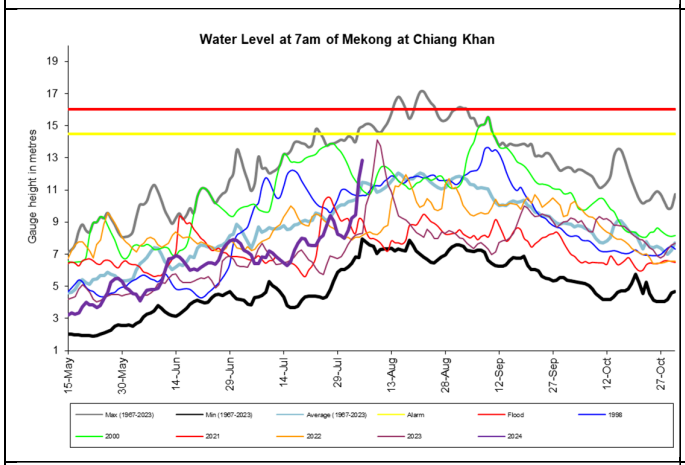
During 30 July-5 August 2024, the LMB was generally normal in most parts of the region. No significant impact of drought was detected for the current work.

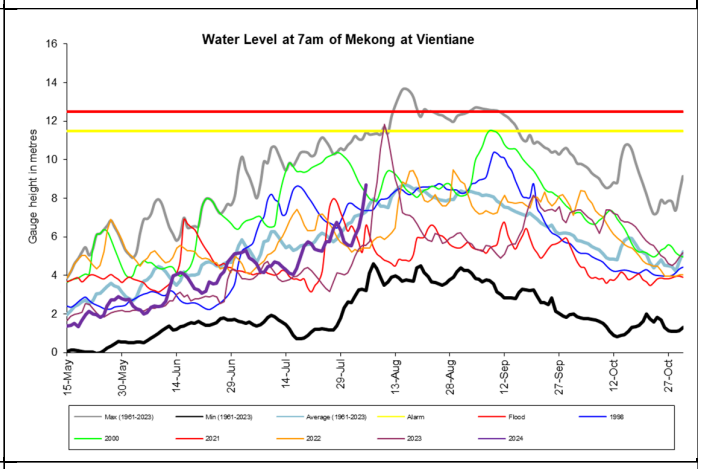
August is expected to be abnormally dry over the central and lower parts. Eastern Cambodia and 3S area are likely the driest area of the region. The forecast also indicates that central and eastern Cambodia is likely at moderately dry during September. While no drought is anticipated for October. More rain is expected to come during October before the end of the rainy season.

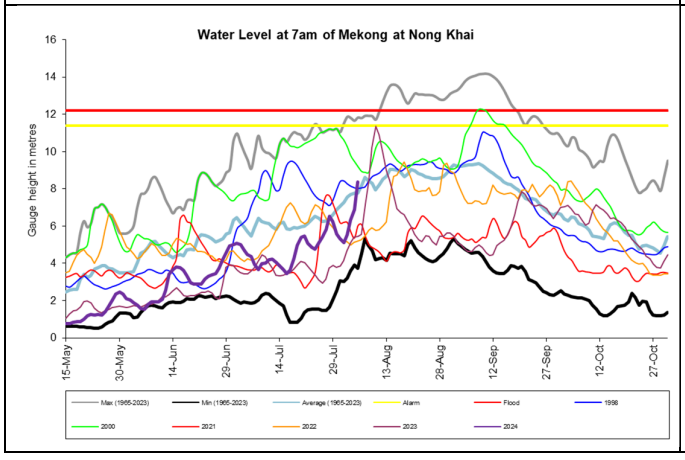
Annex A: Weekly water level monitoring at the 22 key stations

