



Mekong River Commission

Weekly Wet Season Situation Report in the Lower Mekong River Basin 1-7 June 2022

Prepared by
The Regional Flood and Drought Management Centre
07 June 2022

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Key Messages

Key messages for this weekly report are presented below.

Rainfall and its forecast

- Rainfall focused in the areas from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam, including the middle and lower parts in Lao PDR and Cambodia, varying from 0.40 millimetres (mm) to 127.10 mm.
- There will be average rainfalls for the next 5 days over the Mekong region from 8 to 12 June 2022 because there will be a low-pressure dominating the Mekong region.

Water level and its forecast

- Water levels of monitoring stations at Chiang Saen in Thailand decreased about 0.04 m from 06 to 07 June 2022, but still stayed about 0.64 m higher than its LTA level, **which is considered normal**.
- Water level (WL) from Chiang Khan in Thailand from 06 to 07 June 2022 increased by about 0.10 m (about 2.34 m higher than its LTA value), while water level at Vientiane increased about 0.25 m and still stayed about 2.41 m higher than its LTA level, which **considered normal**. Water levels at Nong Khai increased 0.24 m and at Paksane decreased about 0.22 m, staying about 1.39 m and 1.21 m higher than their LTA value, respectively.
- Water levels from Nakhon Phanom in Thailand and Pakse in Lao PDR decreased between 0.02 m and 0.15 m. The current WLs from Khong Chaim to Pakse were staying close to their maximum level, while from Nakhon Phanom to Savannakhet they were higher than their LTA value, considered **normal**. From the stretches of the river from Stung Treng to Kratie decreased about 0.05 m, staying 1.59 m and 3.37 m higher than their LTA level, respectively.
- Water levels from Kompong Cham down to Chaktomuk, Koh Khel and Phnom Penh Port to Prek Kdam in Cambodia increased about 0.05 m, staying between 0.50m and 1.00 m higher than their LTA level.
- The current water levels from Chaing Saen in Thailand to Kompong Cham in Cambodia are higher than their LTA value, except the 2 tidal stations at Tan Chau and Chau Doc which are below their LTA value due to tidal effect during this monitoring period.
- Over the next five days, the water levels across most monitoring stations are expected to go up and stay higher than their long-term average value in most stations.

Drought condition and its forecast

- Drought conditions of the LMB from 29 May to 4 June 2022 **were normal** in all areas from north to the south. There was no drought threat over the region.
- For the upcoming three months' forecasts, the LMB is likely to receive **ample amount of rainfall in May and below average rainfall in both June and July 2022** from the middle to the lower part of the region. Based on the weather forecast, condition in May is likely to be much wetter than normal year especially in the North and central parts of the LMB.

1 Introduction

This Weekly Wet Season Situation Report presents a preliminary analysis of the weekly hydrological and drought situation in the Lower Mekong River Basin (LMB) for the period from **01-07 June 2022**. 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 (MCs) – Cambodia, Lao PDR, Thailand, and Viet Nam – and on satellite data. All the water levels indicated in this report refer 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_wet.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

The weather outlook bulletins for three months (June, July and August) and the weather maps issued by the Thai Meteorological Department (TMD) were used to verify weather conditions in the LMB.

Since end of May 2022, the wet weather has come because the influentially high-pressure air mass areas prevailed over the LMB with gradually decreasing water levels in both mainstream and tributaries. The data from the TMD predict that low pressure of air-mass will reduce temperature and increased rainfall in LMB. From June to July, the low-pressure trough is going to prevail over the Mekong region bringing rainfalls for the start of rainy season period in 2022.

[Figure 1](#) presents the weather map of 6 June 2022, showing a low-pressure dominating the upper part of the Mekong region, which might have some rains for the next few days. The average rainfall is also predicted over the middle and lower parts of LMB, including northern Thailand, Lao PDR and Viet Nam and the 3S area (Sesan, Sre Pok, and Sekong) of Cambodia and Viet Nam.

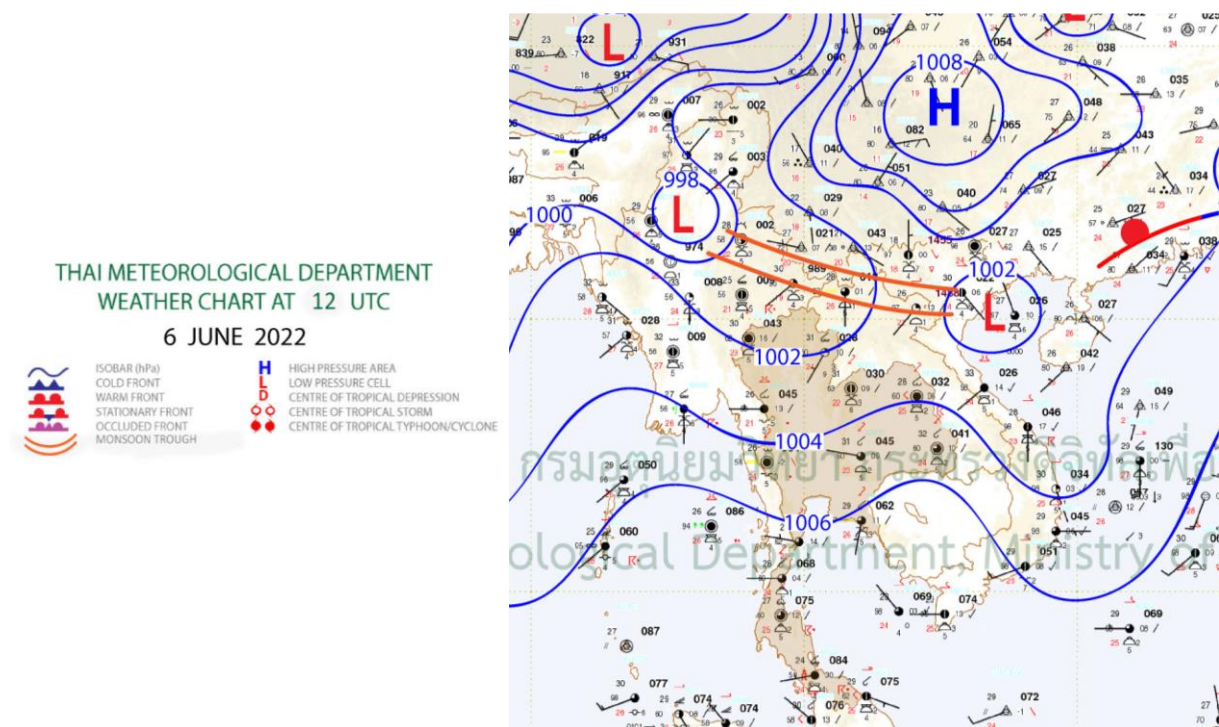


Figure 1. Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), the highest probability of warm and wet conditions is predicted over the lower part of the Mekong region from 30 May to 12 June 2022. Moreover, the Mekong region is likely dominated by warm condition, which may bring rainfall and warm temperatures in general to the lower part of the LMB. **Figure 2** shows the outlook of weather condition from 30 May to 12 June 2022 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

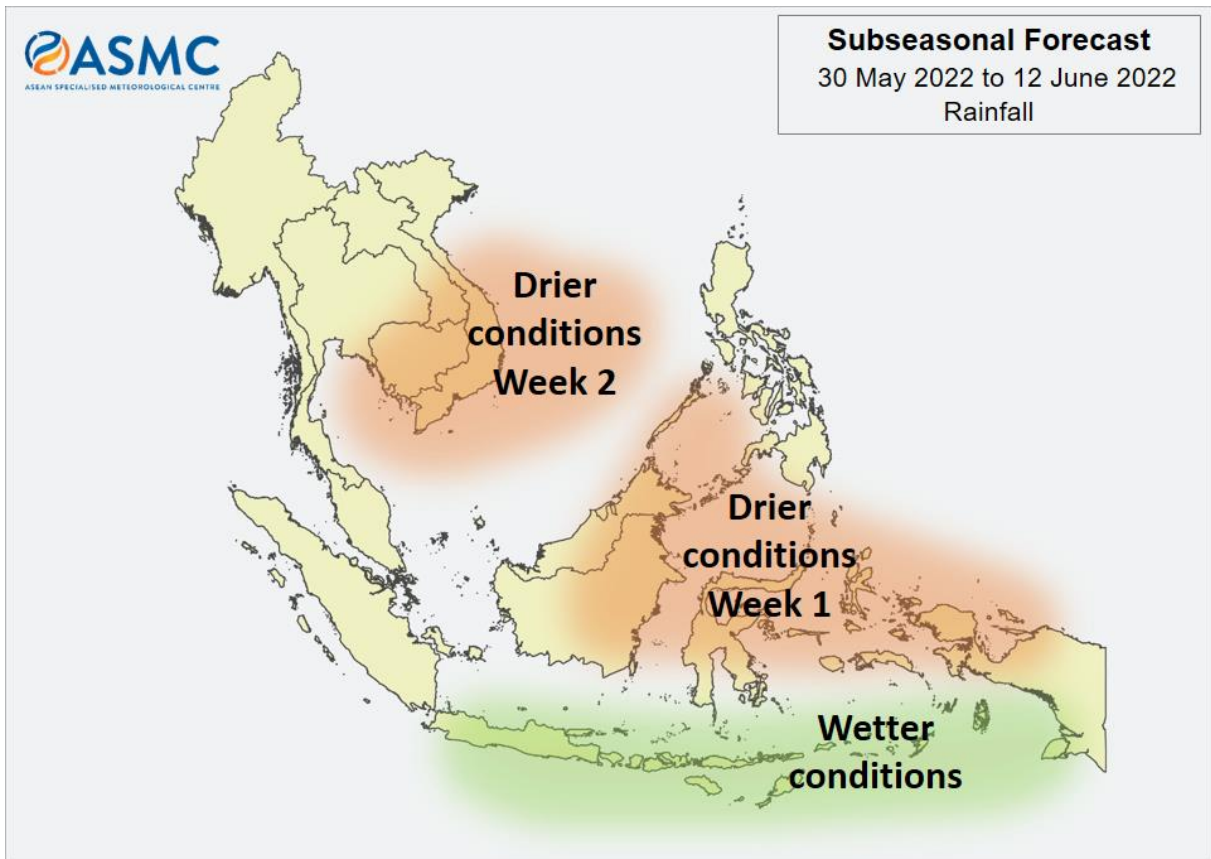


Figure 2. Outlook of wet and dry conditions over the Asian countries by ASMC.

2.1 Tropical depressions (TD), tropical storms (TS) and typhoons (TY)

There is no sign of Tropical Storm moving from the Sea to the LMB between 01 and 06 June 2022, a low- pressure line is still presenting as shown in [Figure 1](#). No storms movement detected on 06 June in the LMB, as displayed in [Figure 3](#).

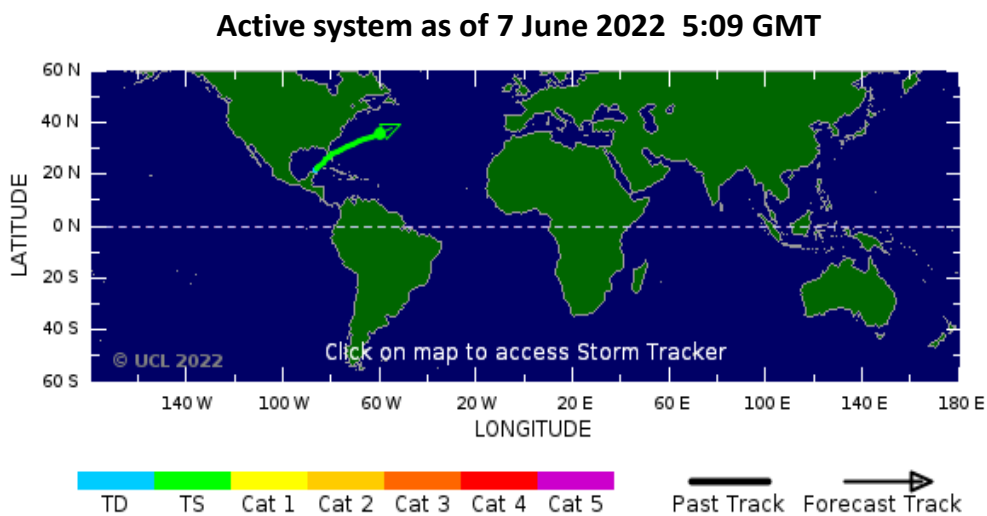


Figure 3. A tropical depression risk observed on 07 June 2022.

