



Mekong River Commission

**Weekly Dry Season Situation Report in
the Lower Mekong River Basin
06-12 December 2022**

Prepared by
The Regional Flood and Drought Management Centre
13 December 2022

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Key Messages

Key messages for this weekly report are presented below.

Rainfall and its forecast

- During December 06-12, less rainfall was observed over the Mekong region, varied between 1.00 mm and 10.50 mm.
- There will be below-average rain for the next 7 days over the Mekong region from 13 to 24 December 2022 due to low-pressure line dominating the Mekong region.

Water level and its forecast

- The MRC's observed water level (WL) at Jinghong showed an increased value about 0.60 m from 535.24 m to 535.84 between 06 and 12 Dec 2022. The outflow increased from 827.00 m³/s to 1210.00 m³/s between 06 and 12 Dec 2022.
- Along with the increased outflow at Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand was up about 0.16 m during the report period and stayed 0.26 m below its LTA, considered low water level. WLs at the monitoring stations at Chiang Khan in Thailand increased about 0.12 m, while at Vientiane in Lao PDR decreased about 0.36 m, staying about 0.76 m and 0.18 m below their LTA value respectively. The current WL from Nong Khai in Thailand was about 1.22 m lower than its LTA value, while at Paksane in Lao PDR it was about 1.17 m lower than its LTA level, which considered low water levels. WL from Thailand's Nakhon Phanom to Pakse decreased between 0.01 m and 0.46 m. The current WLs at Khong Chiam and Pakse were staying very close to their LTA level, which considered normal. Water levels from the stretches of the river from Stung Treng to Kratie and at Kompong Cham in Cambodia, moreover, were decreasing due to less contributed rainfall from the upstream part (at Pakse and 3S area in Viet Nam).
- The water volume of the Tonle Sap Lake up to 12 December 2022 was still slightly higher than its LTA during the same period from 06 to 12 Dec 2022, considered normal.
- The current water levels for most of the stations are below their LTA value. WLs at the 2 tidal stations at Tan Chau and Chau Doc fluctuated between minimum, maximum levels and their LTA value, during this monitoring period.
- Over the next seven days, the water levels across most monitoring stations are expected to go down and remain lower than their long-term average value in most stations.

Drought condition and its forecast

- During December 4-10, the LMB was normal. With a much better soil moisture condition, the combined drought indicator show no drought threat, in overall, over the LMB.
- For the coming two months, **December** is receiving below-average rainfall in the northern and southern parts covering **Chiang Rai, Payao, Bokeo, Phongsaly,**

Luangnamtha, Vientiane, Otdar Meanchey, Siem Reap, and Preah Vihea with moderate and severe droughts. The forecast predicts that the eastern area is also extremely wet in December. While January 2023 is forecasted to be wet in the eastern part and normal in other places.

1 Introduction

This Weekly Dry Season Situation Report presents a preliminary analysis of the weekly hydrological situation in the Lower Mekong River Basin (LMB) for **06-12 December 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 – Cambodia, Lao PDR, Thailand, and Viet Nam – and on satellite data. 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
- 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 (November, December and January) and the weather maps issued by the Thai Meteorological Department (TMD) were used to verify weather conditions in the LMB.

Since the start of November 2022, the cold weather has appeared because the influentially high-pressure air mass areas prevailing 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 bring cool weather condition in the upper part of Thailand, Lao PDR and Viet Nam. As a result, the temperature in the upper part of Thailand will drop sharply as commonly chilly weather, specifically at the upper portion of the northern and north-eastern parts together with very cold weather in mountainous areas (within the Mekong region).

[Figure 1](#) presents the weather map between 06 and 12 December 2022, indicating that a low-pressure cell was active in the South-Sea of Viet Nam but no impact in the LMB. The winter high-pressure in China was moving southward bringing cold air to the LMB region through monsoon wind. Almost no rain occurred in LMB, except in central to southern Viet Nam, and southern Thailand.

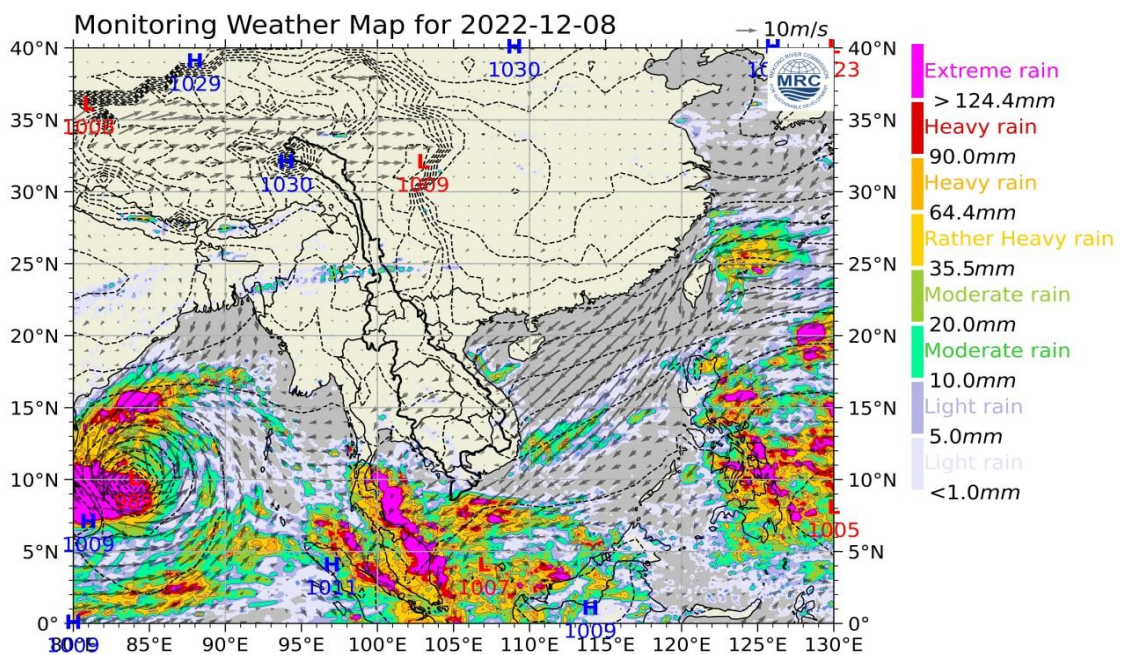


Figure 1: Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), a highest probability of warm condition is predicted over of the lower part of the Mekong region covering Lao PDR and Thailand from 12 to 25 December 2022, during the 2nd and 3rd weeks of December. **Figure 2** shows the outlook of weather condition from 12 to 25 December 2022 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

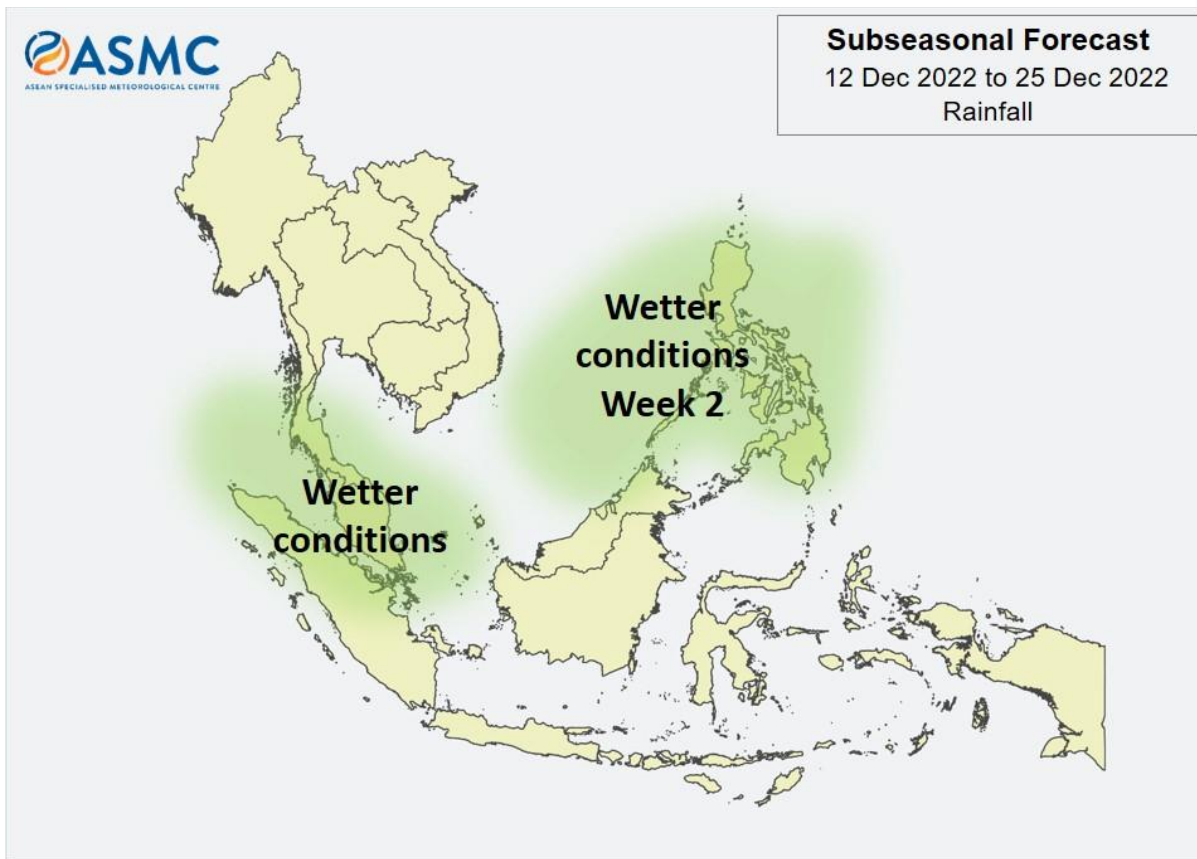


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

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

There was tracking storm covering the LMB during 06-12 December 2022, showing no low-pressure line over the LMB. No movement of storm was detected over Viet Nam, as displayed in [Figure 3](#).