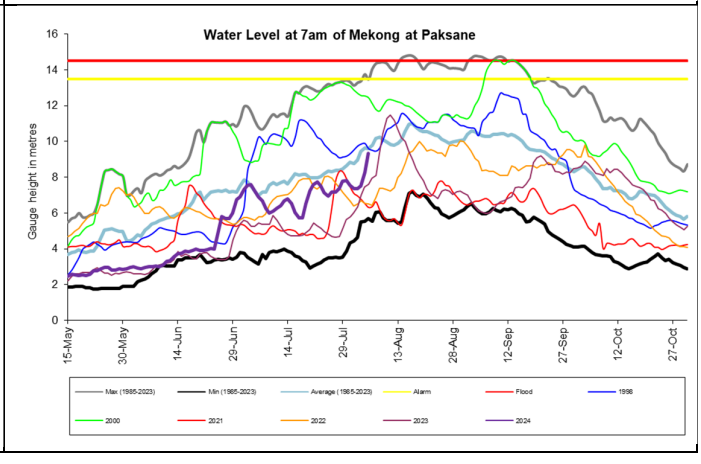


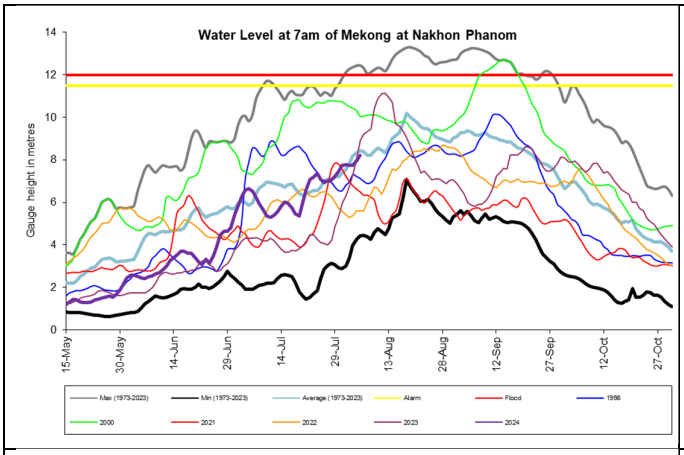


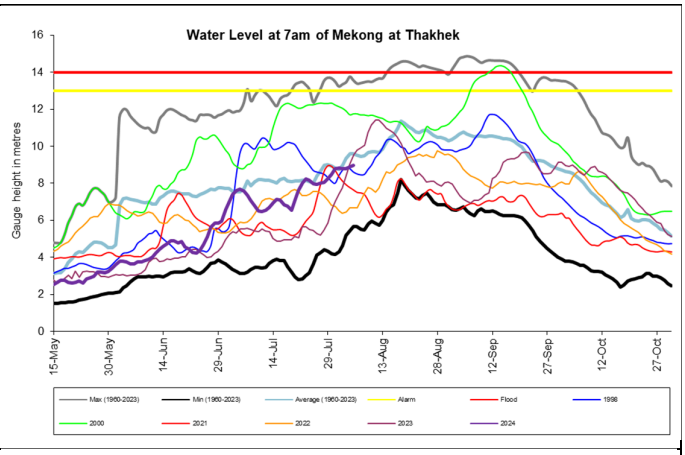


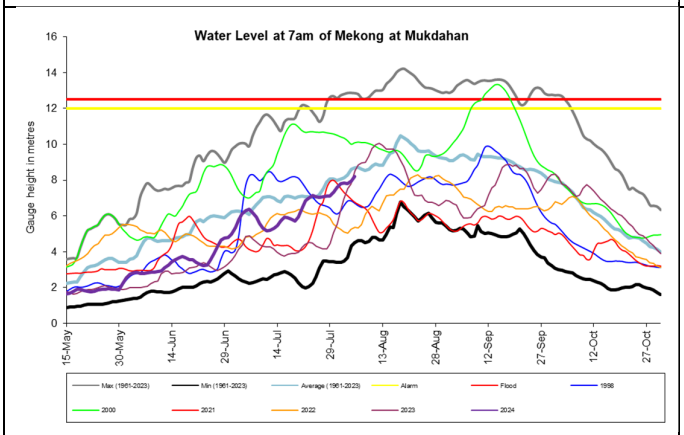


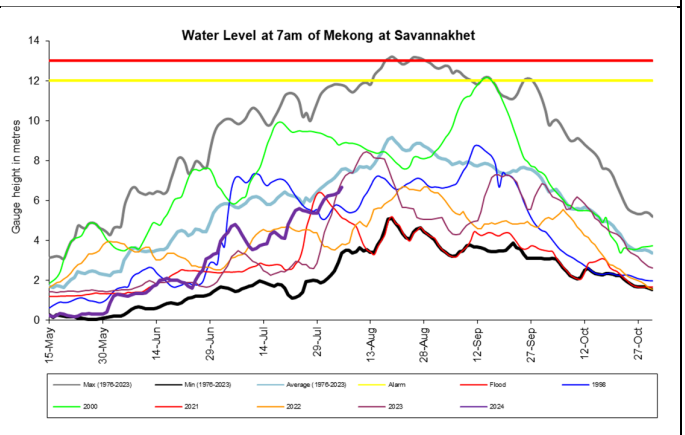