2.2 Rainfall patterns over the LMB

This week from 01 to 06 June 2022, rainfall was observed from the upper to lower part starting from Chiang Kham in Thailand to Tan Chau and Chau Doc in Viet Nam of the Lower Mekong Basin, varied from 1.00 mm to 127.10 mm. The highest rainfall of this week report concentrated in Paksane of Lao PDR and Chaktomuk in Cambodia, which reached up to 127.10 mm. The total rainfall this week was smaller, compared with last week rainfall occurred in the Mekong region. (See shown in [Figure 4](#)).

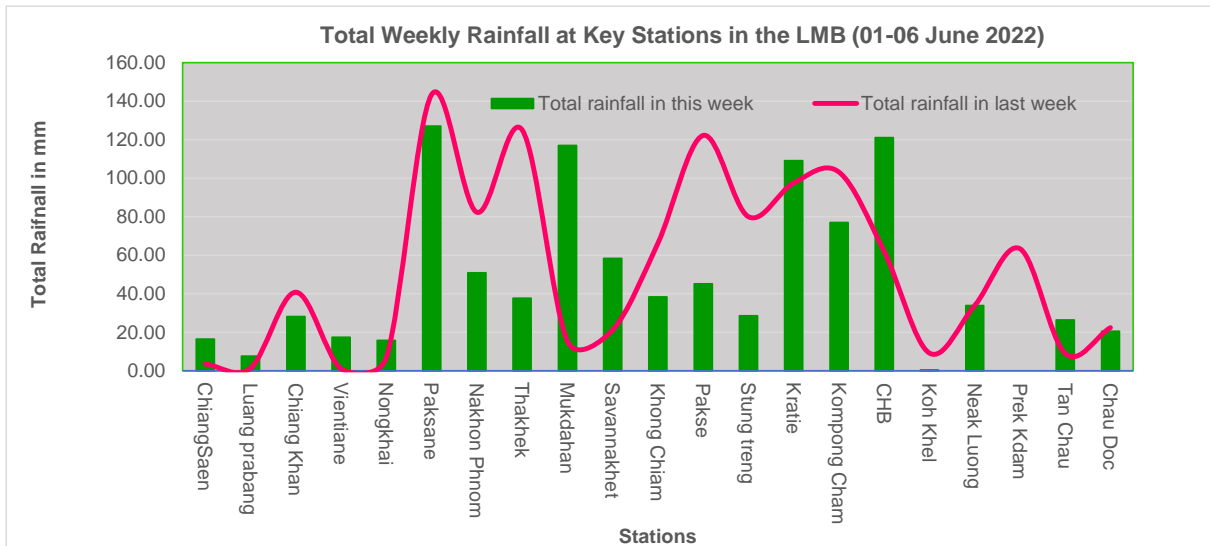


Figure 4. Weekly total rainfall at key stations in the LMB during 01-06 June 2022.

To verify area rainfall distribution, [Figure 5](#) shows a map of the weekly accumulated rainfall based on observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 01 to 06 June 2022.

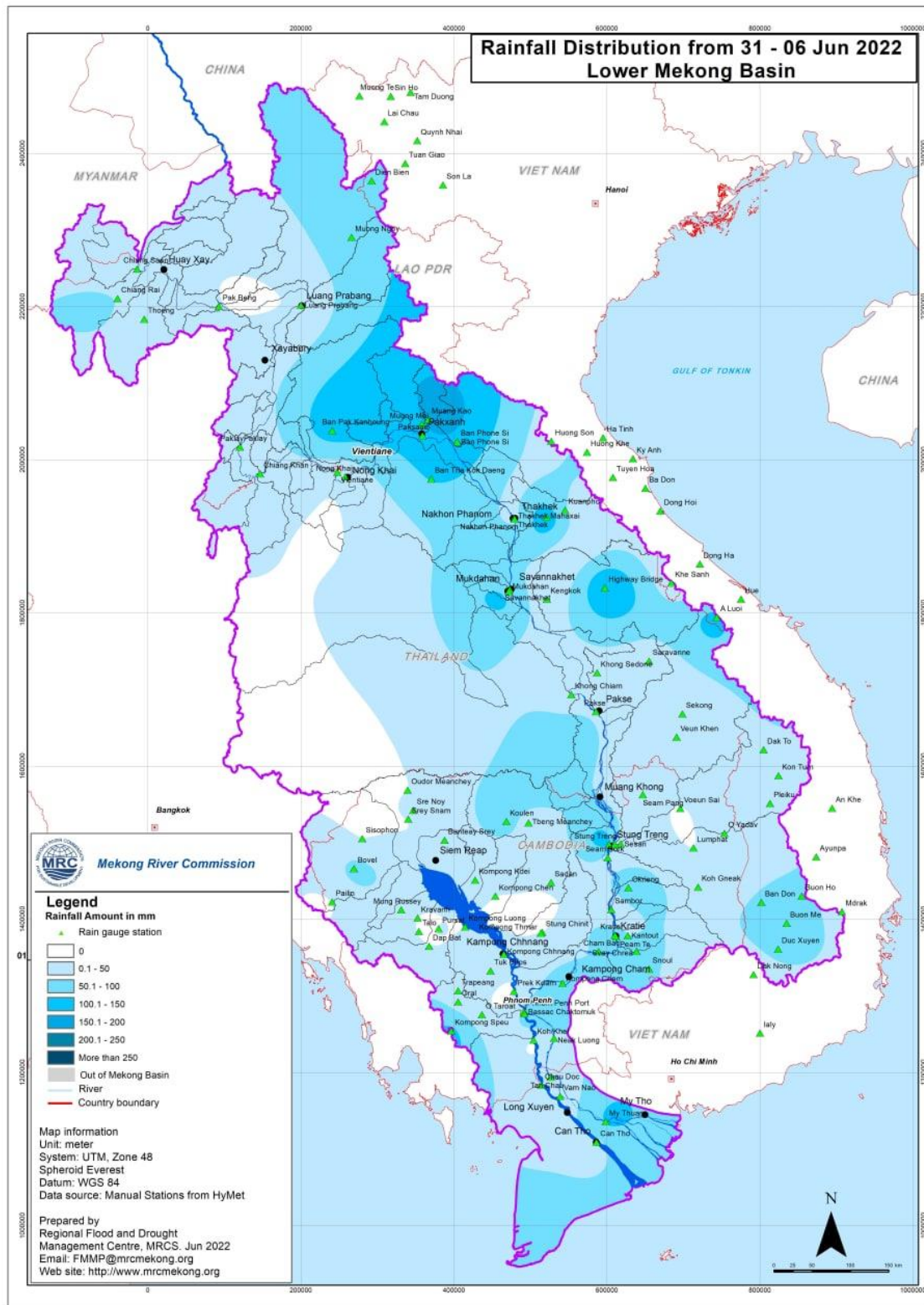


Figure 5. Weekly rainfall distribution over the LMB during 01 -06 June 2022.

3 Water Levels in the Lower Mekong River

The hydrological regimes of the Mekong mainstream are illustrated by recorded water levels and flows at key mainstream stations: at Chiang Saen in Thailand to capture mainstream flows entering from the Upper Mekong Basin (UMB); at Vientiane in Lao PDR to present flows generated by climate conditions in the upper part of the LMB; at Pakse in Lao PDR 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 6](#). The hydrograph for each key station is available from the MRC’s River Flood Forecasting: <http://ffw.mrcmekong.org/overview.php>. The weekly water levels and rainfall at each key station are summarised in [Annex A](#).

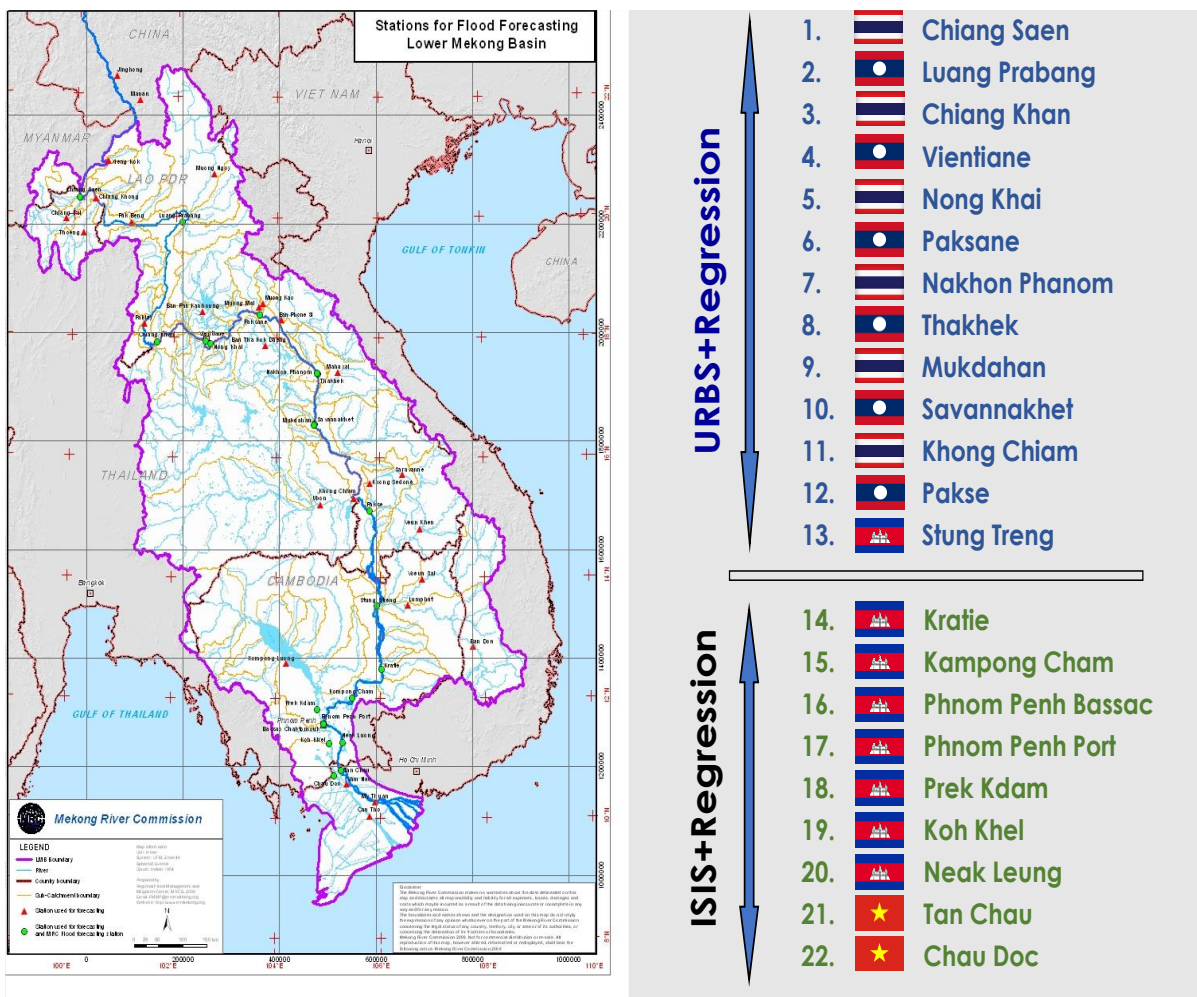


Figure 6. Key stations and model application for River Monitoring and Flood Forecasting.