Active system as of 12 Dec 6:42GMT

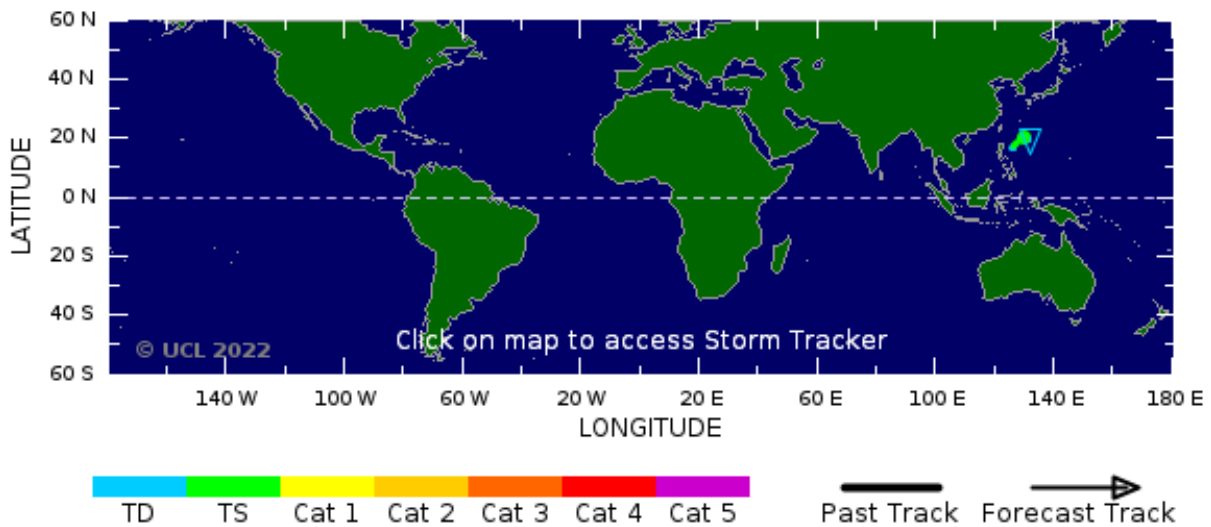


Figure 3: No tropical storm risk observed on 12 December 2022.

Rainfall patterns over the LMB

This week from 06 to 12 December 2022, less rainfall was observed from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam in the Lower Mekong Basin (LMB). The highest rainfall at Chaktomuk in Phnom Penh Cambodia was about 10.50 mm. The highest rainfall of this week report was at Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam, varied from 2.00 mm to 64 mm. The total rainfall of this week report in the Mekong region, compared with last week and its long-term-average (LTA) is showed in [Figure 4](#). The total rainfall of this week was considered low in the LMB.

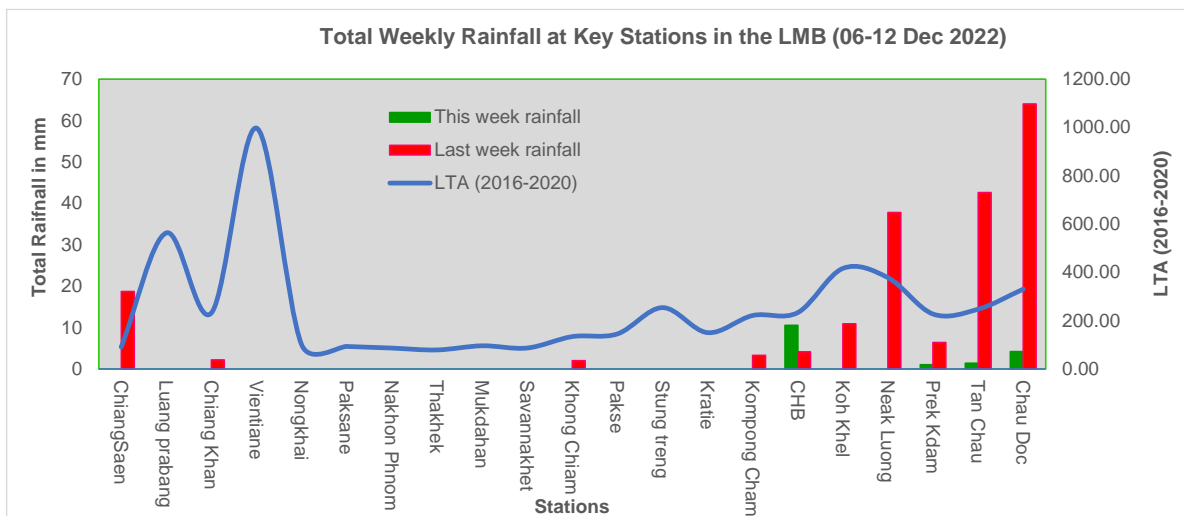


Figure 4: Weekly total rainfall at key stations in the LMB.

To verify area rainfall distribution, [Figure 5](#) shows a map of the weekly accumulated rainfall based on the observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 06 to 12 December 2022.

Absence of rain this week is an indication of the end of the rainy season in the LMB.

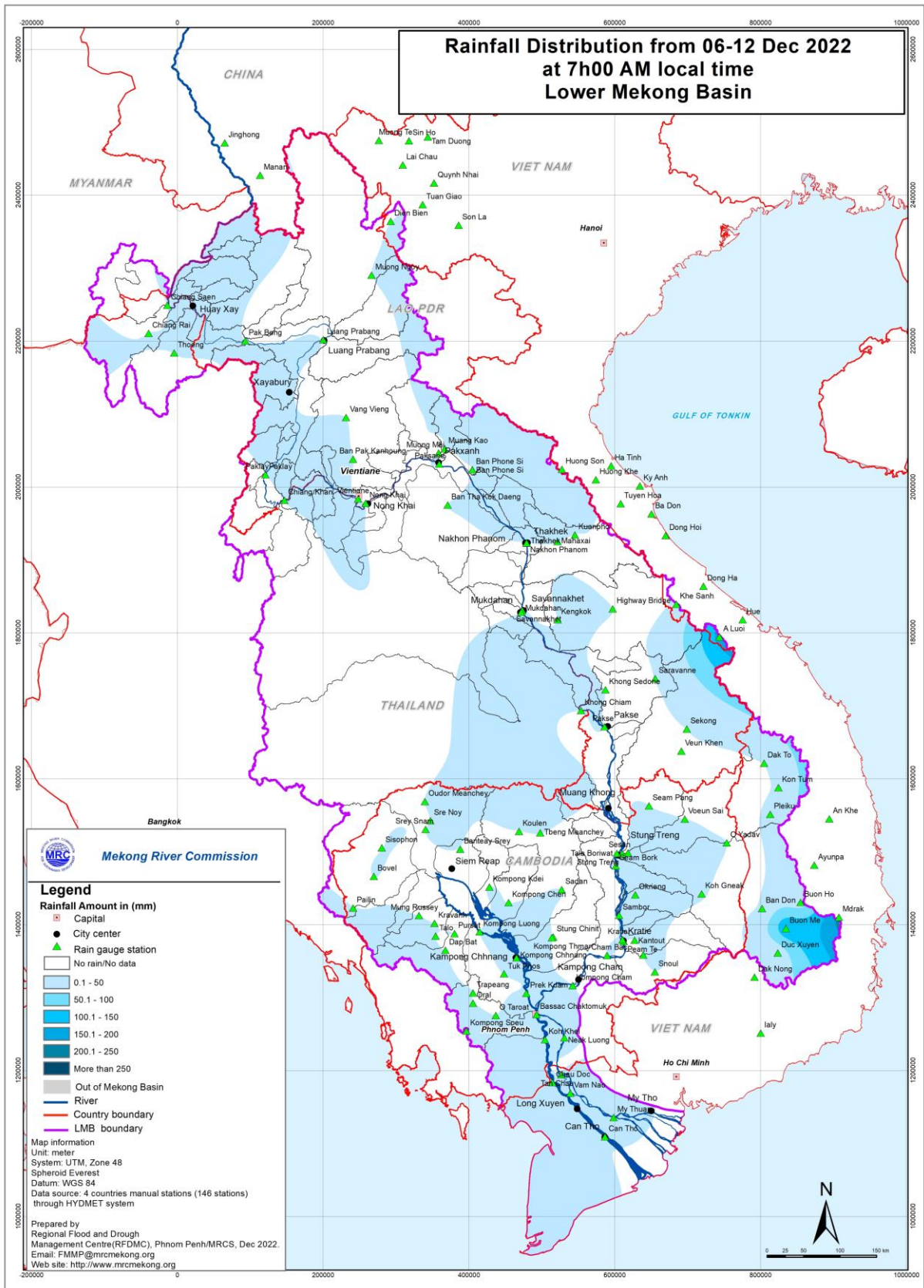


Figure 5: Weekly rainfall distribution over the LMB.

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 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 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**.