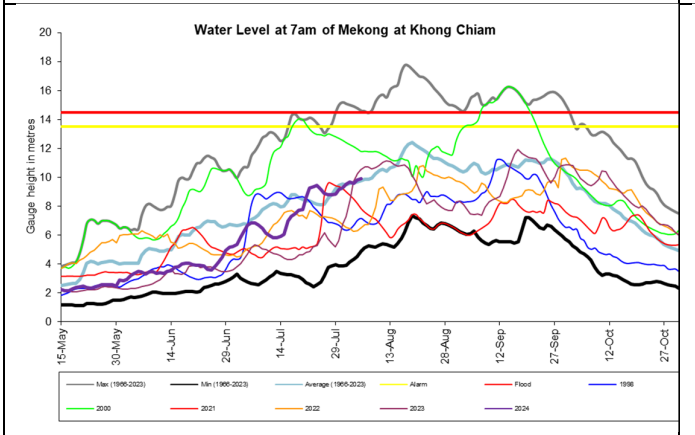


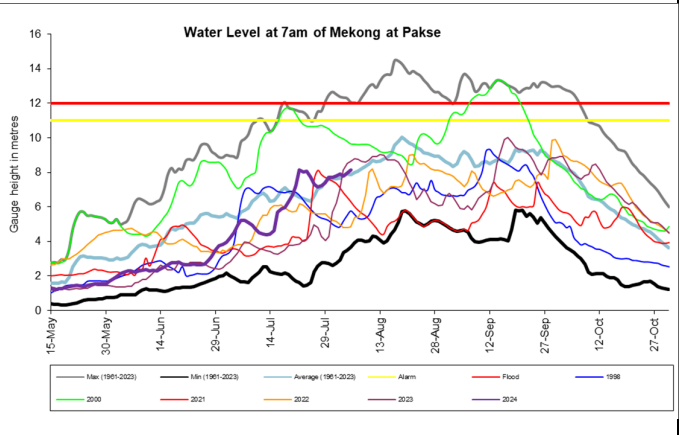

Water Level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1973-2023)
Min (1973-2023)
Average (1973-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