According to MRC’s observed water level at Jinghong, it showed a decrease about 0.30 m from 538.11 m to 537.81 m from 01 to 07 June 2022 (recorded on 7:00 am) and stayed about 0.83 m higher than its Long-Term-Average (LTA: 2015-2021) value. The Eyes on Earth (Mekong Dam Monitor) mentioned that upstream dam restrictions in China will cause the river to drop approximately 1 meter at Chiang Saen, Thailand between June 3-4; between June 5-6 at Luang Prabang, Lao PDR; and at Chiang Khan, Thailand between June 6-7. The outflow at Jinghong station decreased from 3,080.00 m³/s to 2,810.00 m³/s from 01 to 07 June 2022. [Figure 7](#) below presents water level that increased at the Jinghong hydrological station¹, indicating the trend of fluctuating water level up to 07 June 2022

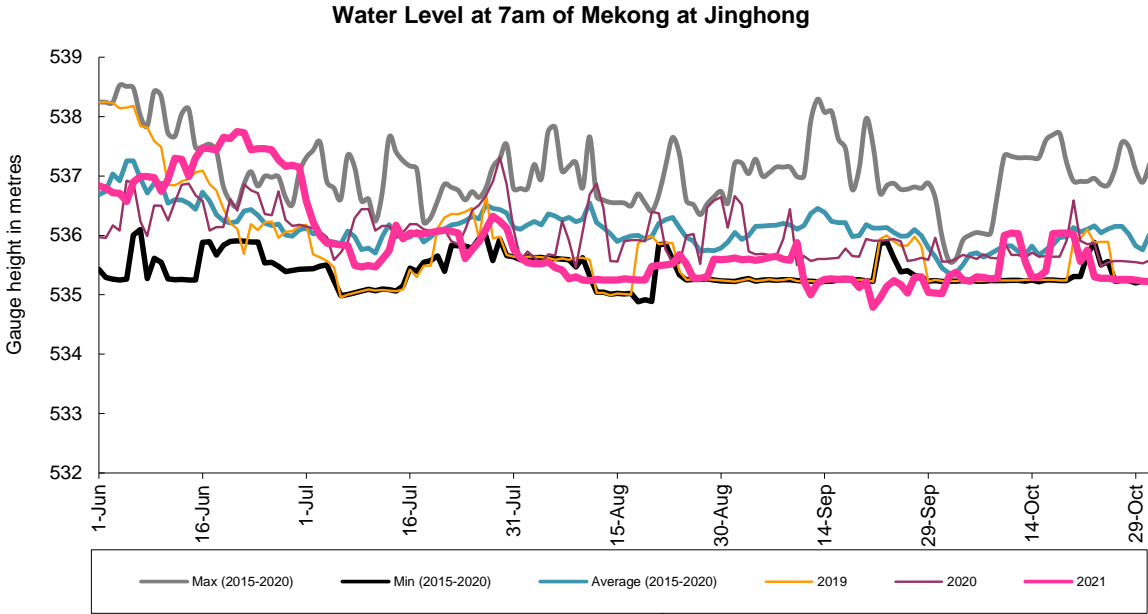


Figure 7. Water level at the Jinghong hydrological station during 1-7 June 2022.

Water levels of monitoring stations at Chiang Saen in Thailand decreased about 0.04 m from 06 to 07 June 2022, but still staying about 0.64 m higher than its LTA level, **which is considered normal**.

Moreover, water level at Chiang Khan in Thailand from 06 to 07 June 2022 increased by about 0.10 m (about 2.34 m higher than its LTA value), while water level at Vientiane increased about 0.25 m and still stayed about 2.41 m higher than its LTA level, which **considered normal**. Water levels at Nong Khai increased 0.24 m and at Paksane decreased about 0.22 m, staying about 1.39 m and 1.21 m higher than their LTA value, respectively.

Water levels from Nakhon Phanom in Thailand and Pakse in Lao PDR decreased between 0.02 m and 0.15 m. The current WLs at Khong Chaim to Pakse were staying close to their maximum levels, while from Nakhon Phanom to Savannakhet they were higher than their LTA value, considering **normal**. From the stretches of the river from Stung Treng to Kratie WL decreased about 0.05 m, staying 1.59 m and 3.37 m higher than their LTA level, 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>.

Water levels from Kompong Cham down to Chaktomuk, Koh Khel and Phnom Penh Port to Prek Kdam in Cambodia increased about 0.05 m, staying between 0.50m and 1.00 m higher than their LTA level.

The current water levels from Chaing Saen in Thailand to Kompong Cham in Cambodia are higher than their LTA value, except the 2 tidal stations at Tan Chau and Chau Doc which are below their LTA value due to tidal effect during this monitoring period.

Based on hydrological phenomenon, the contribution of inflow water from the upstream of Lancang-Mekong in China to the Mekong mainstream is from 16% to 18% in total during the wet season from June to October. The whole inflow of water into the LMB is influenced by rainfall at the Mekong mainstream and its tributaries during the wet season.

Chiang Saen and Luang Prabang

The water level from 01 to 06 June 2022 at Thailand’s Chiang Saen increased from 3.23 m to 3.49 m, showing 0.64 m higher than its Long-Term-Average (LTA) value, which considered normal. The water level at Luang Prabang station in Lao PDR significantly increased from 9.62 m to 10.22 m during the reporting period. This level shows 4.35 m higher than its long-term-average (LTA) value (about 1.67 m lower than its maximum value). The trend – sometimes higher or lower to its historical maximum and LTA values – has been observed since early 2022. The phenomenon was potentially caused by upstream dam operations, downstream Xayaburi dam, and heavy rainfall in the surrounding areas. The water levels at Chiang Saen and Luang Prabang are shown in [Figure 8](#) below.

Being situated between the upstream (Nam Beng, Nam Ou, Nam Suong, and Nam Khan) and downstream (Xayaburi) hydropower dams, the Luang Prabang station has a unique characteristic as it is influenced by the operations of all its surrounding dams. **Thus, the water level at this station can possibly change very rapidly during the early of wet and dry season.**

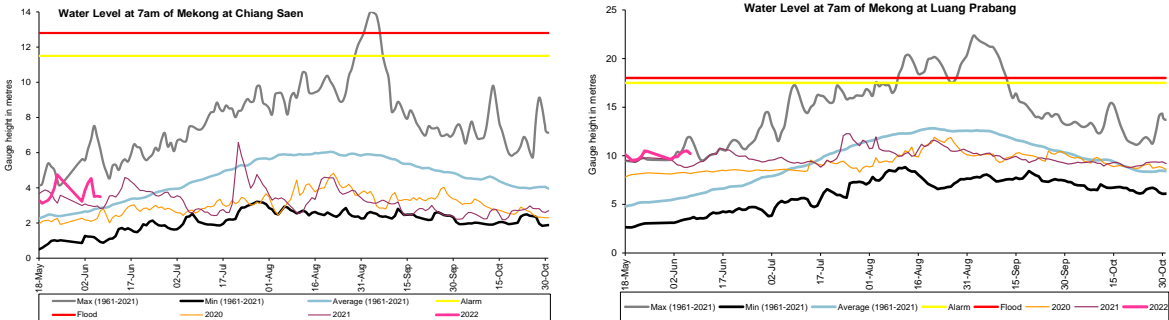


Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) increased from 7.59 m to 8.06 m during the reporting week. It showed 2.34 m higher than its Long-Term-Average. The water level downstream at Vientiane in Lao PDR followed the upstream trend. It also increased from 5.11 m to 5.16 m and was about 2.42 m higher than its LTA during 1-6 June 2022. At Nong Khai station in Thailand, the water level was down during the reporting period. It decreased about 0.06 m from 4.89 m to 4.83 m and showing 1.39 m higher than its

LTA. At Paksane in Lao PDR, water levels decreased about 0.87 m, dropping from 7.06 m to 6.14 m. The water level at these stations were still about 1.34 m and 1.21 m higher than its LTA respectively. The recently decreased water levels were obviously due to the low rainfall in the sub-catchment area, amid the inflows and water storing from upstream. The water levels at Vientiane and Paksane are shown in [Figure 9](#) below.

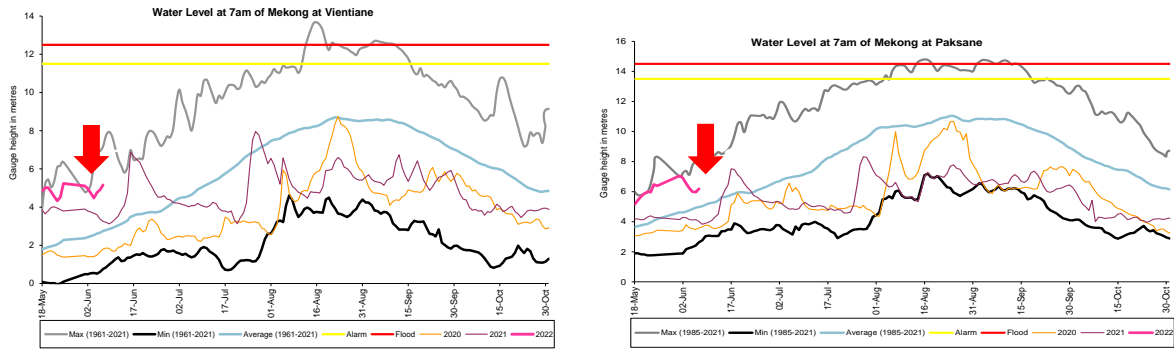


Figure 9. Water levels Veintiane and Paksane in Lao PDR.

Nakhon Phanom to Pakse

The water levels from Nakhon Phanom in Thailand to Savannakhet in Lao PDR were decreasing between 0.43 m and 0.62 m due to less rainfall and inflow from upstream. However, water levels from Khong Chaim in Thailand to Pakse in Lao PDR increased about 0.10 m. **Water levels at these stations were staying higher than their LTA level, which considered normal.** [Figure 10](#) shows the water levels at Nakhon Phanom and Pakse stations.

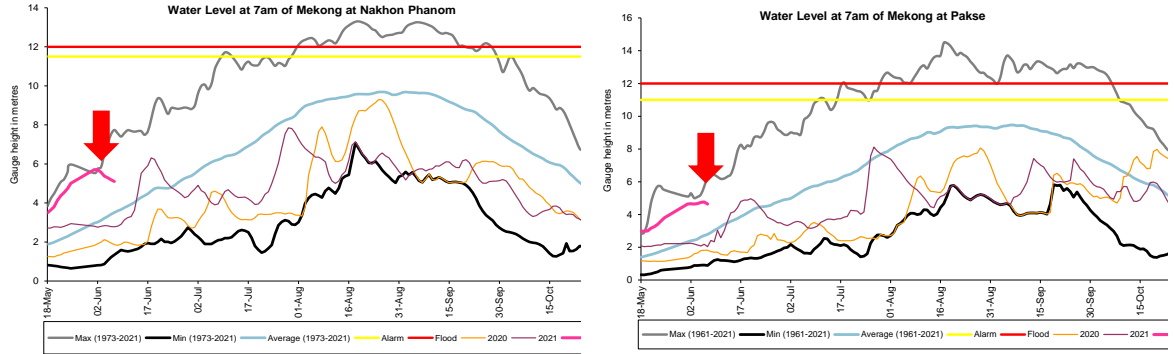


Figure 10. Weekly water levels at Nakhon Phanom in Thailand and Pakse in Lao PDR

Stung Treng to Kompong Cham/Phnom Penh to Koh Khel/Neak Luong/Prek Kdam

Following the same trend from the upstream part of the Mekong River and the 3S river (Sekong, Se San, and Sre Pok), the water levels from Stung Treng to Kratie in Cambodia were slightly up, during 1-6 June 2022. This week water level at Stung Treng and Kratie increased about 0.07 m and 0.13 m, respectively, remaining about 1.59 m and 3.37 m above their LTA (as showed in [Figure 11](#)). The water level at Kompong Cham increased about 0.06 m and was

about 2.14 m higher than its LTA. Generally, the **Water levels at these stations were higher than their LTA, which considered normal.**

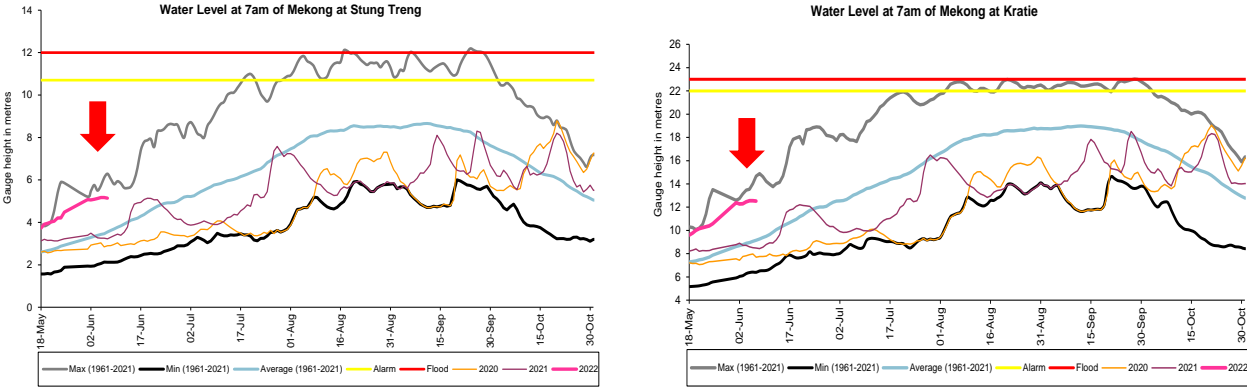


Figure 11. Water levels at Stung Treng and Kratie on the Mekong River.