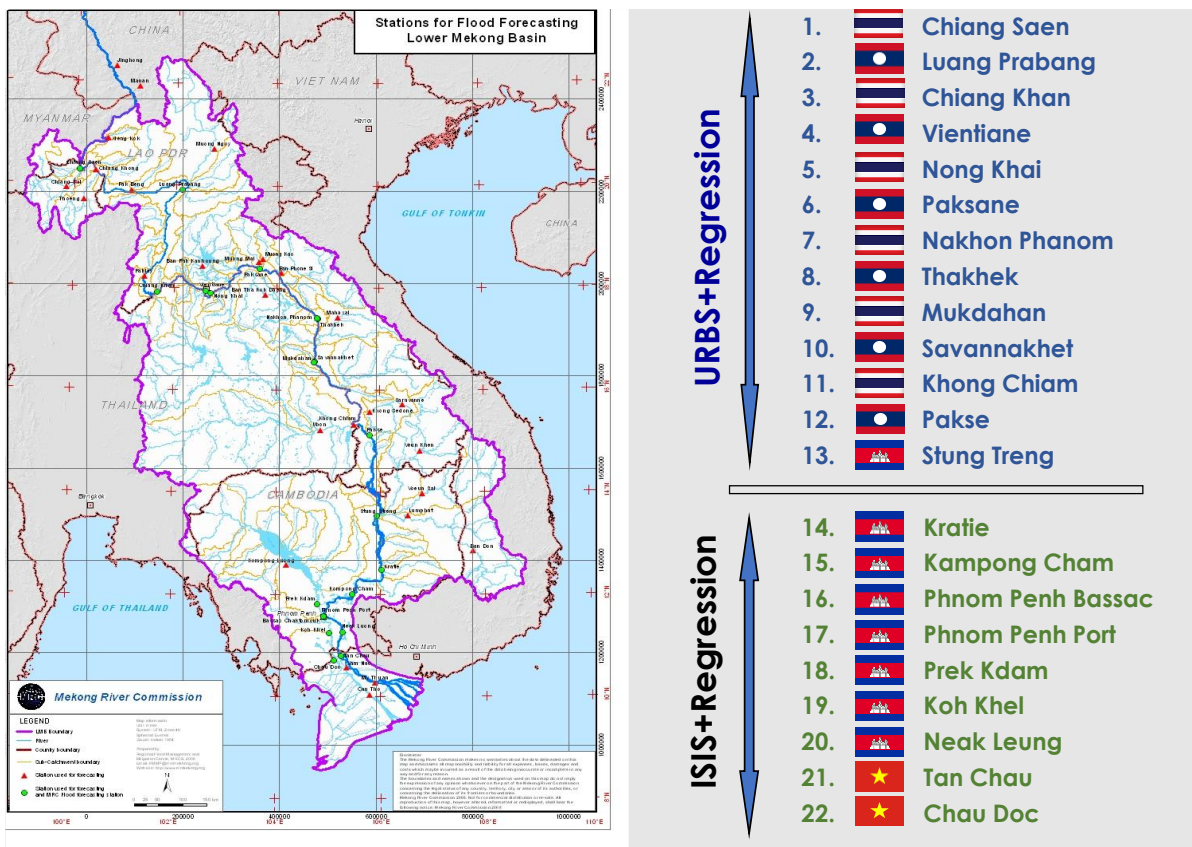


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

The MRC’s observed water level (WL) at Jinghong showed an increased value about 0.60 m from **535.24 m to 535.84 m between 06 and 12 Dec 2022 (recorded on 7:00 am)**. The outflow increased from 827.00 m³/s to 1210.00 m³/s between 06 and 12 Dec 2022.

[Figure 7](#) below presents water level that increased at the Jinghong hydrological station¹, indicating the trend of fluctuating water level up to 12 December 2021.

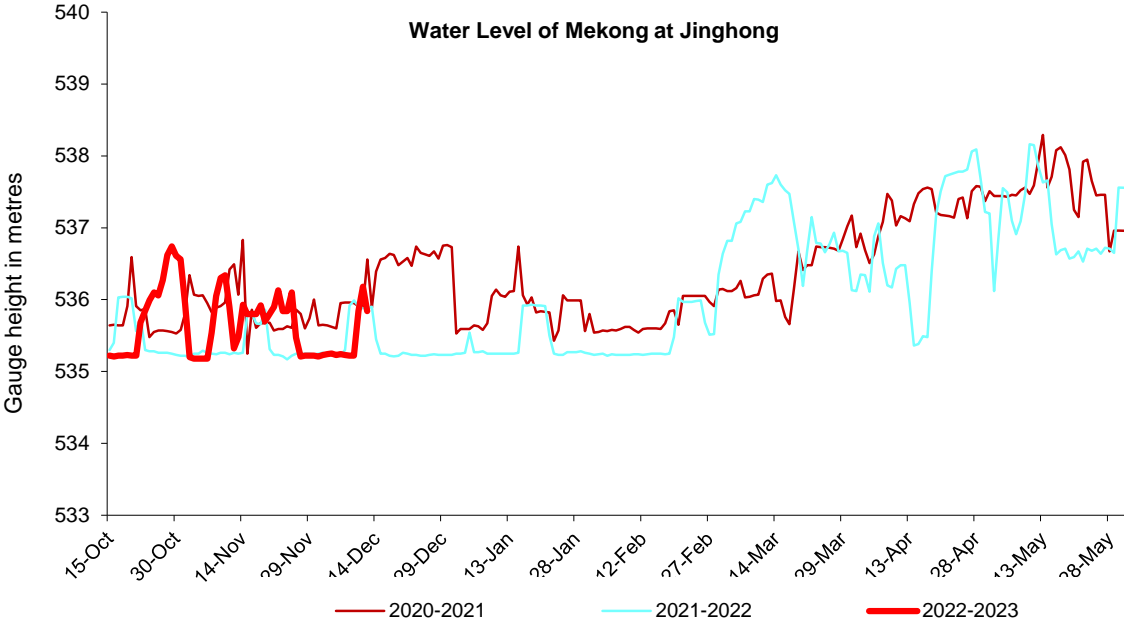


Figure 7. Water level at the Jinghong hydrological station during to 12 Dec 2022.

Along with the increased outflow from Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand increased 0.16 m from 06 to 12 December 2022 and stayed about 0.26 m lower than its long-term average (LTA), which considered low water level. WLs at the monitoring station at Chiang Khan in Thailand increased 0.12 m and stayed 0.76 m below its LTA, while at Vientiane in Lao PDR it decreased about 0.36 m and stayed about 0.18 m below its LTA value. The current WLs from Nong Khai in Thailand decreased 0.24 m and stayed 1.22 m and at Paksane in Lao PDR it decreased about 0.30 m and stayed 1.17 m lower than its LTA value. WLs at these stations were considered low. Water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR decreased between 0.01 m and 0.46 m, which still considered low. WLs at these stations were staying below their LTA value, except WLs from Khong Chiam in Thailand to Pakse in Lao PDR were staying slightly below their LTA value. Water levels from the stretches of the river from Stung Treng to Kratie and at Kompong Cham in Cambodia, moreover, were decreasing between 0.34 m and 0.50 m due to less contributed rainfall from the upstream part (at Pakse and 3S area in Viet Nam). WLs at Stung Treng and Kratie were staying close to their LTA value, while at Kompong Cham the WL was staying about 0.88 m lower than its LTA value.

Based on hydrological phenomenon, the contribution of inflow water from the upstream of Lancang-Mekong in China to the Mekong mainstream is about 16% in total during the wet season from June to October and about 25% in total during the dry season from November to

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>.

May. 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

Water level during December 06-12 at Thailand’s Chiang Saen increased from 2.07 m to 2.23 m, staying about 0.26 m lower than its Long-Term-Average (LTA), which is considered low water level. When compared to last week, this week’s water level is relatively higher.

Water level at the Luang Prabang station in Lao PDR decreased from 8.98 m to 8.58 m, during the reporting period. Compared to last week, the figure shows it is down by about 0.40 m. The water level at this station was 0.54 m lower than its historical maximum value. 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 dry season.**

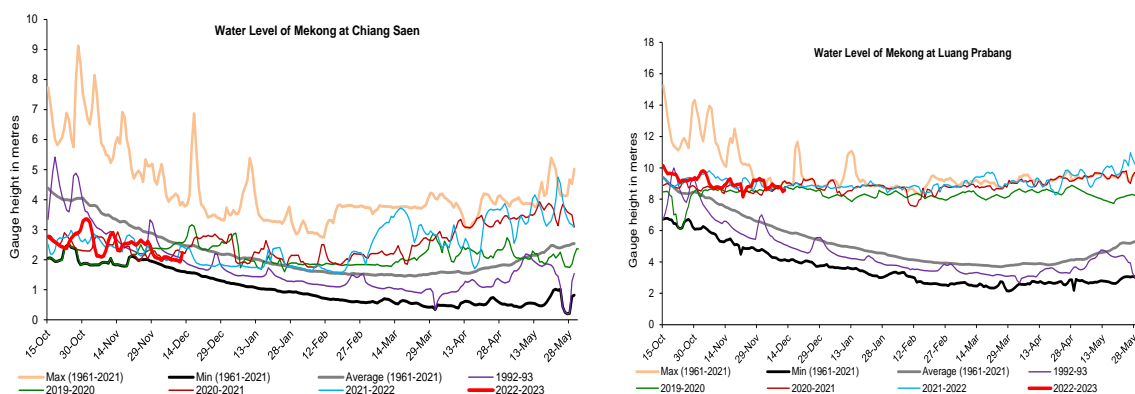


Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) increased about 0.12 m, during the reporting week. It still showed 0.76 m lower than its LTA. Furthermore, water level downstream at Vientiane in Lao PDR decreased from 2.74 m to 2.38 m and was about 0.18 m lower than its LTA during 06-12 Dec 2022. At Nong Khai station in Thailand, the water level decreased 0.24 m during the reporting period. It dropped from 2.08 m to 1.84 m and showed 1.22 m lower than its LTA value, **which considered low water level**. At Paksane in Lao PDR, water level was down about 0.30 m. The recently decreased water levels were obviously due to less inflow from upstream, some rainfalls in the sub-catchment area and water operation from upstream. The water levels at Vientiane and Paksane are shown in [Figure 9](#) below.