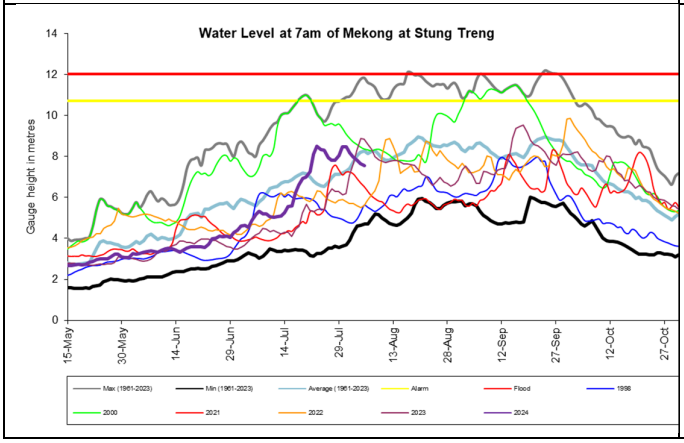

Water Level at 7am of Mekong at Thakhek
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1960-2023)
Min (1960-2023)
Average (1960-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

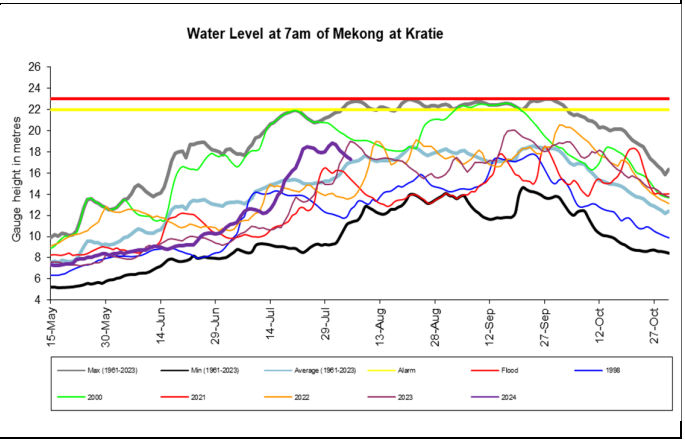

Water Level at 7am of Mekong at Mukdahan
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1961-2023)
Min (1961-2023)
Average (1961-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

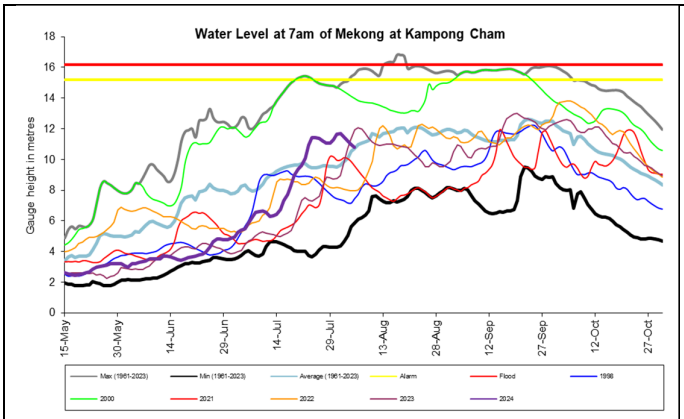

Water Level at 7am of Mekong at Savannakhet
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1976-2023)
Min (1976-2023)
Average (1976-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

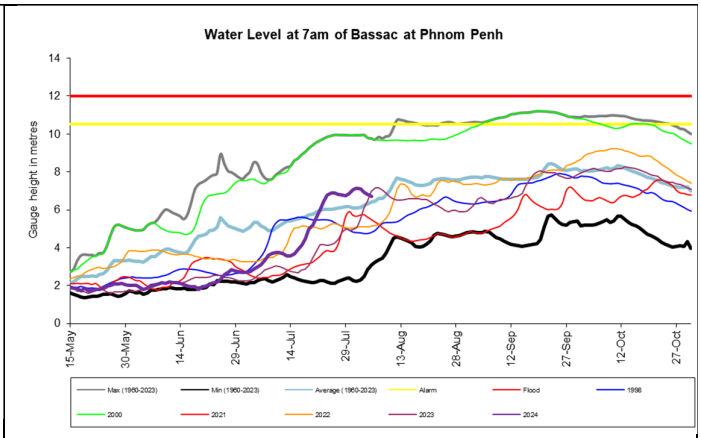

Water Level at 7am of Mekong at Khong Chiam
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1966-2023)
Min (1966-2023)
Average (1966-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