However, at Chaktomuk on the Bassac River, due to some rainfall and contributed flows from upstream catchment, the water level was up by about 0.03 m and stayed 0.94 m higher than its LTA value; while at Koh Khel, water level increased about 0.02 m, staying 1.15 m higher than its LTA value. The water level at Prek Kdam on the Tonle Sap Lake increased about 0.02 m and was about 1.08 m higher than its LTA value. The water level at the Tonle Sap Lake (observed at Kampong Luong) was similar to Prek Kdam station’s water level. The recently increased water level was because of some rain and high inflow contributed from upstream of the Tonle Sap Lake area during the reporting period. The water level at the Tonle Sap Lake (observed at Kampong Luong) followed the same trend of Prek Kdam station’s water level. **Water levels at these stations were staying higher than their LTA level, which still considered normal.**

Tidal stations at Tan Chau and Chau Doc

Like last week, the water levels from 1 to 6 June 2022 at Viet Nam’s Tan Chau and Chau Doc were fluctuating due to daily tidal effects from the sea. The fluctuation levels were between 0.30 m and 0.82 m; they were in between the range of their LTA and historical minimum levels and **considered critical.**

The Tonle Sap Flow

At the end of the dry season, when water levels along the Mekong River rise and the inflows of the Mekong River return into the Tonle Sap Lake. This phenomenon normally takes place from end of May to July. Based on flow observation at Prek Kdam, the inflow of the Tonle Sap Lake took place since 29 May 2022.

[Figure 12](#) shows the seasonal changes of the inflow/reverse flow and the inflow of the TSL at Prek Kdam in comparison with the flows of 2019 and 2020, and their LTA level (1997-2020). Up to June 7 of this reporting period, **it was observed that the main inflow into Tonle Sap Lake increased due to rainfall and inflows from upstream.** This increased inflow into the Tonle Sap Lake was most likely caused by inflows and rainfall from the catchment area. Up to present, the inflow into the Tonle Sap Lake condition in 2022 is higher than 2019, 2020, 2021 and even its LTA (1997-2021) inflow conditions. For next week, some rainfall is forecasted for

the Tonle Sap area; thus, the outflow from the Tonle Sap Lake is likely continuing to slightly increase from the current level.

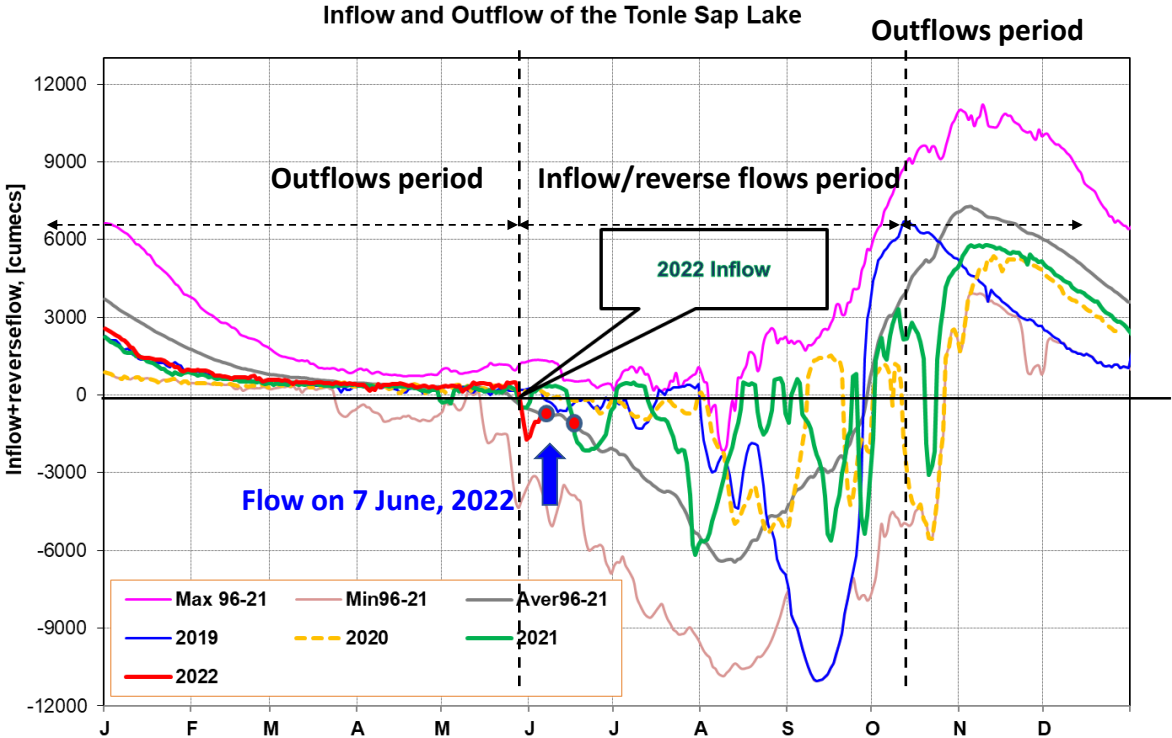


Figure 12. Seasonal change of inflows and outflows of Tonle Sap Lake

Figure 13 shows seasonal changes in monthly flow volumes up to 7 June 2022 for the Lake compared with the volumes in 2019, 2020, 2021 and their LTA, and the fluctuation levels (1997–2021). It shows that up to June 7, **the water volume of the Tonle Sap Lake was even higher than 2019, 2020, 2021 and its LTA (113.07%), during the same period.** The figure is displayed in Table 1, which indicates that the Tonle Sap Lake has been affected by water levels from the tributaries and rainfall in the surrounding sub-catchments and ***considered normal.***

This demonstrates the influence of the relationships of the reverse and out flows, water levels of the Mekong River, inflows from tributaries, and the flow direction in the complex hydraulic environment of the Tonle Sap Lake during the wet and dry seasons. The data show that about half of the annual inflow volume into the Tonle Sap Lake has originated from the Mekong mainstream. Thus, flow alterations in the mainstream could have direct impact on the Tonle Sap Lake water levels and on its hydrology.

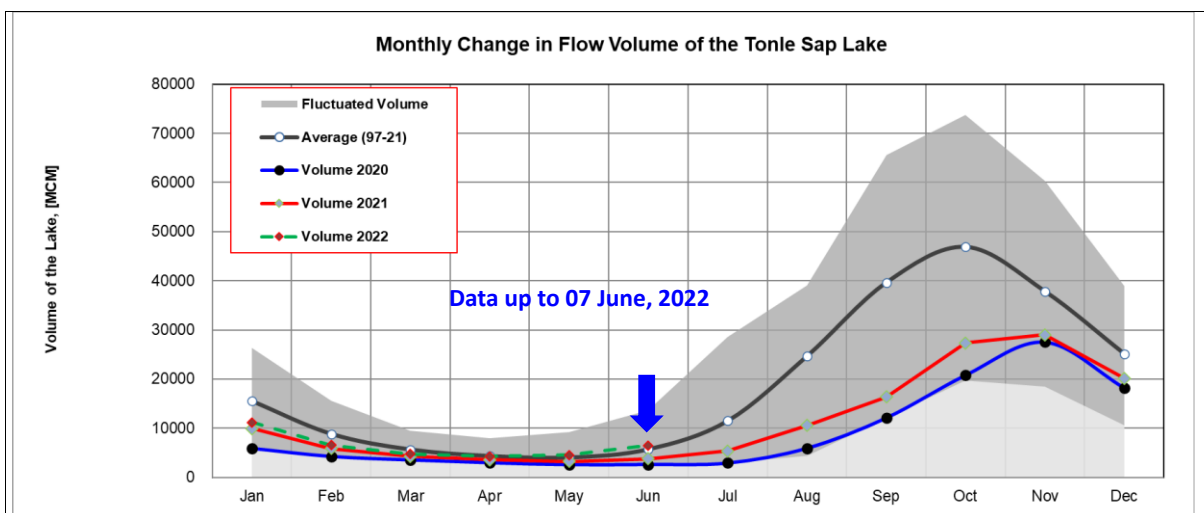


Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.

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

Month	Average Volume (97-21) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2018 [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]	Percentage of Volume in 2021 [%]
Jan	15523.23	26357.53	5906.80	13633.41	10285.31	5906.80	9923.80	11214.32	72.24
Feb	8837.89	15596.22	4198.60	7729.72	6019.30	4264.19	5832.97	6558.79	74.21
Mar	5654.18	9438.24	3347.07	5037.06	4354.62	3553.99	4264.88	4736.52	83.77
Apr	4346.65	8009.14	2866.91	3956.47	3667.47	2992.61	3556.68	4288.31	98.66
May	4030.23	9176.93	2417.81	3864.00	3266.43	2594.92	3240.78	4556.83	113.07
Jun	5708.30	13635.01	2468.70	5919.18	3517.06	2641.88	3798.29	6454.41	113.07
Jul	11493.25	28599.56	2925.86	12024.96	4001.99	2925.86	5346.73		
Aug	24666.69	39015.12	4433.46	22399.65	7622.71	5941.07	10547.80		
Sep	39634.03	65632.35	12105.31	53639.54	24194.19	12105.31	16382.34		
Oct	46873.44	73757.23	19705.50	48193.08	30358.38	20799.13	27318.21		
Nov	37823.16	60367.33	18534.61	31036.07	19112.65	27546.80	28982.93		
Dec	25126.11	38888.95	10563.49	18469.21	10577.29	18251.65	20170.76		
	Critical situation, compared with historical Min values								
	Normal condition, compared with LTA (Long term average)								
	Low volume situation, compared with LTA values								
Unit: Million Cubic Meter (1 MCM= 0.001 Km ³)									

4 Flash Flood in the Lower Mekong Basin

From June 1-7 the LMB was affected by two weather factors including (i) the strong southwest monsoon prevailed over the Gulf of Thailand during the first half of the week then it was moderated and (ii) the low-pressure cell covered upper Viet Nam and the Gulf of Tonkin during the first half of the week. These conditions caused moderate rainfall in some areas from upper to lower parts of the LMB almost the whole week.

According to the MRC-Flash Flood Guidance System (MRC-FFGS) and analysis, flash flood events were detected during the reporting period in several areas in northeast Lao PDR and northwest Viet Nam ranging from low to high risk level, as shown in [Figure 14](#) and [Table 2](#).

Table 2. Detected flash flood in Lao PDR and Viet Nam on June 1.

Rate-risk and location of the flash flood may occur in the next 1, 3, and 6 hours in Lao PDR														
Date of FFG products 1/6/2022 6:00 UTC time														
01-Hour Flash Flood Risk and Location				03-Hour Flash Flood Risk and Location				06-Hour Flash Flood Risk and Location						
Provinces	Districts	Villages	Region	Level Risk	Provinces/Districts	Villages	Region	Level Risk	Provinces/Districts	Villages	Region	Level Risk		
Xaysomboun	Thaifom	NAVPHAI	province is mountainous Northeast	Low-Risk	Xaysomboun	Thaifom	NAVPHAI	province is mountainous Northeast	Low-Risk	Xaysomboun	Thaifom	NAVPHAI	province is mountainous Northeast	Low-Risk
Xaysomboun	Hom	VIENKED	province is mountainous Northeast	Moderate-Risk	Xaysomboun	Hom	VIENKED	province is mountainous Northeast	Low-Risk	Xianghuang	Morkmay	KHANGVIENG	Northeast	Low-Risk
Xaysomboun	Thaifom	NAYAD	province is mountainous Northeast	Low-Risk	Xaysomboun	Thaifom	PHONTHONG (NEW VILLAGE)	province is mountainous Northeast	Low-Risk	Xaysomboun	Hom	VIENKED	province is mountainous Northeast	Moderate-Risk
Xaysomboun	Thaifom	PHONTHONG (NEW VILLAGE)	province is mountainous Northeast	Low-Risk	Xaysomboun	Thaifom	NAKAI OR NAMPAT	province is mountainous Northeast	Low-Risk	Xaysomboun	Thaifom	NAYAD	province is mountainous Northeast	Low-Risk
Xaysomboun	Thaifom	NAKAI OR NAMPAT	province is mountainous Northeast	Low-Risk	Bolikhamsay	Pakxanh	XAYSAYANG	Central Laos	Moderate-Risk	Xaysomboun	Thaifom	PHONTHONG (NEW VILLAGE)	province is mountainous Northeast	Low-Risk
Bolikhamsay	Pakxanh	XAYSAYANG	Central Laos	High-Risk	Bolikhamsay	Thaphabat	HOUAYGNAI	Central Laos	Low-Risk	Xaysomboun	Thaifom	NAKAI OR NAMPAT	province is mountainous Northeast	Low-Risk
Bolikhamsay	Thaphabat	HOUAYGNAI	Central Laos	Low-Risk	Bolikhamsay	Thaphabat	HATKHAY	Central Laos	Low-Risk	Bolikhamsay	Pakxanh	XAYSAYANG	Central Laos	Moderate-Risk
Bolikhamsay	Thaphabat	HATKHAY	Central Laos	Low-Risk	Xaysomboun	Hom	KOPMI	province is mountainous Northeast	Moderate-Risk	Bolikhamsay	Thaphabat	HOUAYGNAI	Central Laos	Low-Risk
Xaysomboun	Hom	KOPMI	province is mountainous Northeast	Moderate-Risk	Xaysomboun	Hom	MUANGSOUJ	province is mountainous Northeast	Moderate-Risk	Bolikhamsay	Thaphabat	HATKHAY	Central Laos	Low-Risk
Xaysomboun	Hom	MUANGSOUJ	province is mountainous Northeast	High-Risk	Bolikhamsay	Thaphabat	GNANGKHEUA	Central Laos	Low-Risk	Xaysomboun	Hom	KOPMI	province is mountainous Northeast	Moderate-Risk
Bolikhamsay	Thaphabat	GNANGKHEUA	Central Laos	Low-Risk	Vientiane	Thoulakho	NAMANG	Northwest	Moderate-Risk	Xaysomboun	Hom	MUANGSOUJ	province is mountainous Northeast	Moderate-Risk
Bolikhamsay	Thaphabat	SOMSA-ATH	Central Laos	Low-Risk						Bolikhamsay	Thaphabat	GNANGKHEUA	Central Laos	Low-Risk
Vientiane	Thoulakho	NAMANG	Northwest	Moderate-Risk						Bolikhamsay	Thaphabat	SOMSA-ATH	Central Laos	Low-Risk
										Vientiane	Thoulakho	NAMANG	Northwest	Moderate-Risk
										Vientiane	Thoulakho	NAMANG	Northwest	Low-Risk
										Vientiane	Yangiang	NABUA	Northwest	Low-Risk
										Vientiane	Yangiang	NAMPAT NEUA	Northwest	Low-Risk