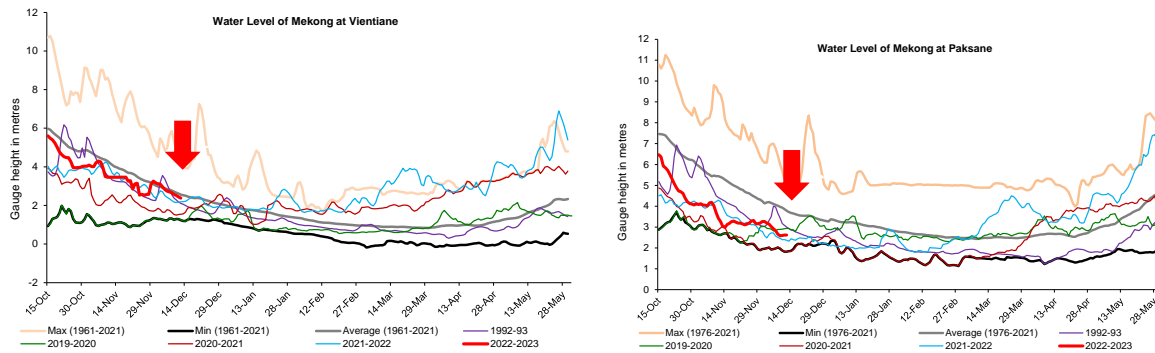


Figure 9. Water levels Veintiane and Paksane in Thailand and Lao PDR.

Nakhon Phanom to Pakse

Similarly, water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR decreased between 0.01 m and 0.46 m, during the reporting period, **staying below their LTA level**. However, from Khong Chiam to Pakse in Lao PDR the WLs were staying close below their LTA value, **which considered normal**. [Figure 10](#) shows the water levels at Nakhon Phanom and Pakse stations.

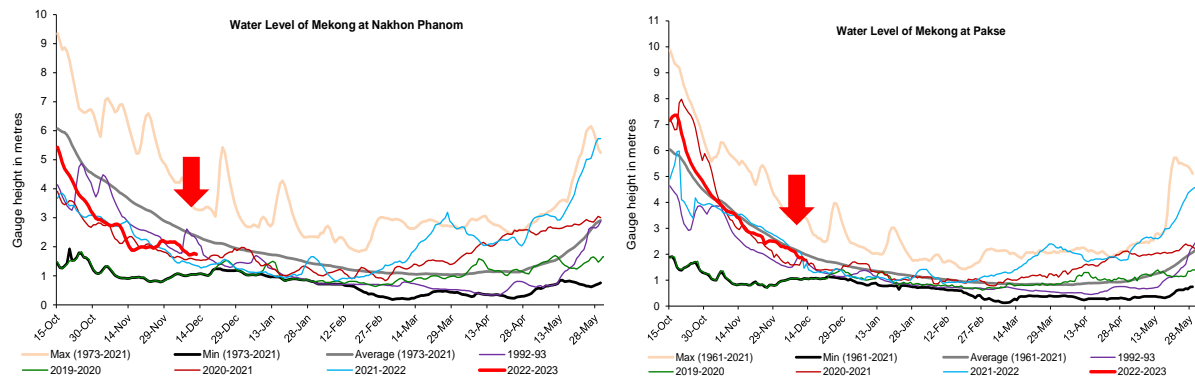


Figure 10: Water levels at Nakhon Phanom and Savannakhet of Thailand and Lao PDR.

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

Due to less rainfall 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 decreasing during 06-12 Dec 2022. This week water level from Stung Treng to Kratie decreased about 0.34 m and 0.50 m, respectively. However, water levels at Stung Treng remained about 0.01 m lower than its LTA value, while at Kratie it was about 0.15 m lower than its LTA value. Water level at these two stations were considered normal situation (as showed in [Figure 11](#)).

This week, the Water levels at Kompong Cham dropped 0.34 m and stayed 0.88 m below its LTA value, which considered low water levels.

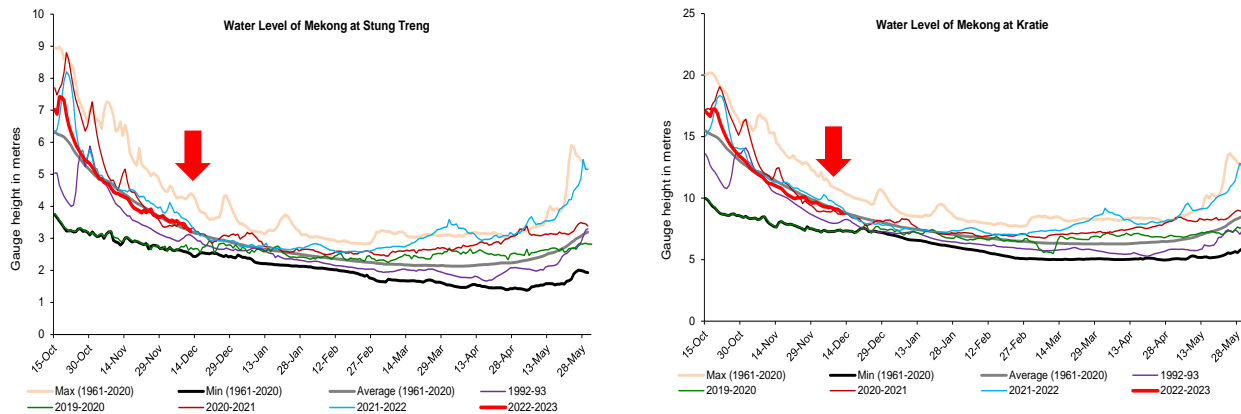


Figure 11: Water levels at Stung Treng and Kratie on the Mekong River.

At Chaktomuk on the Bassac River, due to less contributed flows from upstream catchment, the water level was down by about 0.25 m and stayed 0.96 m lower than its LTA value; while at Koh Khel, water level decreased about 0.17 m, staying 0.38 m lower than its LTA value. The water level at Prek Kdam on the Tonle Sap Lake decreased about 0.36 m and was about 0.06 m lower than its LTA value. The water level at the Tonle Sap Lake (observed at Kompong Luong) was similar to Prek Kdam station's water level. The recently decreased water level was due to low rainfall and inflow contributed from upstream of the Tonle Sap Lake area during the reporting period. The water level at the Tonle Sap Lake (observed at Kompong Luong) followed the same trend of Prek Kdam station's water level. **Water levels at these stations were staying lower than their LTA level, which still considered low water level.**

Tidal stations at Tan Chau and Chau Doc

Like last week, the water levels from 06 to 12 Dec 2022 at Viet Nam's Tan Chau and Chau Doc were fluctuating between their LTA, maximum and minimum values due to daily tidal effects from the sea. The fluctuation levels were between 1.71 m and 2.05 m. In Tan Chau and Chau Doc, the fluctuation of water levels at these stations were lower and higher respectively than their LTA level, which **considered normal.**

The Tonle Sap Flow

At the end of the wet season, when water levels along the Mekong River subside, the outflows of the Tonle Sap Lake return into the Mekong River and then to the Delta. This phenomenon normally takes place from end of September to October. Based on flow observation at Prek Kdam, the outflow of the Tonle Sap Lake was taking place since 29 October 2022.

[Figure 12](#) shows the seasonal changes of the inflow/reverse flow and the outflow of the TSL at Prek Kdam in comparison with the flows of 2019-2021 and 2022, and their LTA level (1997-2021). Up to December 12 of this reporting period, **it was observed that the main outflow to Tonle Sap Lake decreased due to less rainfall and inflows from upstream.** This decreased outflow of Tonle Sap Lake was most likely caused by less inflows and rainfall from the catchment area. Up to this date, the outflow from the Tonle Sap Lake condition in 2022 is higher than 2019, 2020 and 2021 outflow conditions. The outflow of 2022 is still higher than

its LTA. For next week, less rainfall is forecasted for the Tonle Sap area; thus, the outflow into the Tonle Sap Lake is likely continuing to decrease from the current level.

Figure 13 shows seasonal changes in monthly flow volumes up to 12 December 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 December 12, the water volume of the Tonle Sap Lake was staying slightly higher than its LTA (about 17%) and also higher than 2019, 2020, 2021 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 Mekong River, the tributaries, and rainfall in the surrounding sub-catchments and ***considered critical***.

This demonstrates the influence of the relationships between the reverse 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.