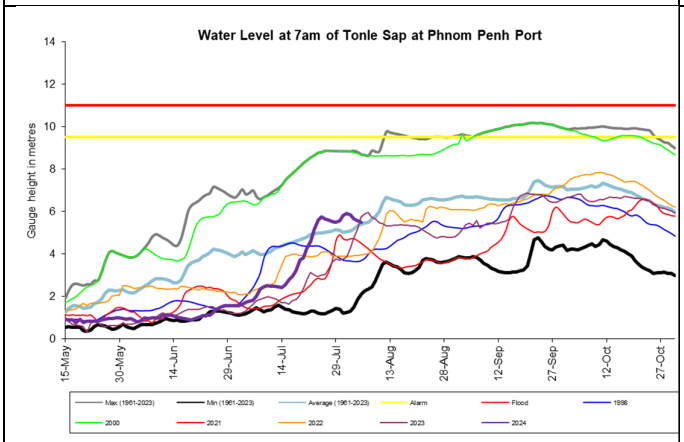

Water Level at 7am of Mekong at Pakse
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1961-2023)
Min (1961-2023)
Average (1961-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

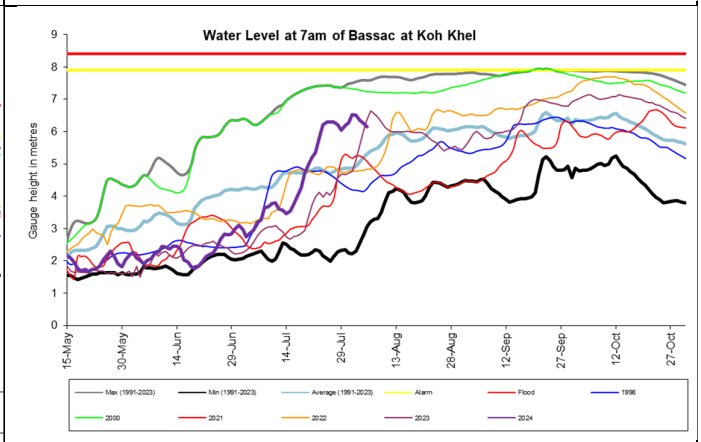

Water Level at 7am of Mekong at Stung Treng
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1961-2023)
Min (1961-2023)
Average (1961-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

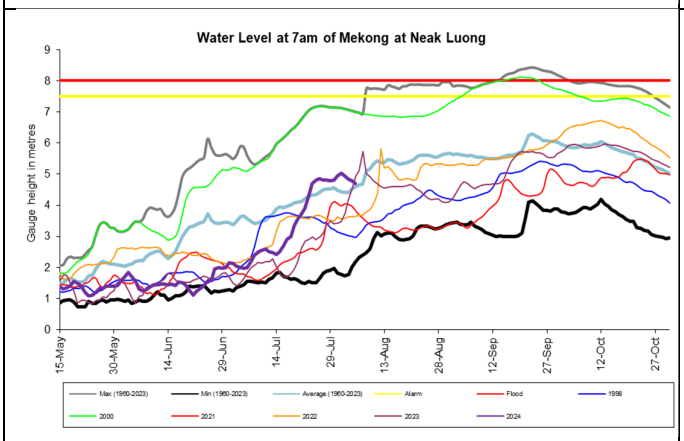

Water Level at 7am of Mekong at Kratie
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1961-2023)
Min (1961-2023)
Average (1961-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