Rate-risk and location of the flash flood may occur in the next 1, 3, and 6 hours in Viet Nam												
Date of FFG products 1/6/2022 6:00 UTC time												
01-Hour Flash Flood Risk and Location				3-Hour Flash Flood Risk and Location in Vietnam				6-Hour Flash Flood Risk and Location in Vietnam				
Provinces	Districts	Region	Level Risks	Provinces	Districts	Region	Level Risks	Provinces	Districts	Region	Level Risks	
Lao Cai	Sa Pa	Northwest	Low-Risk	Lao Cai	Sa Pa	Northwest	Low-Risk	Lao Cai	Sa Pa	Northwest	Low-Risk	
Lao Cai	Than Uyen	Northwest	Low-Risk	Lao Cai	Than Uyen	Northwest	Low-Risk	Lao Cai	Than Uyen	Northwest	Low-Risk	
								Lai Chau	Phong Tho	Northwest	Low-Risk	
								Lao Cai	Bat Xat	Northwest	Low-Risk	
								Son La	Phu yen	Northwest	Low-Risk	
								Tuyen Quang	Chiem Hoa	Northeast	Low-Risk	
								Bac Kan	Bach Thong	Northeast	Low-Risk	
								Ha Giang	Bac Quang	Northeast	Low-Risk	
								Tuyen Quang	Na Hang	Northeast	Low-Risk	
								Bac Kan	TX Bac Kan	Northeast	Low-Risk	

Figure 14. Flash Flood Guidance for the next 1 hour, 3 hours and 6 hours on June 1.

5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from 29 May to 4 June 2022

Drought monitoring data for 2021 are available from Saturday to Friday every week; thus, the reporting period is normally delayed by three days 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)**

Meteorological drought indicator of SPI from May 29 to June 6, as displayed in [Figure 15](#), shows that the LMB was normal in most parts of the LMB and wet in some areas in the middle and south-eastern parts of the region.

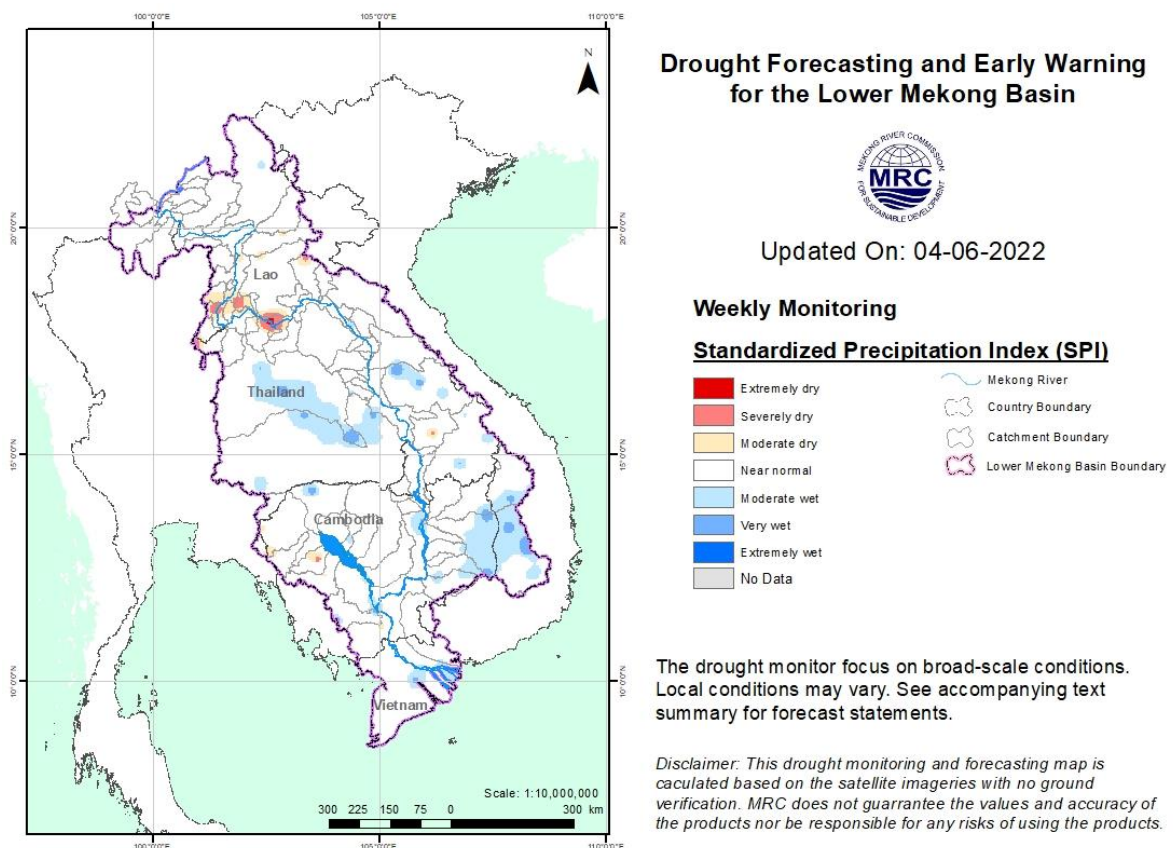


Figure 15. Weekly standardized precipitation index from 29 May to 4 June 2022.

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

Like last week (Oct 9-15), the soil water fraction from May 29 to June 4, as displayed in [Figure 16](#), shows normal condition in all over the LMB except some wet condition in the middle area. No agricultural drought was detected during the reporting week.

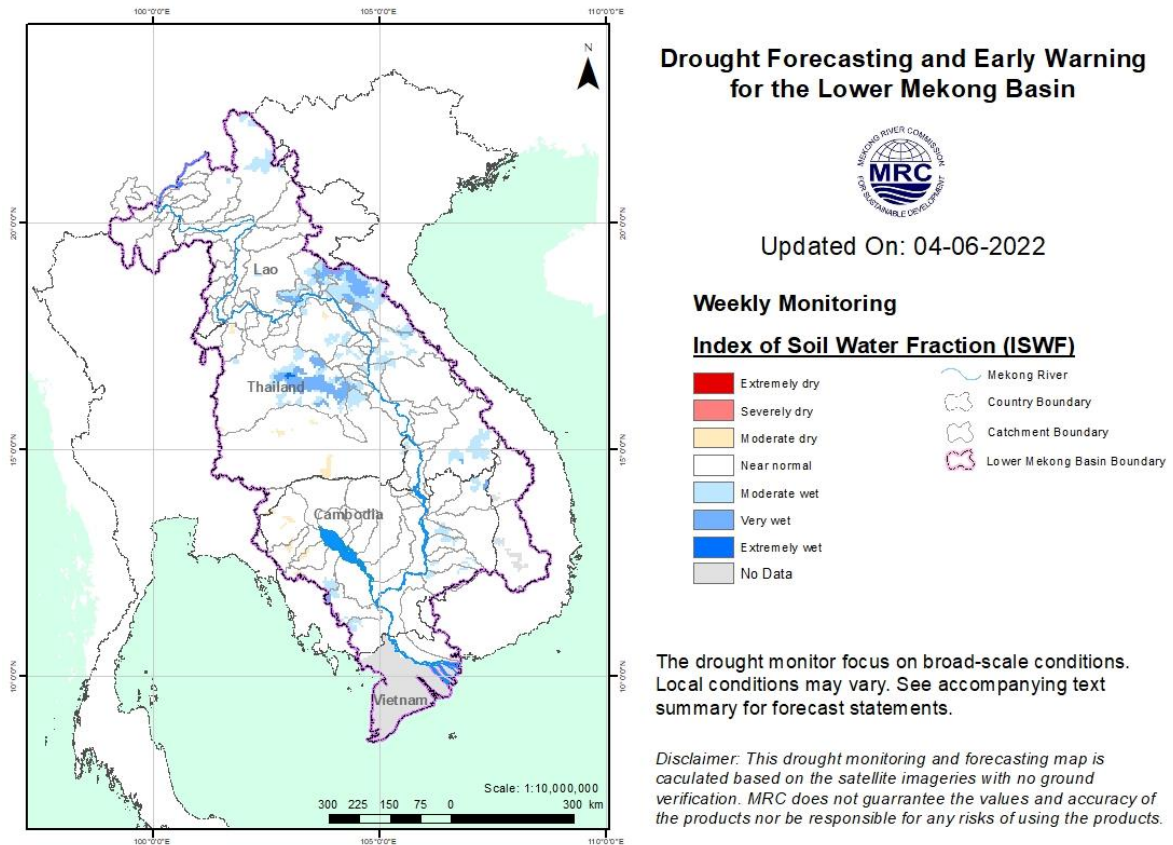


Figure 16. Index of Soil Water Fraction from 29 May to 4 June 2021.

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

With normal and wet conditions of meteorological and agricultural indicators, the LMB did not show any drought threat to the region during May 29-June 4. The combined drought index, as displayed in [Figure 17](#), shows normal condition in all parts of the region.

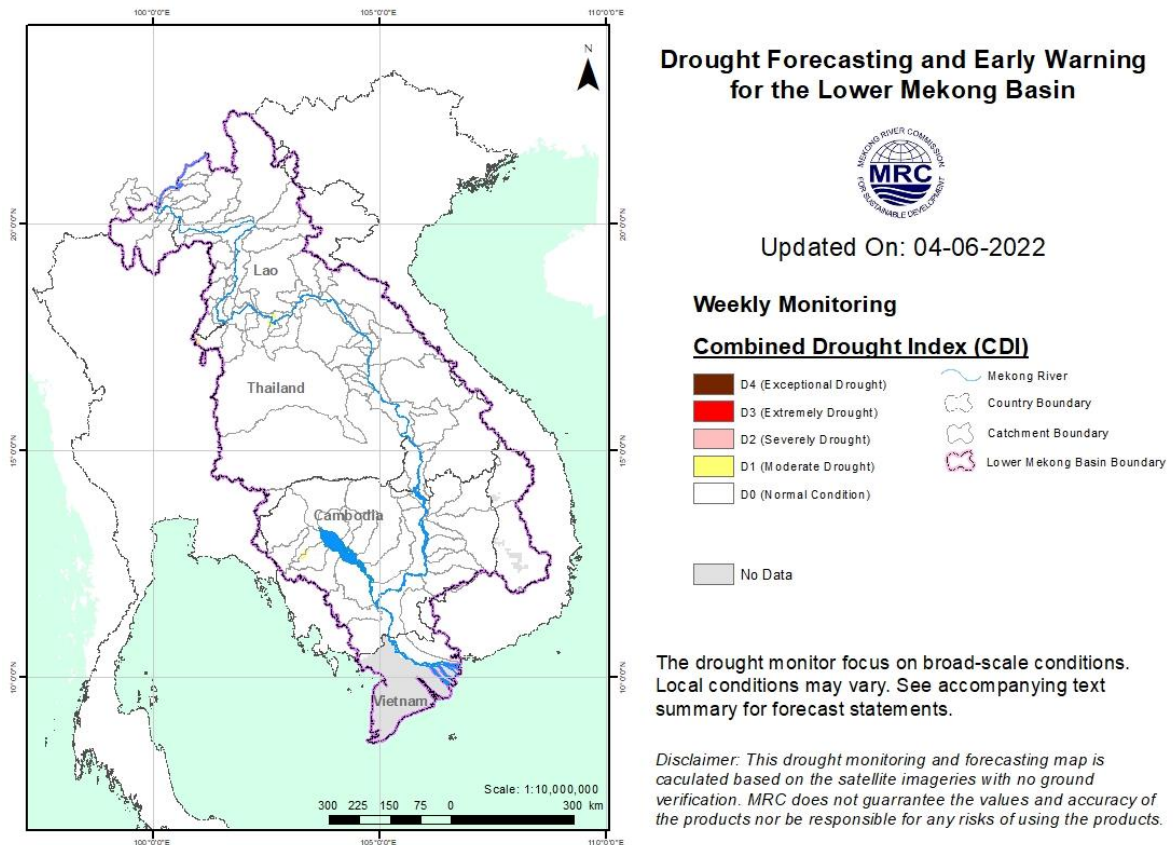


Figure 17. Weekly Combined Drought Index from 29 May to 4 June 2022.