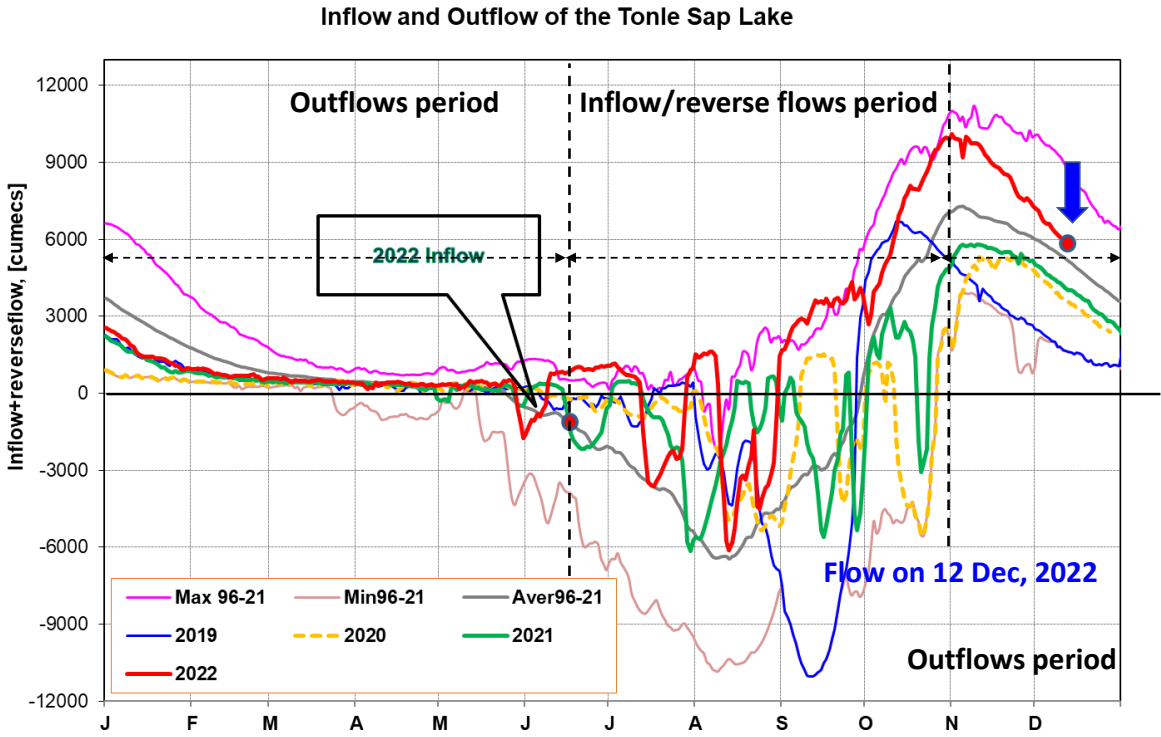


Figure 12: Seasonal change of inflows and outflows of Tonle Sap Lake.

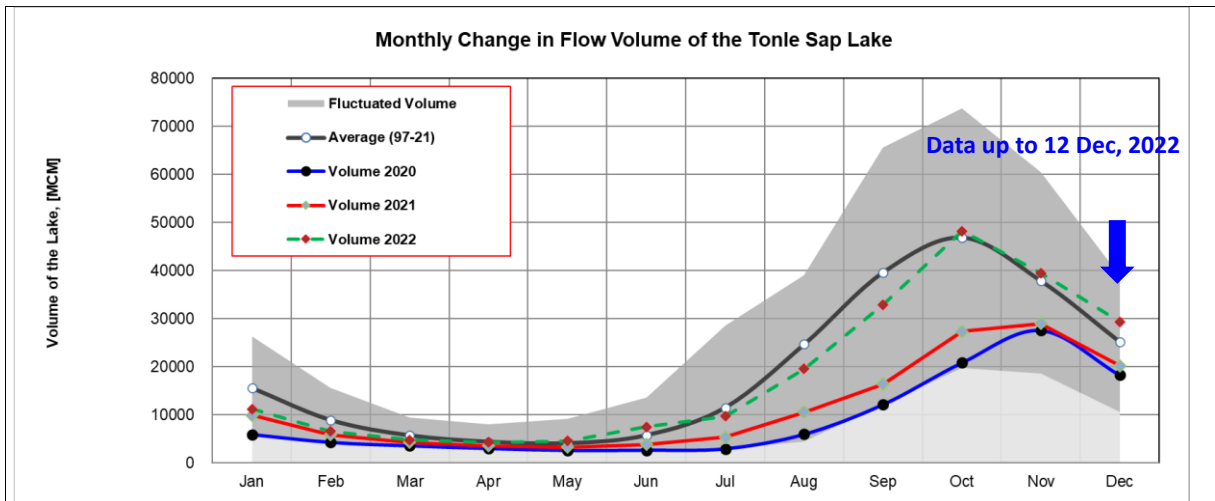


Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.

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

Month	LTA (97-21) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2018 [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]	Volume in 2022 [%], compared with its LTA
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	7489.04	131.20
Jul	11493.25	28599.56	2925.86	12024.96	4001.99	2925.86	5346.73	9703.79	84.43
Aug	24666.69	39015.12	4433.46	22399.65	7622.71	5941.07	10547.80	19554.70	79.28
Sep	39634.03	65632.35	12105.31	53639.54	24194.19	12105.31	16382.34	32860.34	82.91
Oct	46873.44	73757.23	19705.50	48193.08	30358.38	20799.13	27318.21	48199.12	102.83
Nov	37823.16	60367.33	18534.61	31036.07	19112.65	27546.80	28982.93	39452.53	104.31
Dec	25126.11	38888.95	10563.49	18469.21	10577.29	18251.65	20170.76	29293.36	116.59
	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)						LTA: Long-Term-Average			

4 Flash Flood in the Lower Mekong Basin

During 6-12 December 2022, the LMB was affected by two main weather factors. These include (i) moderate and high pressure with cold air mass covered the north part and (ii) the active northeast monsoon prevailed over the Gulf of Thailand. These conditions caused generally cool weather and heavy rainfall in the morning at some areas in the northern and north-eastern parts of the LMB.

According to the MRC-Flash Flood Guidance System (MRC-FFGS) and analysis, flash flood events were not detected during the reporting period over the LMB.

5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from 04 to 10 December 2022

Drought monitoring data for 2022 are available from Sunday to Saturday every week; thus, the reporting period is normally delayed by two 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)**

Similar to condition last week (Nov 27-Dec 3) Meteorological drought condition of the LMB from Dec 4 to 10, as shown in [Figure 11](#), was relatively wet in the middle and the south and normal in the north of the region. No meteorological drought was found during the monitoring week.

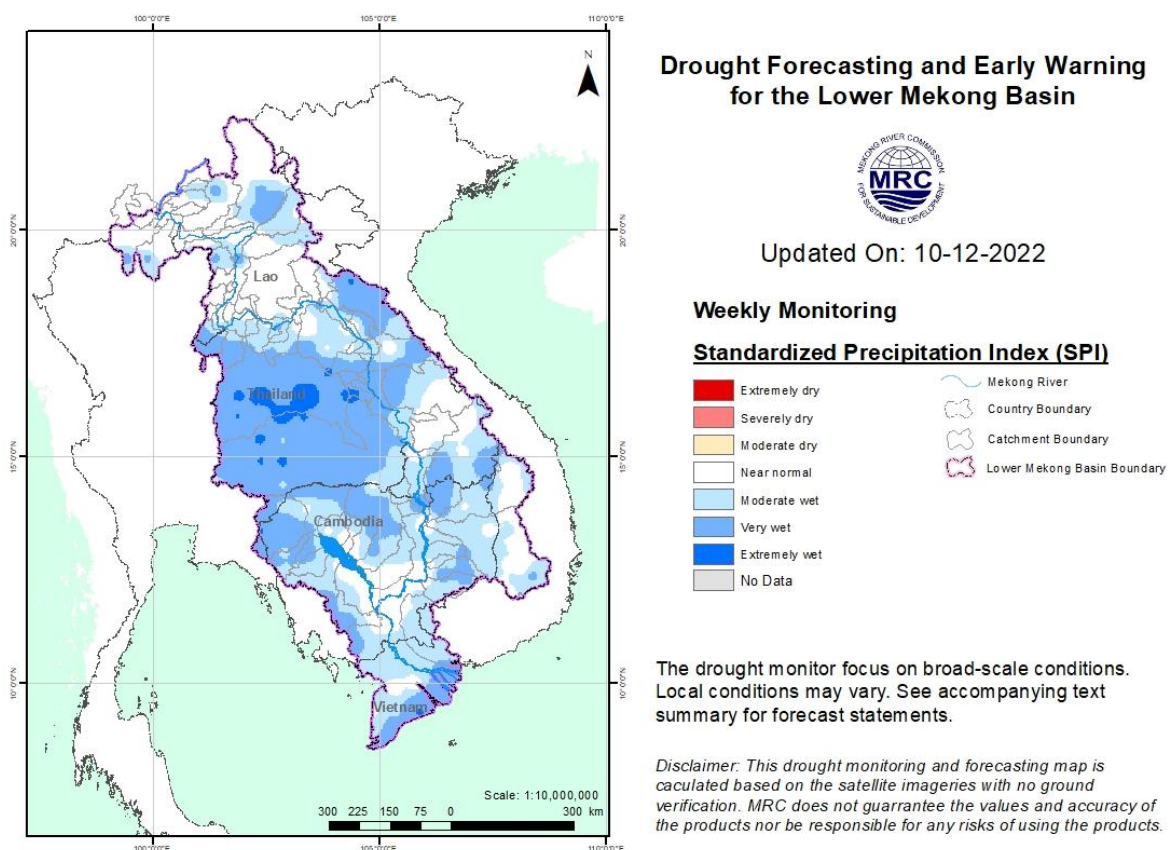


Figure 14: Weekly standardised precipitation index from December 4 to 10.

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

With relatively less rainfall in the northern and southern parts of the region, soil moisture condition from December 4 to 10, as displayed in [Figure 12](#), were severely dry in some areas in the north and south of the LMB. However, this condition is normal during dry season and is very much similar to the condition last week.

Note: The index of soil water fraction presents the current soil water fraction conditions compared with normal month; therefore, it normally shows extremely dry during dry season which is completely different from SPI that is standardized to its specific month of the years. However, this does not mean that the areas are threatened by agricultural drought as generally during transition period of wet and dry seasons and dry season only the irrigated areas are used for agricultural plantation.