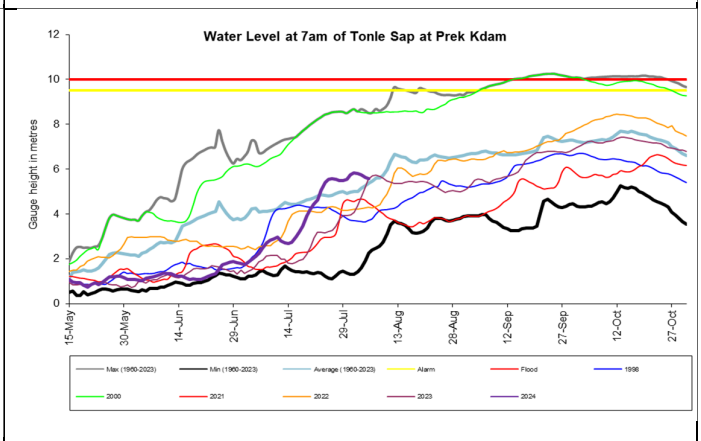

Water Level at 7am of Mekong at Kampong Cham
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1961-2023)
Min (1961-2023)
Average (1961-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

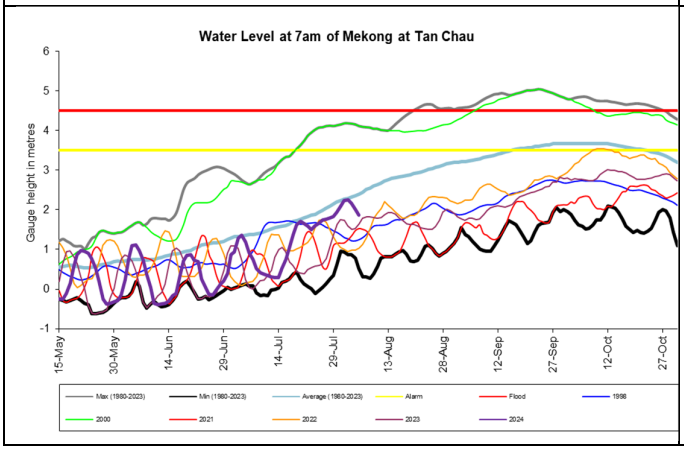

Water Level at 7am of Bassac at Phnom Penh
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1960-2023)
Min (1960-2023)
Average (1960-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

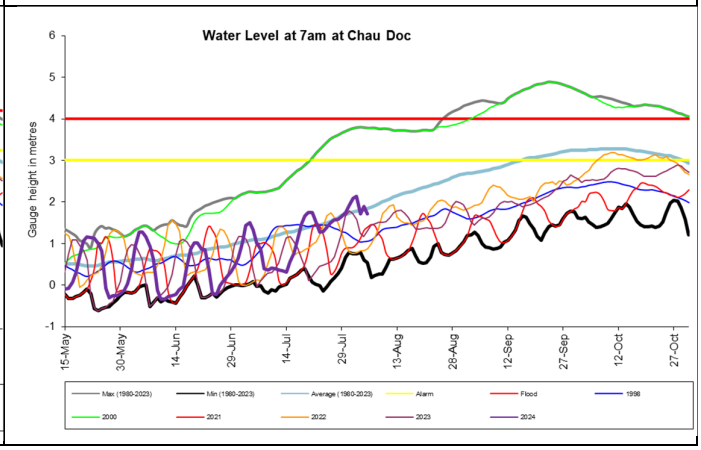

Water Level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1961-2023)
Min (1961-2023)
Average (1961-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024


Water Level at 7am of Bassac at Koh Khel
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1991-2023)
Min (1991-2023)
Average (1991-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024


Water Level at 7am of Mekong at Neak Luong
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1960-2023)
Min (1960-2023)
Average (1960-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024


Water Level at 7am of Tonle Sap at Prek Kdam
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1960-2023)
Min (1960-2023)
Average (1960-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024


Water Level at 7am of Mekong at Tan Chau
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1960-2023)
Min (1960-2023)
Average (1960-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024