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.

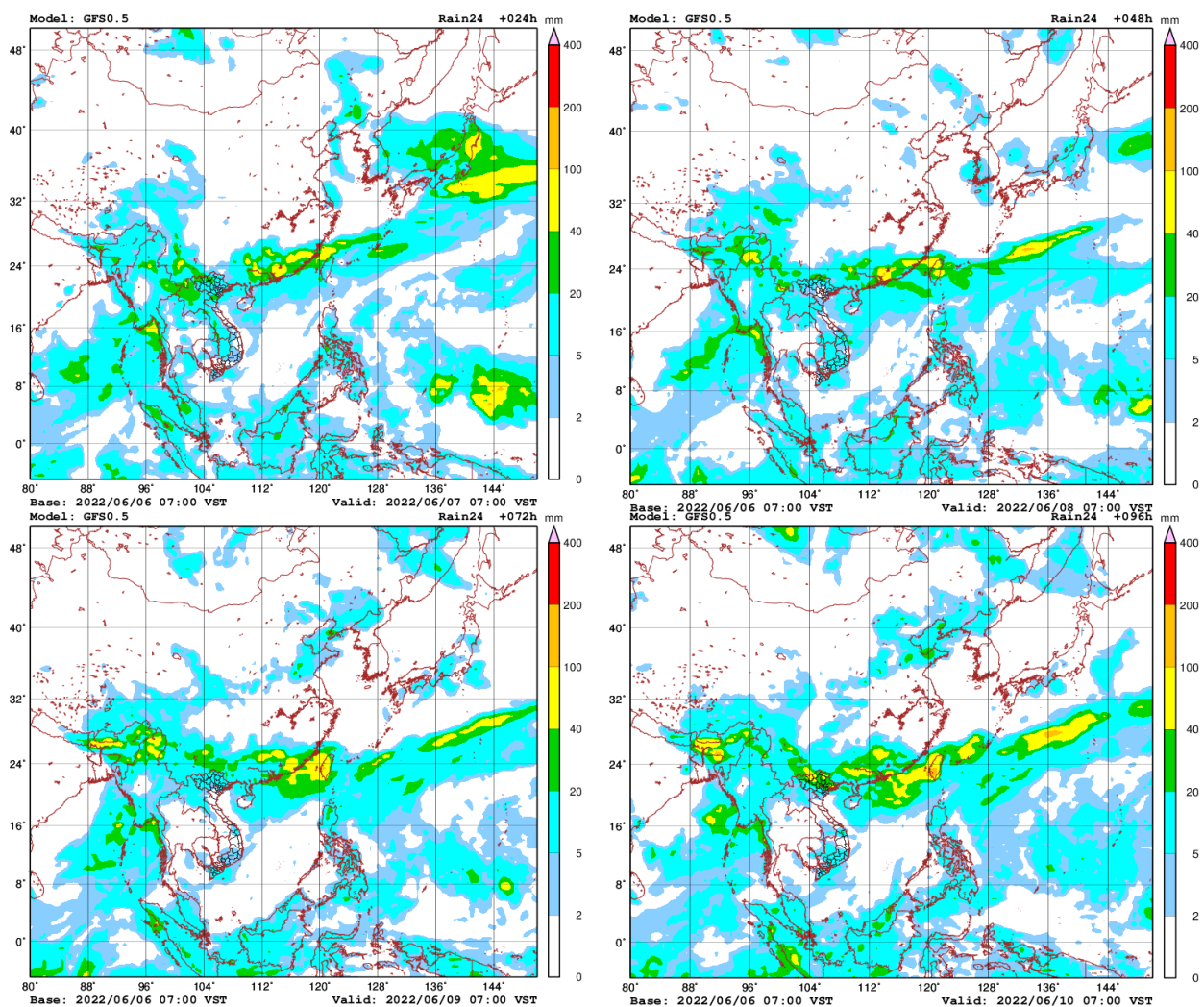
6 Weather and Water Level Forecast and Flash Flood Information

6.1 Weather and rainfall forecast

Based on the analysis of the synoptic meteorological information and result from the Global Forecast System (GFS) model, in the coming week, the southwest monsoon and low-pressure cell will continue prevailing over the LMB.

From June 7 to 13, small (5 -20 mm/24h) and moderate (20-50mm/24h) rainfall will likely occur over the LMB. However, from June 9 to 13, the heavy rain (50-100 mm/24h) will likely happen in some areas in the upper part of the LMB.

[Figure 18](#) shows accumulated rainfall forecast (24 h) of the GFS model from June 7 to 13.



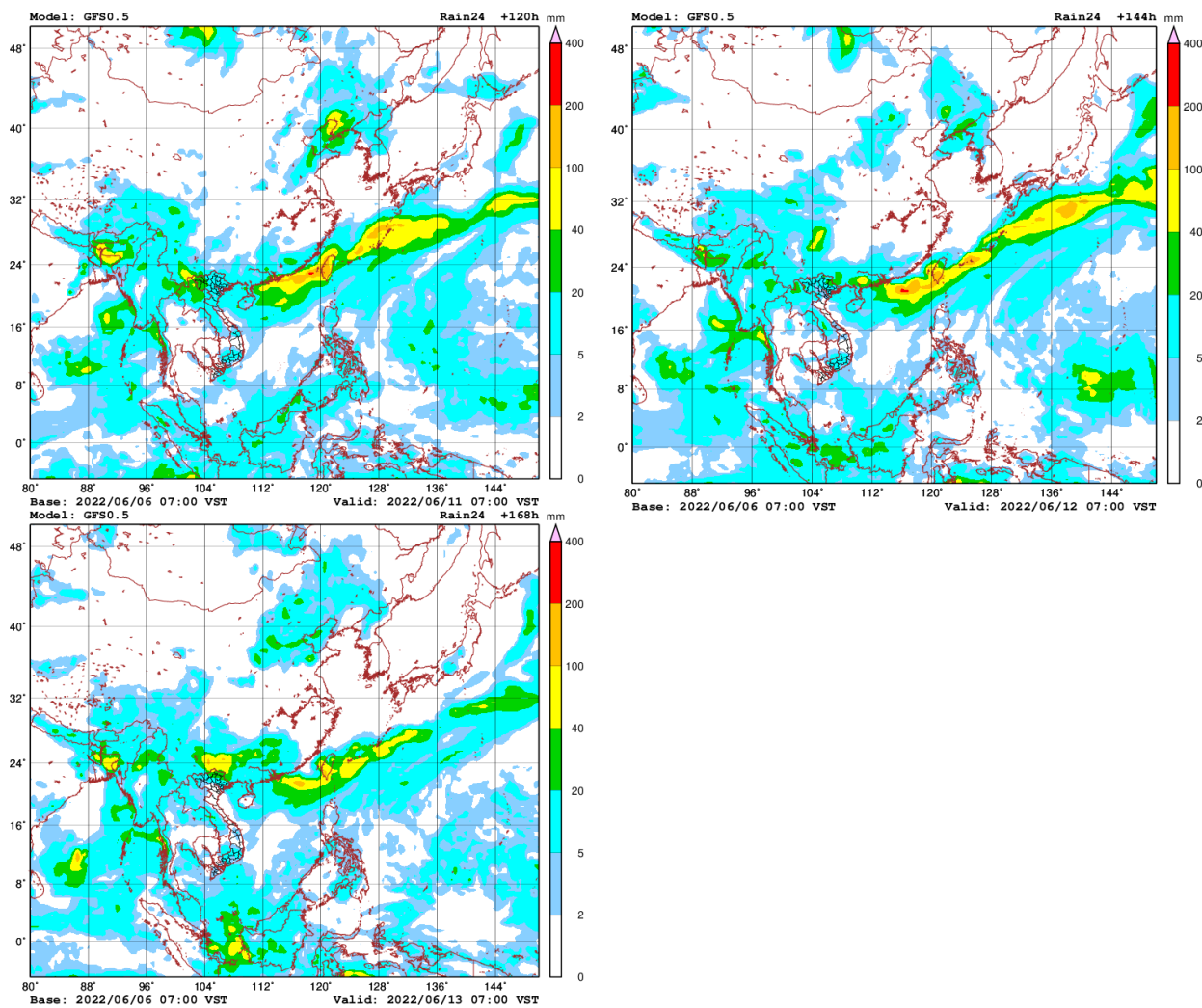


Figure 18. Accumulated rainfall forecast (24 h) based on a GFS model.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on June 7's daily flood forecasting bulletin, the daily forecasted water level at Chiang Saen in Thailand is expected to increase from 3.49 m to 3.86 m over the next five days. The trend will keep the water level at this station above its LTA.

For Luang Prabang in Lao PDR, the water level will also increase from 10.22 m to 10.55 m during the next five days. The current water level is higher than its LTA. Precipitation is forecasted for the area between Chiang Saen and Luang Prabang next week.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand is forecasted to go down approximately 0.03 m, while water level at Vientiane in Lao PDR will also decrease about 0.05 m. Furthermore, from Nong Khai in Thailand, the water level will decrease also about 0.05 m over the next five days; at Paksane in Lao PDR water level will increase about 0.07 m due to forecasted rainfall in the upper catchments. Rainfall is forecasted for the area of Paksane next week.

The water levels at these stations are remaining lower than their LTA.

Nakhon Phanom to Pakse

The water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR are forecasted to go up between 0.03 m and 0.17 m over the next five days. Water level at these stations will stay higher than their LTA level. Rainfall is forecasted for the area next week.

Stung Treng to Kompong Cham/Phnom Penh to Koh Khel/Neak Luong

From Stung Treng to Kompong Cham along the Mekong River in Cambodia, the water levels will go down from 0.20 m to 0.60 m over the next five days. Precipitation is forecasted for the area between Stung Treng and Kompong Cham during next week.

The water levels of the Tonle Sap Lake at Prek Kdam and Phnom Penh Port as well as at Phnom Penh's Chaktomuk on the Bassac River will decrease about 0.30 m over the next five days.

Water levels at most of the stations will continue to stay higher than their LTA value, particularly in the lower part of the region from the Bassac at Phnom Penh to Koh Khel as well as from Tonle Sap at Prek Kdam to Phnom Penh Port, including the Tonle Sap Lake. Precipitation is forecasted for the low-lying area of Cambodia next week.

Tidal stations at Tan Chau and Chau Doc

For Viet Nam's Tan Chau on the Mekong River and Chau Doc on the Bassac River, the water levels will be fluctuating above their minimum level, following daily tidal effects from the sea. Rainfall is forecasted for the Delta area next week.

The performance of the weekly flood forecast, with an accuracy and data input evaluation from 1 to 7 June 2022, is presented in **Annex 1**.

[Table 2](#) shows the daily flood forecasting Bulletin issued on 7 June 2022. Results of the weekly river monitoring bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php.

6.3 Flash Flood Information

With small and moderate rainfall forecasted for next week, flash floods with high level are not expected to take place in the LMB. However local heavy rain in a short period of time is possible with unexpected short flash floods. The information on flash flood guidance for the next one, three, and six hours is updated twice a day at: <http://ffw.mrcmekong.org/ffg.php>.

Detailed information on Flash Flood Warning Information as well as on its explanation is available for download [here](#).

6.4 Drought forecast

There are several climate-prediction models with different scenarios on the upcoming months until July 2022. The MRC's DFEWS adopts an ensemble model called the North America Multi-Model Ensemble (NMME), which averages all scenarios.

The global scale of rainfall prediction is used to see how the rain distribution looks like for the coming months. [Figure 18](#) shows the ensemble mean of daily average precipitation (mm/day) each month from May to July 2022 produced by the NMME.