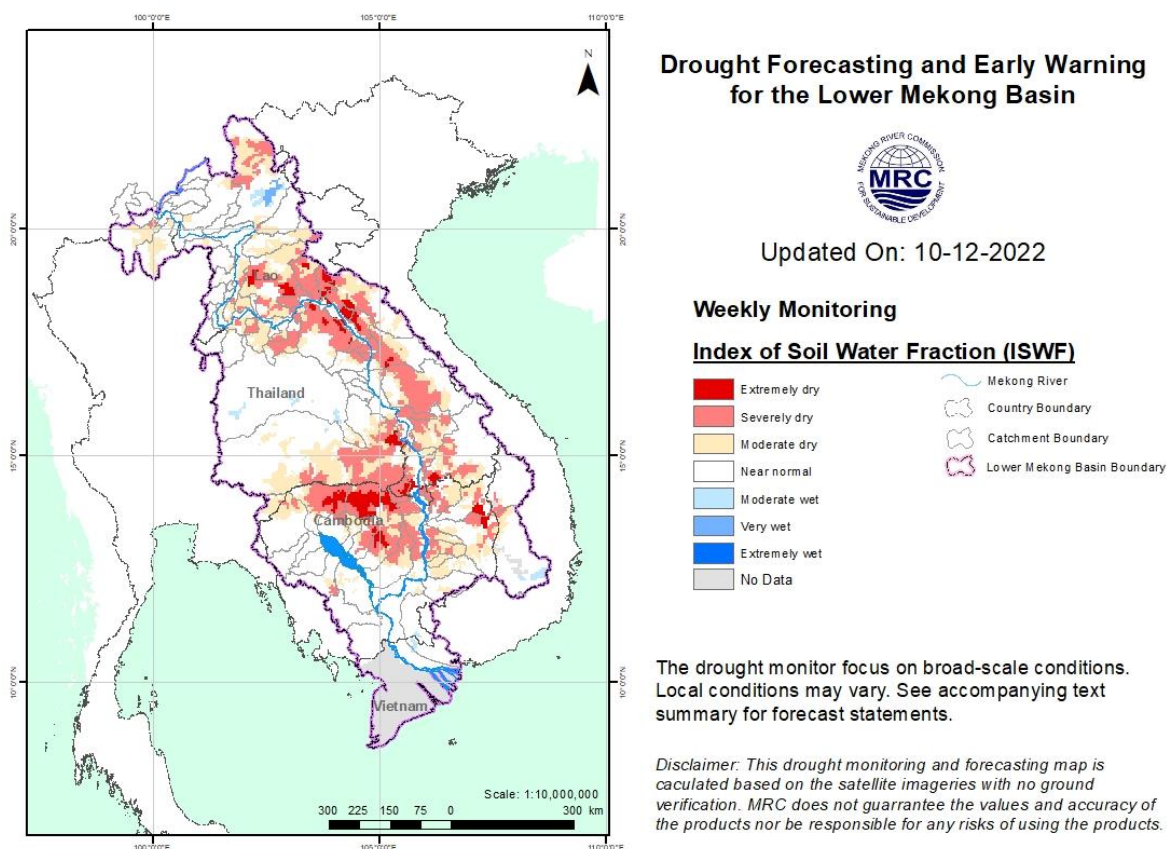


Figure 15: Weekly Index of Soil Water Fraction from December 4 to 10.

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

The combined drought indicator, as displayed in [Figure 13](#), reveals that during December 4-10 the LMB was at normal condition. With a much better soil moisture condition, the combined drought indicator show no drought threat, in overall, over the LMB.

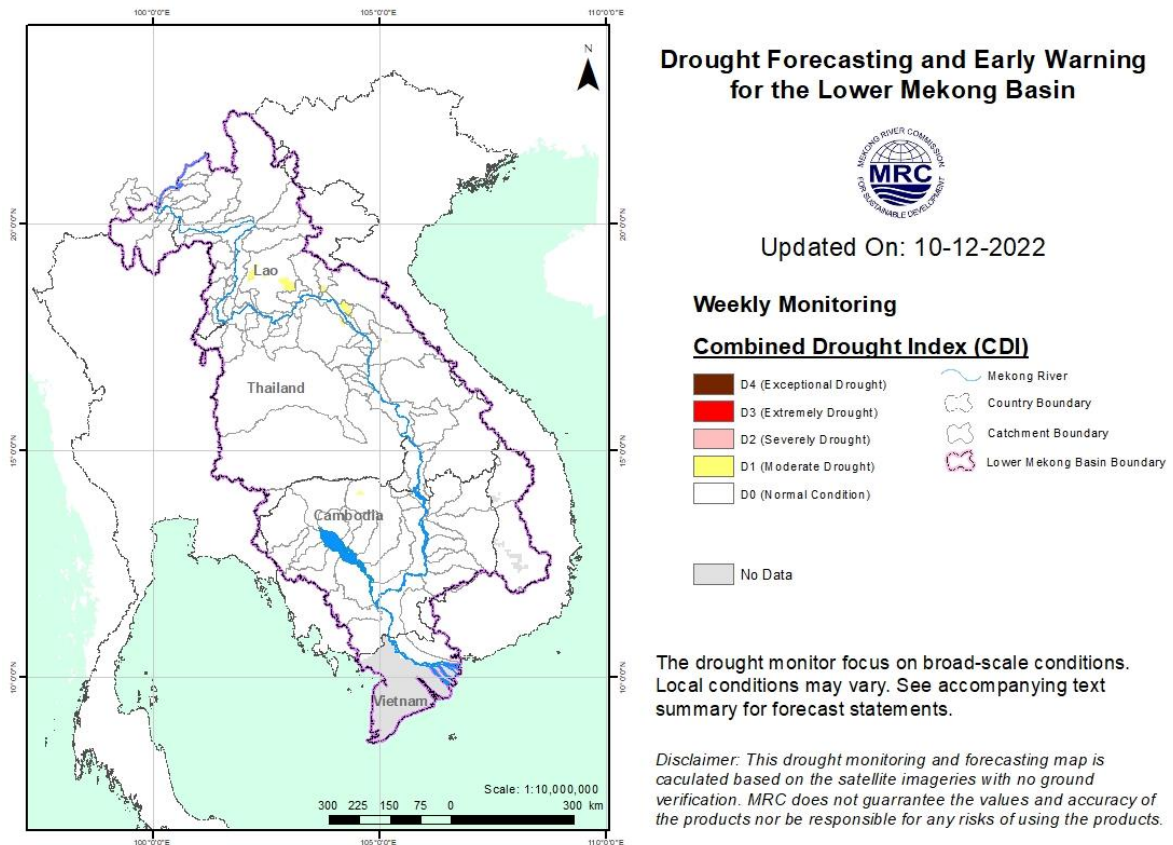


Figure 16: Weekly Combined Drought Index during November 27-December 3.

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.

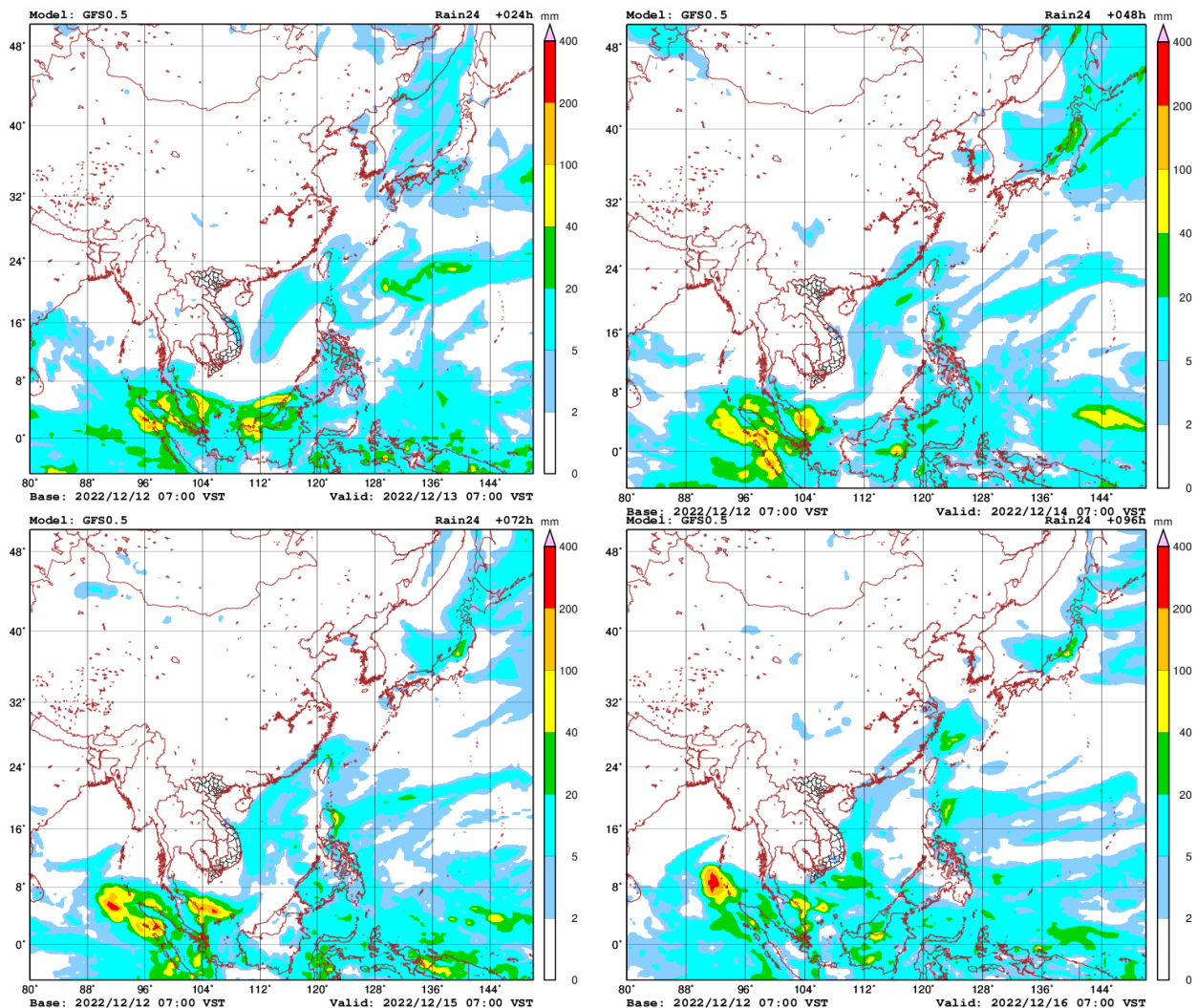
6 Weather and Water Level Forecast and Flash Flood Information

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, two main factors might affect the LMB. They include (i) moderate and high pressure area from China covers upper parts and (ii) the on-going prevailing Southwest Monsoon from the Gulf of Thailand to the lower part of the LMB.