Water Level at 7am at Chau Doc
Gauge height in metres
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct
27-Oct
Max (1960-2023)
Min (1960-2023)
Average (1960-2023)
Alarm
Flood
1998
2000
2021
2022
2023
2024

Annex B: Tables for weekly updated water levels and rainfall at the Key Stations

Table A1: Weekly observed water levels

2024	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
30/07/2024	537.54	3.79	10.48	8.15	5.74	5.56	7.82	7.46	8.50	7.31	5.75	9.14	7.72	8.48	18.54	11.28	6.84	5.56	6.18	4.82	5.55	1.93	1.74
31/07/2024	536.88	3.97	10.98	8.01	5.56	5.32	7.55	7.75	8.80	7.59	6.05	9.24	7.69	8.47	18.86	11.65	7.05	5.80	6.28	4.95	5.73	2.09	1.91
01/08/2024	537.13	4.55	11.26	8.50	5.55	5.12	7.35	7.77	8.83	7.81	6.25	9.52	7.78	8.16	18.70	11.70	7.15	5.92	6.52	5.03	5.83	2.23	2.09
02/08/2024	537.19	6.11	11.54	9.22	6.02	5.55	7.35	7.73	8.77	7.83	6.26	9.66	7.92	7.97	18.15	11.46	7.09	5.84	6.50	4.95	5.81	2.25	2.13
03/08/2024	537.17	7.50	13.52	9.45	6.47	6.32	7.52	7.74	8.80	7.81	6.30	9.60	7.80	7.81	17.85	11.18	6.91	5.66	6.36	4.84	5.73	2.17	1.72
04/08/2024	537.42	6.93	14.24	11.74	7.28	6.88	8.27	7.97	8.90	7.94	6.39	9.82	7.94	7.65	17.54	10.98	6.80	5.56	6.26	4.78	5.64	2.00	1.89
05/08/2024	537.09	6.54	14.28	12.86	8.68	9.36	9.32	8.22	8.95	8.22	6.68	9.91	8.12	7.54	17.29	10.80	6.70	5.49	6.15	4.70	5.57	1.87	1.71
Flood level		12.80	18.00	16.00	12.50	12.00	14.50	12.50	14.00	12.50	13.00	14.50	12.00	12.00	23.00	16.20	12.00	11.00	7.90	8.00	10.00	4.50	4.00