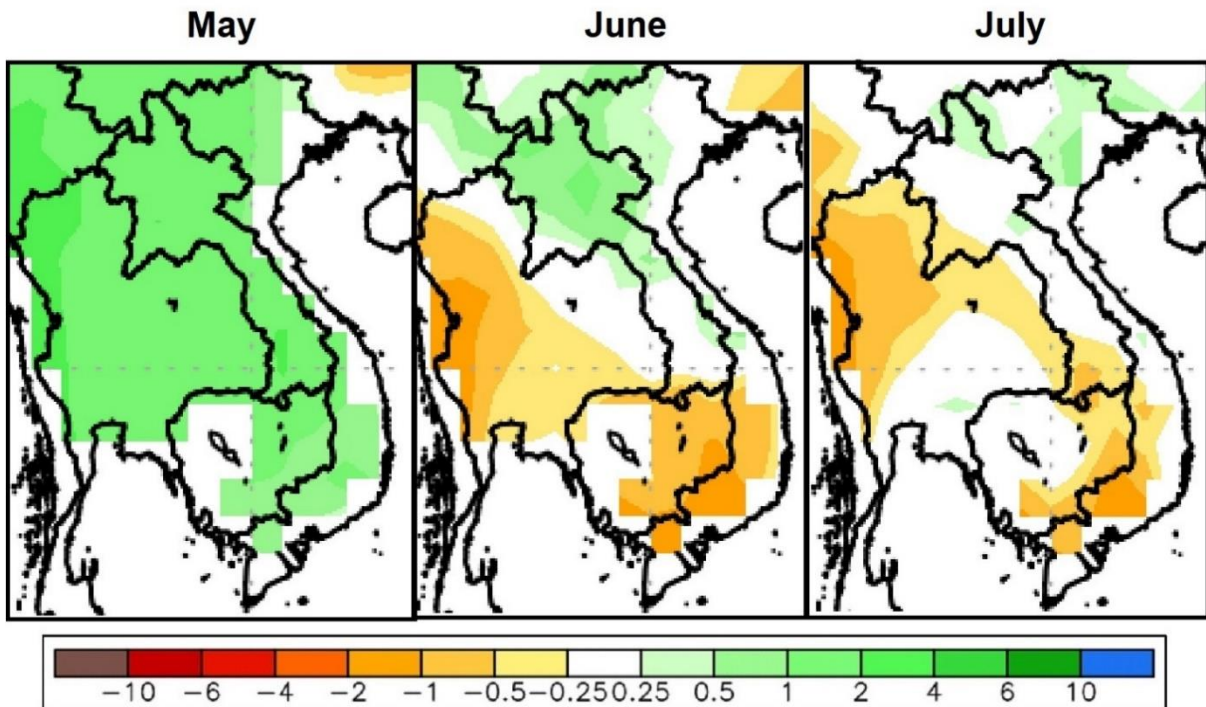


Figure 19. Daily average of monthly rainfall anomaly forecast from May to July 2022.

The ensemble prediction model based on the initial conditions in April 2022 reveals that the LMB is likely to receive ample amount of rainfall in May and below average rainfall in both June and July 2022 from the middle to the lower part of the region. Based on the weather forecast, condition in May is likely to be much wetter than normal year especially in the north and central parts of the LMB.

The 2021 dry season is relatively wetter than that of 2020 and the monsoon rain in 2022 might come on time or even earlier than normal year.

Table 2. Weekly River Monitoring Bulletin.



Mekong Bulletin

Mekong River Commission Secretariat (MRCS)
 Regional Flood and Drought Management Centre (RFDMC)
 P.O. Box 623 #576, National Road #2, Chak Angre Krom, Meanchey, Phnom Penh, Cambodia
 Tel: (855-23) 425353, Fax: (855-23) 425363, Email: floodforecast@mrcmekong.org
 River Flood Forecast: 08 June - 12 June 2022

Date: 07 June 2022

Location	Country	24-hr Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Flood level (m)	Alarm level (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)						There is currently no flood warning in place at monitoring sites on the Mekong					
						06-Jun	07-Jun	08-Jun	09-Jun	10-Jun	11-Jun	12-Jun	07	08	09	10	11	12	
Jinghong		17.0				537.50	537.81							↑	×	×	×	×	×
Chiang Saen		0.0	357.110	12.80	11.50	3.53	3.49	3.68	3.83	3.90	3.92	3.86	↑	↑	↑				
Luang Prabang		0.0	267.195	18.00	17.50	10.50	10.22	10.19	10.14	10.31	10.47	10.55	↓				↑	↑	
Chiang Khan		0.0	194.118	16.00	14.50	7.96	8.06	7.89	7.84	7.80	7.92	8.06	↑	↓					↑
Vientiane		0.0	158.040	12.50	11.50	4.91	5.16	5.25	5.10	5.05	5.00	5.13	↑		↓				↑
Nongkhai		4.0	153.648	12.20	11.40	4.59	4.83	4.92	4.77	4.71	4.66	4.78	↑		↓				↑
Paksane		22.0	142.125	14.50	13.50	5.97	6.19	6.37	6.43	6.34	6.30	6.26	↑	↑					
Nakhon Phanom		9.1	130.961	12.00	11.50	5.19	5.10	5.20	5.33	5.38	5.31	5.26	↑	↑	↑				
Thakhek		19.3	129.629	14.00	13.00	6.34	6.24	6.35	6.49	6.55	6.47	6.41	↑	↑	↑				
Mukdahan		0.0	124.219	12.50	12.00	5.15	5.03	4.92	5.00	5.13	5.18	5.12	↓	↓		↑			
Savannakhet		0.0	125.410	13.00	12.00	3.63	3.52	3.43	3.50	3.61	3.65	3.60	↓			↑			
Khong Chiam		1.9	89.030	14.50	13.50	6.31	6.18	6.02	5.87	6.00	6.16	6.24	↓	↓	↓	↑	↑		
Pakse		0.0	86.490	12.00	11.00	4.77	4.64	4.50	4.39	4.50	4.62	4.67	↓	↓	↓	↑	↑		
Stung Treng		nr	36.790	12.00	10.70	5.17	5.14	4.98	4.84	4.72	4.82	4.93	↓	↓	↓	↓	↑	↑	
Kratie		56.4	-0.101	23.00	22.00	12.56	12.52	12.45	12.25	12.09	11.94	12.08	↓	↓	↓	↓	↓	↑	
Kompong Cham		nr	-0.930	16.20	15.20	6.82	6.82	6.78	6.71	6.51	6.35	6.20	↓	↓	↓	↓	↓	↓	
Phnom Penh (Bassac)		18.2	-1.020	12.00	10.50	3.87	3.87	3.85	3.81	3.70	3.62	3.55			↓	↓	↓	↓	
Phnom Penh Port		-	0.070	11.00	9.50	2.46	2.48	2.45	2.40	2.29	2.21	2.15			↓	↓	↓	↓	
Koh Khel (Bassac)		19.5	-1.000	8.40	7.90	3.73	3.74	3.73	3.70	3.64	3.60	3.56			↓	↓	↓	↓	
Neak Luong		4.5	-0.330	8.00	7.50	2.64	2.65	2.65	2.63	2.60	2.52	2.46				↓	↓	↓	
Prek Kdam		nr	0.080	10.00	9.50	2.98	2.99	2.97	2.93	2.85	2.78	2.74			↓	↓	↓	↓	
Tan Chau		0.0	0.000	4.50	3.50	0.35	0.36	0.44	0.56	0.78	0.99	1.06			↑	↑	↑	↑	
Chau Doc		23.0	0.000	4.00	3.00	0.30	0.30	0.37	0.48	0.68	0.87	0.95			↑	↑	↑	↑	

REMARKS:

-: not available.
 nr: no rain.

LEGEND	
rising water level	↑
stable water level	↔
falling water level	↓
alarm stage	■
alarm situation	■
flood stage	■
no data available	×

Note: Stable water level is defined as a daily change of less than 10cm from Chiang Saen to Savannakhet; less than 5cm at Pakse and Stung Treng; and no more than 3cm from Kratie downstream.
Flood stage is when the flood level exceeds. A flood level is determined by each Member Country.
Alarm stage is when the water level ranges between alarm and flood levels.
Alarm situation is when the water level is forecasted to reach the flood stage within the next three days.

River Flood Forecaster

K. Sothea
 KHEM Sothea

NOTE: Discharge at Luang Prabang may be influenced by hydropower operations (at both upstream and downstream).
 For more info, please refer to this link:
<http://www.mrcmekong.org/>; http://ffw.mrcmekong.org/bulletin_wet.php; <http://ffw.mrcmekong.org/reportflood.php>

7 Summary and Possible Implications

7.1 Rainfall and its forecast

Rain was observed from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam during June 1-7, including the lower part in Lao PDR and Cambodia, varying from 0.40 mm to 127.10 mm due to do any low-pressure ling dominating in the LMB. However, this week rainfall was considered low at the middle and lower parts of the LMB compared with last week rainfall.

Based on the forecasted satellite data, rainfall is forecasted for some areas of the LMB with the value range from 20 mm to 100 mm for the next seven days. The forecasting model using GFS data, moreover, shows that no significant rainfall (<100 mm) is likely to take place in the Mekong region from 8 to 12 June 2022.

7.2 Water level and its forecast

According to MRC's observed water level at Jinghong, it showed a decrease of about 0.30 m from 538.11 m to 537.81 m from 01 to 07 June 2022 (recorded on 7:00 am) and stayed about 0.83 m higher than its Long-Term-Average (LTA: 2015-2021) value. The outflow at Jinghong station decreased from 3,080.00 m³/s to 2,810.00 m³/s from 01 to 07 June 2022.

Along with the increased outflow from Jinghong upstream, water levels of monitoring stations at Chiang Saen in Thailand also increased about 0.33 m from 1 to 7 June 2022. Moreover, from Chiang Khan in Thailand to Vientiane in Lao PDR, water levels increased about 0.15 m during June 1-7 due to some rainfall in the area and influence of dam operation. Water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR, on the other hand, were decreasing. Water levels from the stretches of the river from Stung Treng to Kratie and at Kompong Cham in Cambodia, moreover, were slightly increasing, due to less contributed rainfall from the upstream part (at Pakse and 3S area in Viet Nam).

Over the next five days, the water levels from Stung Treng to the lower part at key stations in Cambodia are expected to go down between 0.05 m and 0.30 m.

The flow volume of the Tonle Sap Lake is higher than its LTA. From next week, the flow is expected to continue increasing due to some rainfall forecasted in the inflow catchments of the Tonle Sap Lake.

From Stung Treng to Kratie, the water levels will continue staying higher than their LTA value. The water levels – at Neak Luong on the Mekong River, from Prek Kdam to Phnom Penh Port on the Tonle Sap, and from Chaktomuk to Koh Khel on the Bassac – are forecasted to continue higher than their LTA.

The situation in Tan Chau on the Mekong River and Chau Doc on the Bassac River is expected to remain unchanged.

Since the fourth week of October 2020, water levels across most monitoring stations in the LMB have significantly dropped to the level lower than their LTA (from upper to lower stretches within the LMB). For a more complete preliminary analysis of the hydrological conditions in the LMB over July–December 2020 and November 2020 to May 2021 see this [Situation Report](#).

The contribution to the Mekong River’s flow from the UMB in China (Yunnan component) is about 16% by the time the river discharges through the Mekong Delta into the Sea. By far the major contribution comes from the two major ‘left-bank’ (Eastern) tributaries between Vientiane – Nakhon Phanom and Pakse – Stung Treng, which together contribute more than 40% of the flows.

7.3 Flash flood and its trends

With the predicted amount of rainfall for the coming week as mentioned earlier in [section 6.1](#), the major flash floods are not expected in the LMB during next week. However local heavy rain in a short period of time is possible with unexpected short flash floods.

7.4 Drought condition and its forecast

Drought conditions of the LMB from 29 May to 4 June 2022 were normal in all areas from north to the south. There was no drought threat over the region.

For the upcoming three months’ forecasts, the LMB is likely to receive ample amount of rainfall in May and below average rainfall in both June and July 2022 from the middle to the lower part of the region. Based on the weather forecast, condition in May is likely to be much wetter than normal year especially in the North and central parts of the LMB.