During 13-19 December 2022, small rainfall (5-20 mm/24h) or no rain may occur in the LMB.

[Figure 14](#) shows accumulated rainfall forecast (24hrs) of the GFS model during 13-19 December 2022.



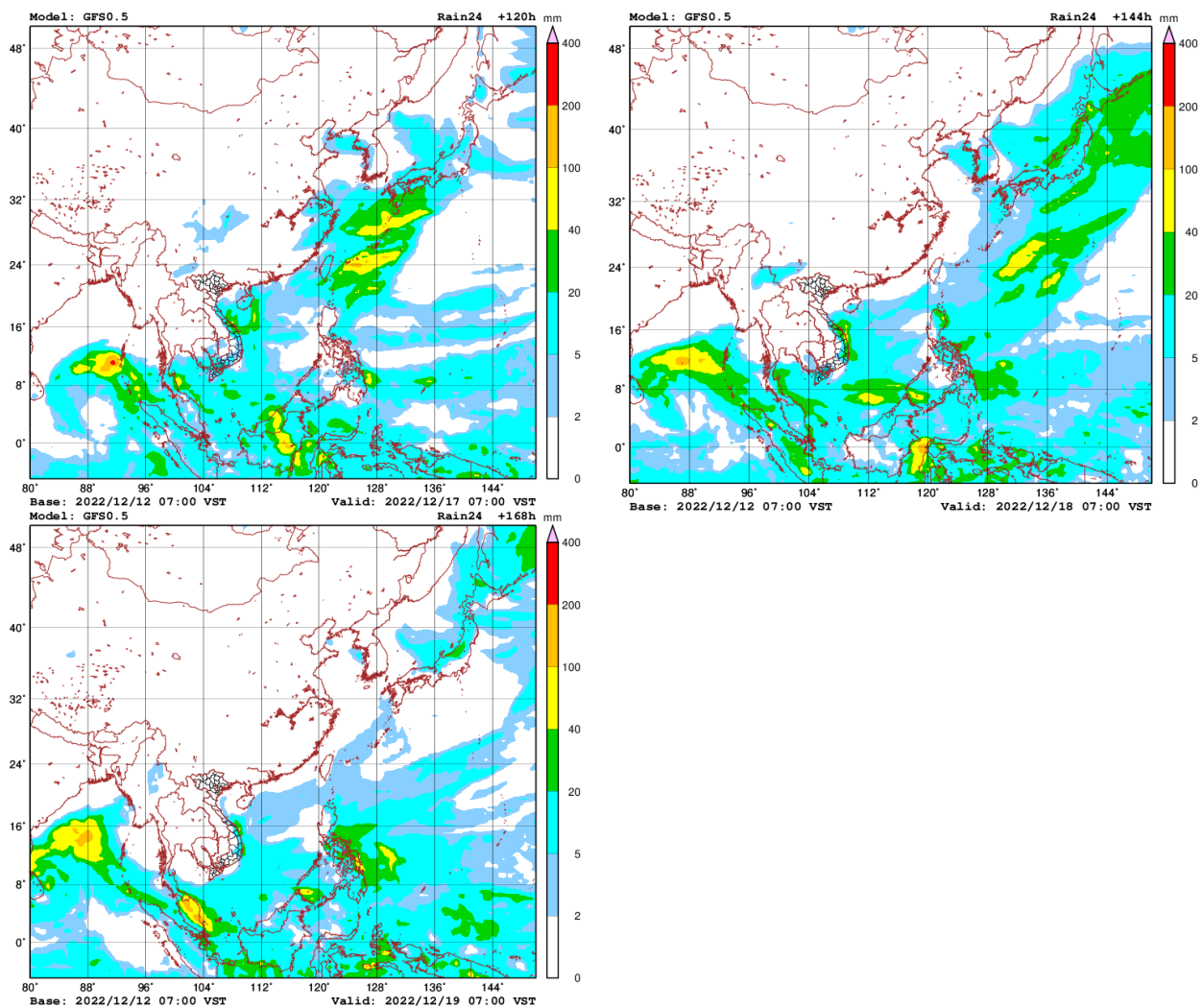


Figure 17: Accumulated rainfall forecast (24 hrs) of model GFS.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on December 12's weekly river monitoring bulletin, the weekly forecast water level at Chiang Saen in Thailand is expected to decrease from 2.23 m to 1.67 m in the next seven days. The trend of water levels at these stations will continue staying below their LTA.

For Luang Prabang in Lao PDR, the water level is likely decreasing about 0.15 m during the same period. The current water level is higher than its LTA value and about 0.54 m lower than its historical maximum value.

Chiang Khan, Vientiane-Nong Khai and Paksane

Water level at Chiang Khan station in Thailand is forecasted to be up about 0.03 m for the next seven days. However, from Vientiane in Lao PDR and Nong Khai in Thailand WLS will increase between 0.05 m and 0.12 m in the next seven days. At Paksane in Lao PDR, water level will increase about 0.11 m due to some effect of inflow from the upper catchments. No rainfalls

are forecasted in the area due to low pressure dominated in the upper sub-catchments. The water levels here will remain lower than their LTA.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR will increase between 0.01 m and 0.46 m in the next seven days. Water levels at these stations will stay lower than their LTA level, except at Khong Chiam and Pakse where the WLS are going to stay close to its LTA value. Next week below-average precipitation is forecasted in the area.

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 likely go down between 0.44 m and 0.64 m over the next seven days. Below-average rainfall 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 between 0.20 m and 0.50 m over the next seven days.

Water levels at most of the stations will continue to stay lower than their LTA value, particularly in the lower part of the region from the Bassac in Phnom Penh to Koh Khel as well as from Tonle Sap in Prek Kdam to Phnom Penh Port, including the Tonle Sap Lake. Moderate rainfall 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, water levels will be moving up and down between their LTA and Minimum values following daily tidal effects from the sea.

[Table 3](#) shows the weekly River Monitoring Bulletin issued on December 12. Results of the started weekly river monitoring bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php. Tables for weekly updated water levels and rainfall at the Key Stations are presented in **Annex A**.

6.3 Flash Flood Information

Flash flood events are not likely to happen in the LMB next week. However, local heavy rain in a short period of time might still be possible with unexpected short flash floods. During the dry season if extreme weather occurs, the information on flash flood guidance for the next one, three, and six hours is updated at <http://ffw.mrcmekong.org/ffg.php>.

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

6.4 Drought forecast

There are several climate-prediction models with different scenarios in the upcoming months until November 2022. The MRC’s DFEWS adopts an ensemble model called the North America Multi-Model Ensemble (NMME), which averages all scenarios, and downscales the forecasts to the regional level. The Viable Infiltration Capability (VIC) is then used to generate soil moisture and runoff for the whole basin.

[Figure 18](#) below shows the Combine Drought Indicator (CDI) forecast for November and December 2022 and January 2023. CDI is a combination of meteorological and agricultural indicators.

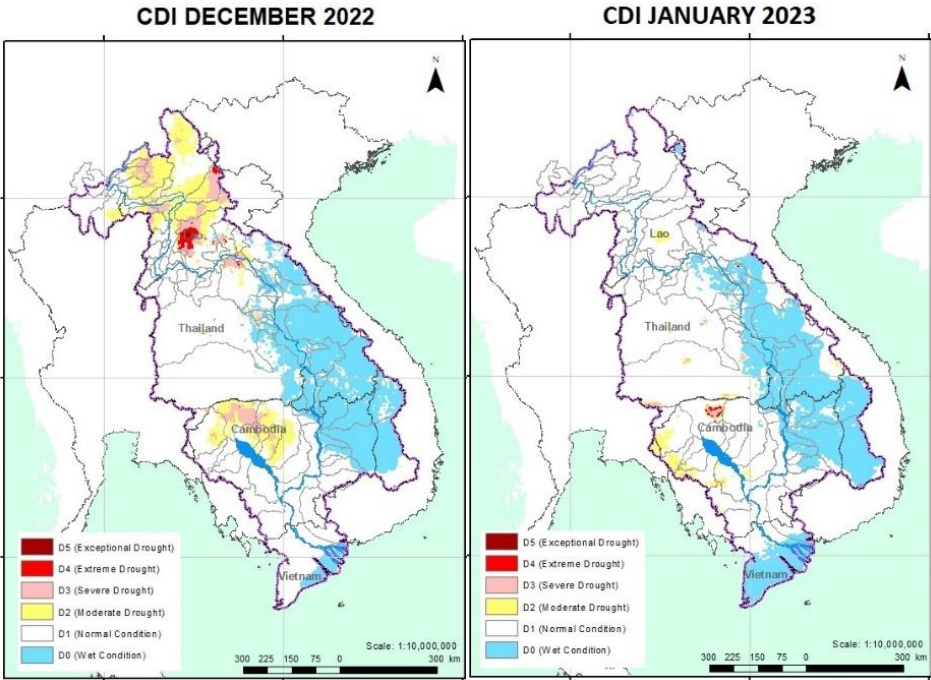


Figure 18. Monthly forecast of CDI for December 2022 and January 2023.