Table A2: Weekly observed rainfall

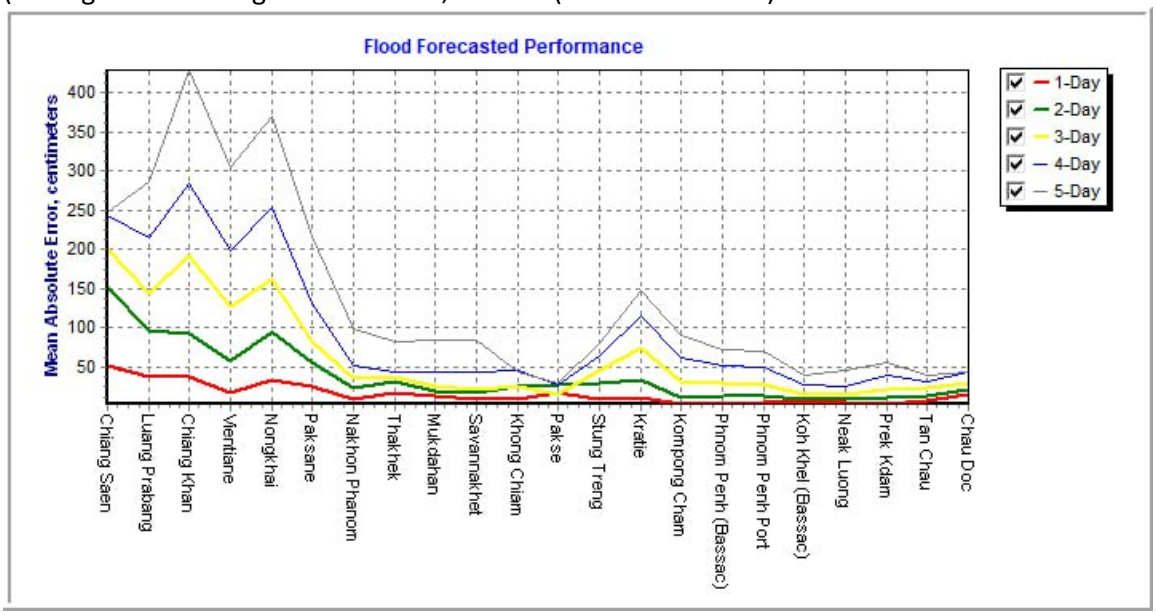
2024	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
30/07/2024	8	12	41.2	8.8	14.1	29	60.2	14.5	21.7	0	0	50.2	49	15	0	0	0		0	0	0	0	0
31/07/2024	42	33.6	2.2	3.2	19.5	9.8	5.2	12.4	20.1	21.1	26.8	3	0	0	0	0	0		0	2.6	34.4	0	0
01/08/2024	64	46.5	7.4	10.2	2.2	47.6	47.8	3.5	20.8	1.3	1.4	6.3	7	5	0	1	0		15.4	0	0	0	0
02/08/2024	2	60	41.6	7.6	7.2	7.5	14.4	3.1	4	2.3	5	0	10	0	0	0	1.6		1	2.8	0	16.3	35
03/08/2024	0.5	27.9	8.2	2.2	5.8	11.4	20.1	28.4	48.1	0	1	0	0	0	0	0	0		0	0	0	0	0
04/08/2024	1.5	14.6	5.8	26.5	5.2	4.6	171.8	12.6	16.9	34.5	10.8	4	10.2	0	0	0	2.1		17.6	0	7.2	0	9.1
05/08/2024	2	8.6	0	15	28	0	64.5	0	0	0	0	46.1	1.4	0	0	1.5	69.5		0	11.4	0	2	0.1
Sum	120.0	203.2	106.4	73.5	82.0	109.9	384.0	74.5	131.6	59.2	45.0	109.6	77.6	20.0	0.0	2.5	73.2	0.0	34.0	16.8	41.6	18.3	44.2

Annex C: Performance of the weekly flood forecasting

"Accuracy" here refers to the state where data recorded in the MRC's Mekong River Flood Forecasting System are cleaned and verified.

The adjustment of flood forecasting outcomes from the flood forecasting system requires flood forecasters to have extensive knowledge in hydrology and statistical modelling for estimating the relationships between stations upstream and downstream in the Mekong River Basin. Flood forecasting performance presented in the graph below shows the average flood forecasting accuracy at each key station along the Mekong mainstream from 30 July to 05 August 2024.

The forecasting values from 30 July – 05 August 2024 show that the overall accuracy is worst for a four-day to five-day forecast in lead time (more than 250 cm) for the upper stations (Chiang Saen to Nongkhai. However, it is fair (less than 250 cm) from Paksane downward.



Note: The higher percentage of flood forecasting accuracy is due to several key factors as follows:

- Missing rainfall in Cambodia (DOM) data and data input are not sufficient to be used for inputting into the flood forecasting model system.
- Chiang Saen station is influencing by hydropower upstream operation from China.
- Luang Prabang to Chiang Khan and Paksane to Stung Treng to Kratie have been influenced by hydropower operations upstream, tributaries inflows.
- The influence of heavy rainfall caused by storms and hydropower operations from upstream, tributaries inflows and the lower part of the Mekong floodplain, including the 3S (Stung Treng and Kratie).
- Fluctuations of the water levels at Tan Chau and Chau Doc stations were due to daily tidal effects of the sea in the Mekong Delta.
- Satellite rainfall data were not representative of the actual rainfall at ground stations in some areas of the Mekong region.

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