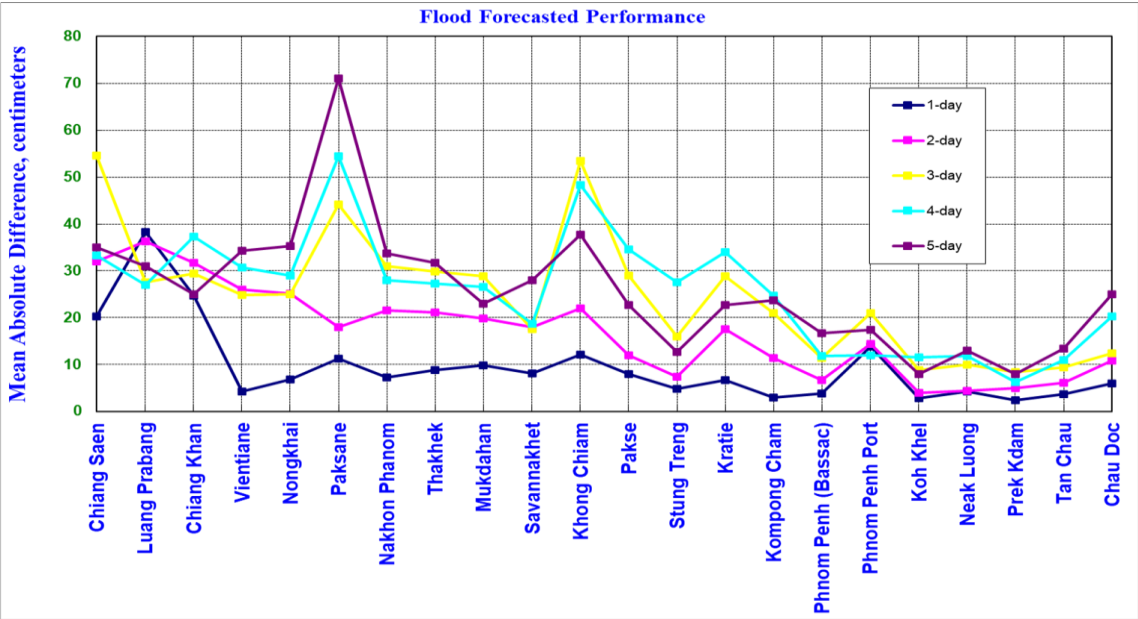
Annex 1: Performance of the weekly flood forecasting

Accuracy

“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 1-7 June 2022.

The forecasting values from 1-7 June 2022 show that the overall accuracy is fair for a one-day to five-day forecast in lead time at stations in the lower parts of the Mekong River from Paksane in Lao PDR due to some effect of rainfall and dams' operation in this area during the report period.



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.
- Luang Prabang to Chiang Khan and Stung Treng to Kratie have been effluent 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).
- Khong Chiam, Pakse, Stung Treng and Kratie stations have been affected by heavy rainfall from Viet Nam and some hydropower operations on Sekong, Sesan and Sre Pok

(water retention and release). Rainfall always accumulates at this spot, which could be causing rapidly high-water levels.

- 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.

Performance based on data from the Member Countries

Flood forecasting performance is based on the hydro-met data received from the Member Countries. The flood forecasting achievement indicated in (%) and (cm) from 1 day to 5 days at each key station, against with Old Benchmark are presented in Table B1 and Table B2.

The evaluation of performance indicators, missing data and completion time for flood forecasting are presented in Table B3 and Figures B4, B5 and B6, respectively from 1 to 7, June 2022.

Table B1: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 1 to 7 June, 2022 in cm

Lead-time Forecasted	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
1-day	<u>20</u>	<u>38</u>	<u>25</u>	4	7	11	7	9	10	8	12	8	5	7	3	4	14	3	4	2	4	6
2-day	<u>32</u>	<u>36</u>	<u>32</u>	<u>26</u>	<u>25</u>	18	<u>22</u>	<u>21</u>	20	18	<u>22</u>	12	7	18	11	7	14	4	4	5	6	11
3-day	55	<u>28</u>	<u>29</u>	<u>25</u>	<u>25</u>	<u>44</u>	<u>31</u>	<u>30</u>	<u>29</u>	18	53	<u>29</u>	16	<u>29</u>	<u>21</u>	11	<u>21</u>	9	10	8	9	12
4-day	<u>33</u>	<u>27</u>	<u>37</u>	<u>31</u>	<u>29</u>	55	<u>28</u>	<u>27</u>	<u>27</u>	19	<u>48</u>	<u>35</u>	<u>28</u>	<u>34</u>	<u>25</u>	12	12	12	12	6	11	<u>20</u>
5-day	<u>35</u>	<u>31</u>	<u>25</u>	<u>34</u>	<u>35</u>	71	<u>34</u>	<u>32</u>	<u>23</u>	<u>28</u>	<u>38</u>	<u>23</u>	13	<u>23</u>	<u>24</u>	17	17	8	13	8	13	<u>25</u>

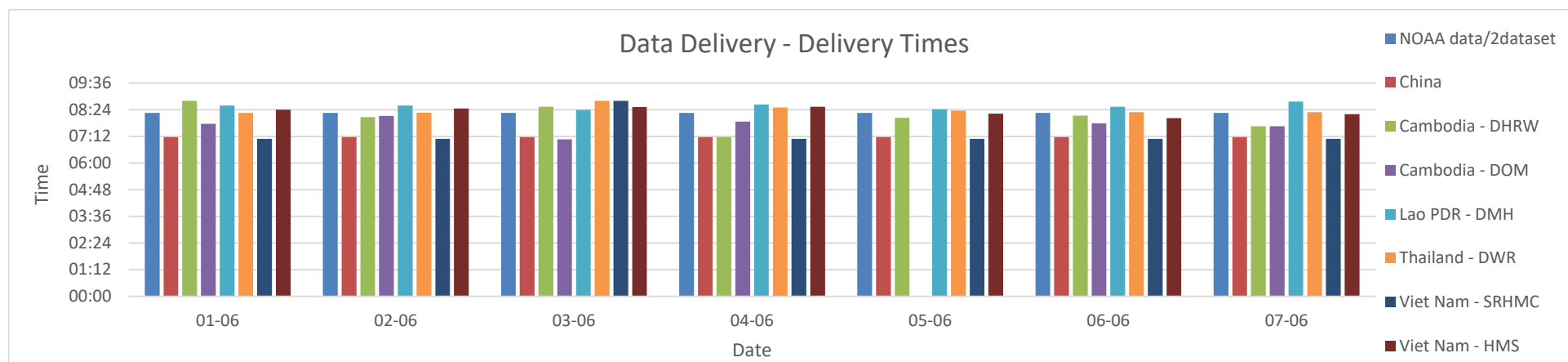
Table B2: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 1 to 7 June, 2022 in %

Lead-time Forecasted	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	Average
1-day	71.4	57.1	57.1	57.1	57.1	71.4	<u>28.6</u>	<u>42.9</u>	71.4	57.1	71.4	71.4	57.1	<u>42.9</u>	71.4	71.4	57.1	57.1	71.4	71.4	<u>42.9</u>	57.1	59.7
2-day	66.7	66.7	<u>50.0</u>	66.7	<u>50.0</u>	<u>50.0</u>	<u>33.3</u>	<u>50.0</u>	66.7	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	16.7	83.3	<u>50.0</u>	66.7	66.7	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	53.8
3-day	<u>40.0</u>	<u>40.0</u>	60.0	60.0	60.0	<u>40.0</u>	60.0	60.0	60.0	60.0	60.0	60.0	<u>40.0</u>	<u>40.0</u>	<u>40.0</u>	<u>40.0</u>	60.0	60.0	<u>40.0</u>	80.0	<u>40.0</u>	60.0	52.7
4-day	<u>50.0</u>	<u>50.0</u>	75.0	75.0	<u>50.0</u>	<u>50.0</u>	<u>25.0</u>	75.0	<u>50.0</u>	75.0	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>25.0</u>	<u>25.0</u>	51.1
5-day	<u>33.3</u>	66.7	66.7	66.7	<u>33.3</u>	<u>33.3</u>	<u>33.3</u>	66.7	<u>33.3</u>	<u>33.3</u>	66.7	<u>33.3</u>	66.7	66.7	<u>33.3</u>	66.7	<u>33.3</u>	66.7	<u>33.3</u>	<u>33.3</u>	66.7	66.7	50.0

Table B3: Overview of performance indicators for the past 7 days from 1 to 7 June, 2022

	FF time sent				Arrival time of input data								Missing data (number-mainstream and trib.st.)							
	FF completed and sent (time)	Stations without forecast	FF2 completed and sent (time)	Weather data available (time)	NOAA data	China	Cambodia - DHRW	Cambodia - DOM	Lao PDR - DMH	Thailand - DWR	Viet Nam - SRHMC	Viet Nam - HMS	NOAA data/2dataset	China/2	Cambodia - DHRW/15	Cambodia - DOM/34	Lao PDR - DMH/32	Thailand - DWR/13	Viet Nam - SRHMC/6	Viet Nam - HMS/39
2022																				
week	10:33	00:00	-	-	08:15	07:10	08:03	07:42	08:33	08:23	07:19	08:20	0	0	0	34	23	0	0	2
month	10:33	00:00	-	-	08:15	07:10	08:03	07:42	08:33	08:23	07:19	08:19	0	0	0	34	0	0	0	2

Fig. B4: Data delivery times for the past 7 days from 1 to 7 June, 2022



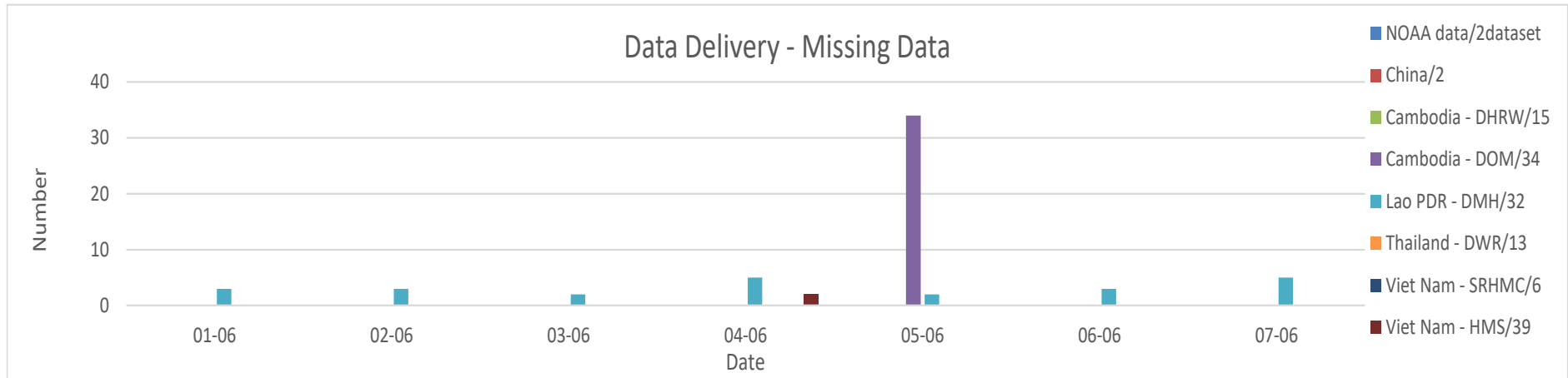
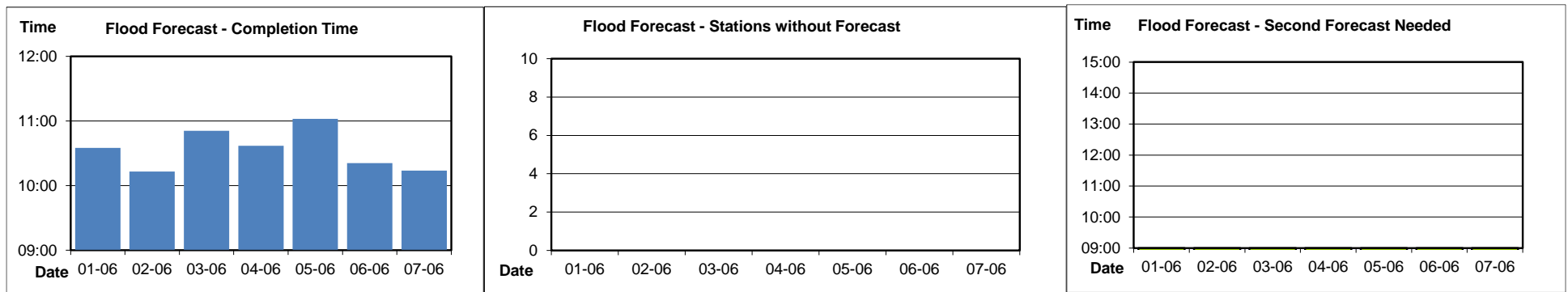


Fig. B5: Missing data for the past 7 days from 1 to 7 June, 2022

Fig. B6: Flood forecast completion time, stations without forecasts, and second forecasts need from 1 to 7 June, 2022





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