Figure 15 above shows that **December** is receiving below-average rainfall in the northern and southern parts covering **Chiang Rai, Payao, Bokeo, Phongsaly, Luangnamtha, Vientiane, Otdar Meanchey, Siem Reap, and Preah Vihea** with **moderate and severe droughts**. The forecast predicts that the eastern area is also extremely wet in December. While January 2023 is forecasted to be wet in the eastern part and normal in other places.

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: foodforecast@mrcmekong.org
 Forecast period from: 13 December to 19 December 2022

Date: 12 December 2022

LOCATION	Country	Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Min water level against zero gauge (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)							
					11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	
Jinhong		0.0	-	-	536.18	535.84								
Chiang Saen		0.0	357.110	0.00	1.93	2.23	2.37	2.22	2.05	1.93	1.74	1.70	1.67	
Luang Prabang		0.0	267.195	2.53	8.48	8.58	8.63	8.89	9.00	8.87	8.70	8.59	8.43	
Chiang Khan		0.0	194.118	1.91	4.90	4.82	4.76	4.83	5.05	5.12	5.03	4.92	4.85	
Vientiane		0.0	158.040	-0.28	2.44	2.38	2.27	2.17	2.23	2.45	2.53	2.42	2.30	
Nongkhai		0.0	153.648	0.33	1.83	1.84	1.76	1.66	1.85	2.05	2.12	2.02	1.90	
Paksane		0.0	142.125	0.10	2.62	2.62	2.60	2.55	2.47	2.60	2.75	2.80	2.73	
Nakhon Phanom		0.0	130.961	0.18	1.77	1.74	1.72	1.69	1.62	1.52	1.59	1.67	1.70	
Thakhek		0.0	129.629	1.38	3.18	3.05	2.97	2.92	2.73	2.66	2.72	2.80	2.85	
Mukdahan		0.0	124.219	0.72	2.05	2.05	1.93	1.85	1.80	1.62	1.55	1.60	1.69	
Savannakhet		0.0	125.410	-0.65	1.00	1.01	1.01	0.96	0.93	0.82	0.78	0.82	0.90	
Khong Chiam		0.0	89.030	1.02	2.95	2.88	2.83	2.70	2.58	2.50	2.30	2.22	2.30	
Pakse		0.0	86.490	0.03	1.88	1.78	1.74	1.65	1.60	1.56	1.40	1.35	1.41	
Stung Treng		nr	36.790	0.32	3.27	3.21	3.11	3.08	3.00	2.97	2.94	2.80	2.77	
Kratie		nr	-1.080	3.06	8.91	8.74	8.60	8.46	8.40	8.31	8.27	8.23	8.10	
Kompong Cham		nr	-0.930	0.65	4.88	4.74	4.63	4.52	4.41	4.37	4.30	4.27	4.25	
Phnom Penh (Bassac)		nr	-1.020	1.58	4.14	4.05	3.98	3.92	3.85	3.83	3.80	3.78	3.77	
Phnom Penh Port		-	0.000	0.14	3.14	3.05	2.97	2.91	2.84	2.82	2.80	2.77	2.75	
Koh Khel		nr	-1.000	1.52	4.00	3.92	3.85	3.79	3.75	3.74	3.73	3.72	3.71	
Neak Luong		nr	-0.330	0.81	3.12	3.05	2.99	2.94	2.89	2.84	2.80	2.76	2.72	
Prek Kdam		nr	0.080	0.58	4.53	4.42	4.34	4.27	4.21	4.18	4.15	4.13	4.12	
Tan Chau		nr	0.000	-0.37	1.92	1.71	1.56	1.47	1.40	1.35	1.31	1.27	1.24	
Chau Doc		nr	0.000	-0.60	2.00	1.77	1.57	1.46	1.38	1.32	1.27	1.23	1.20	

REMARKS:

-: not available.
 *: reference stations without forecast.
 nr: no rain.

River Flood Forecaster

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

This week, less rainfall was observed over the Mekong region. From Chiang Saen station down to the lower part at Tan Chau and Chau Doc in Viet Nam rain varied from 1.00 mm to 10.50 mm. The highest rainfall was 10.50 mm recorded at Chaktomuk in Phnom Penh, Cambodia during this reporting week. Compared with last week's amount, the rainfall this week was considered lower in the Mekong region.

Based on the forecasted rainfall from satellite using GFS data, rainfall is likely to take place in the areas from the lower part of Cambodia to the 3S area and Mekong Delta in Viet Nam during December 13-24, varying from 0.05 mm to 20.00 mm. This indicates that the dry season has been started in the LMB.

7.2 Water level and its forecast

The MRC's observed water level (WL) at Jinghong showed an increased value about 0.60 m from 535.24 m to 535.84 m between 06 and 12 Dec 2022. The outflow increased from 827.00 m³/s to 1210.00 m³/s between 06 and 12 Dec 2022.

Water levels in the lower part of the monitoring locations in the LMB during this reporting week were increasing from Chiang Saen to Chiang Khan in Thailand. Water levels at Vientiane, Nong Khai, and Paksane decreased and stayed lower than their LTA value. Water levels from Nakhon Phanom down to Pakse were staying lower than their LTA value. Water levels from Stung Treng to Kratie were staying close to their LTA level, considered normal. At Kompong Cham, Chaktomuk, Prek Kdam and Koh Khel in Cambodia, water levels dropped lower than their LTA level. Water levels at Prek Kdam in Cambodia were slightly lower than their LTA level. The low level was due to low inflows from upstream and less rainfall in the region from 06 to 12 December 2022. Generally, this week's water levels were relatively lower than those of last week from the upper to the lower part of the LMB.

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

From Stung Treng to Kompong Cham, the water levels will continue to go down. 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 stay below their LTA.

The situation in Tan Chau on the Mekong River and Chau Doc on the Bassac River is expected to remain fluctuating. In Tan Chau and Chau Doc, the fluctuation of water levels was lower than its LTA level, which **considered critical**.

Since the third week of September 2022, water levels across most monitoring stations in the LMB have increased due to the above-average rainfall but still staying lower than their LTA

value (from middle to lower stretches within the LMB). The preliminary analysis of the hydrological conditions in the LMB over July–December 2020 and November 2020 to May 2021 was done as [Situation Report](#), which can be used as reference for the trend of water level and flows of the Mekong River Basin.

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 of rainfall for the coming week as mentioned earlier in [section 6.1](#), major flash floods are not likely to happen in the LMB.

7.4 Drought condition and its forecast

During December 4-10, the LMB was at normal condition. With a much better soil moisture condition, the combined drought indicator show no drought threat, in overall, over the LMB.

For the coming two months, **December** is receiving below-average rainfall in the northern and southern parts covering **Chiang Rai, Payao, Bokeo, Phongsaly, Luangnamtha, Vientiane, Otdar Meanchey, Siem Reap, and Preah Vihea** with **moderate and severe droughts**. The forecast predicts that the eastern area is also extremely wet in December. While January 2023 is forecasted to be wet in the eastern part and normal in other places.

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

Table A1: Weekly observed water levels

2022	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
06-12-2022	535.24	2.07	8.98	4.70	2.74	2.08	2.92	1.93	3.24	2.25	1.02	3.34	2.18	3.55	9.24	5.08	4.30	3.33	4.09	3.25	4.78	1.94	2.00
07-12-2022	535.23	2.00	8.84	4.73	2.70	1.80	2.83	1.85	3.20	2.16	1.02	3.26	2.14	3.47	9.26	5.06	4.29	3.30	4.08	3.27	4.72	2.00	2.05
08-12-2022	535.22	2.00	8.80	4.86	2.66	1.71	2.66	1.80	3.21	2.12	1.01	3.22	2.10	3.45	9.15	5.04	4.26	3.29	4.08	3.22	4.67	1.92	2.00
09-12-2022	535.22	1.99	8.80	4.90	2.58	1.76	2.58	1.72	3.18	2.08	1.01	3.10	1.94	3.46	9.10	4.96	4.24	3.24	4.04	3.15	4.62	1.96	2.03
10-12-2022	535.84	1.97	8.75	4.82	2.52	1.85	2.60	1.73	3.18	2.03	1.00	2.87	1.86	3.35	9.09	4.92	4.21	3.19	4.02	3.12	4.56	1.97	2.03
11-12-2022	536.18	1.93	8.48	4.90	2.44	1.83	2.62	1.77	3.18	2.05	1.00	2.95	1.88	3.27	8.91	4.88	4.14	3.14	4.00	3.12	4.53	1.92	2.00
12-12-2022	535.84	2.23	8.58	4.82	2.38	1.84	2.62	1.74	3.05	2.05	1.01	2.88	1.78	3.21	8.74	4.74	4.05	3.05	3.92	3.05	4.42	1.71	1.77

Table A2: Weekly observed rainfall

2022	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
06-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5.1	7.3	0	0	0
07-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8		0	0	0	1.4	0.2
08-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.7		0	0	1	0	4
09-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
10-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
11-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
12-12-2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
Sum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5		5.1	7.3	1.0	1.4	4.2



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