



Mekong River Commission

**Weekly Dry Season Situation Report in
the Lower Mekong River Basin
15-21 November 2022**

Prepared by
The Regional Flood and Drought Management Centre
22 November 2022

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Key Messages

Key messages for this weekly report are presented below.

Rainfall and its forecast

- During November 15-21, rainfall was observed over the Mekong region, varied in between 1.30 mm to 104.40 mm.
- There will be moderate rain for the next 7 days over the Mekong region from 23 to 29 November 2022 due to low-pressure line dominating the Mekong region.

Water level and its forecast

- The MRC's observed water level at Jinghong showed an increase of about 0.10 m from 535.80 m on 5 Nov to 535.90 on 21 Nov 2022. The outflow was up from 1,180.00 m³/s on 15 Nov to 1,250.00 m³/s on 21 Nov 2022.
- Along with the increased outflow from Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand also increased about 0.23 m during the report period and stayed 0.54 m below its LTA and was close to its minimum value, considered low water level. WLs at the monitoring stations from Chiang Khan in Thailand to Vientiane in Lao PDR decreased about 0.18 m and 0.61 m, staying about 1.04 m and 0.79 m below their LTA value respectively. The current WL from Nong Khai in Thailand to Paksane in Lao PDR are about 1.62 m and 1.63 m lower than their LTA level, which considered low water levels. WL from Thailand's Nakhon Phanom to Mukdahan increased from 0.03 m to 0.09 m, while from Savannakhet to Pakse in Lao PDR decreased from 0.07 m to 0.40 m and continued staying below their LTA level. The current WL at Savannakhet is slightly higher than its minimum level, which considered critical. 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 21 Nov 2022 was about 0.11% higher than its LTA during the same period from 15 to 21 November 2022, and still 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 lower than 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 October November 13 to 19 the LMB was facing some moderate and severe droughts mainly in the northern and southern parts of the LMB covering **Phongsaly, Xiengkhuang, Xaysomboun, Vientiane, Borikhamxay, Khammuane, Savannakhet, Saravane, Champasack, Attapeu, Si Saket, Ubon Ratchathani, Ordar Meanchey, Siem Reap, Preah Vihea, Stung Treng, Ratanakiri, Mondulkiri, Kratie, Pursat, Battambang,**

and Kampong Thom due to severely dry soil moisture which is normal during dry season; thus, this is not considered as drought threat for the LMB.

- For the coming three months, November is generally wet with the wettest areas in the eastern part. While **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. Similar to November, 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 **08-14 November 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 end of October 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 of 21 November 2022, indicating that a low-pressure cell was active in the South-Sea of Viet Nam. This low-pressure cell will still be active for the whole week which will cause light to moderate rainfall over the LMB.

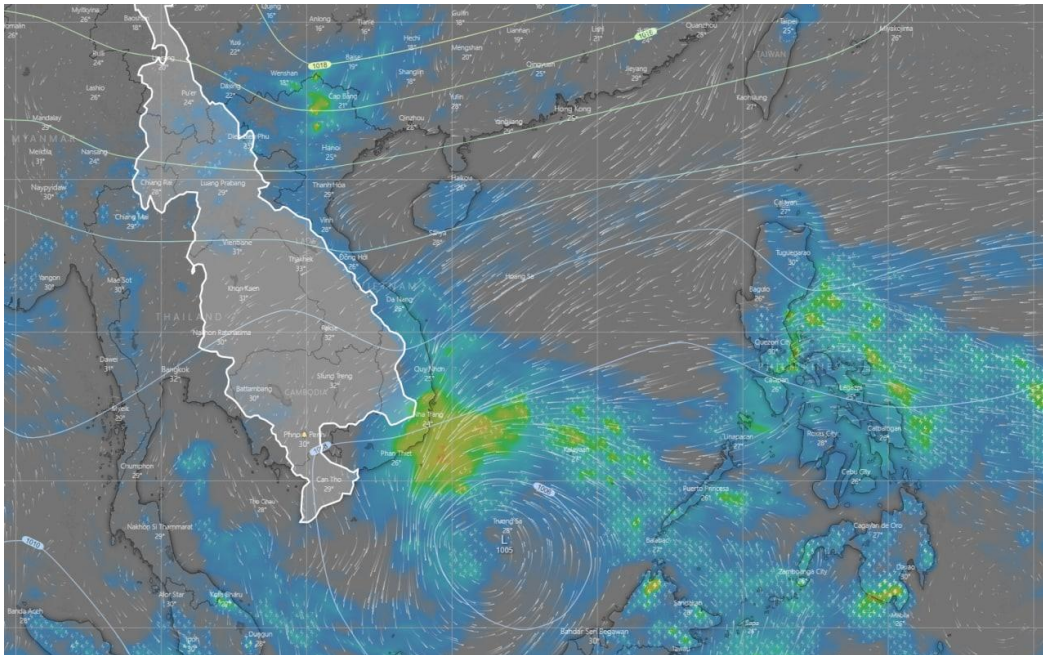


Figure 1: Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), a highest probability of warm and wet conditions is predicted over of the lower part of the Mekong region covering Lao PDR and Thailand from 14 to 27 November 2022, during the 1st and 3rd weeks of November. **Figure 2** shows the outlook of weather condition from 14 to 27 November 2022 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

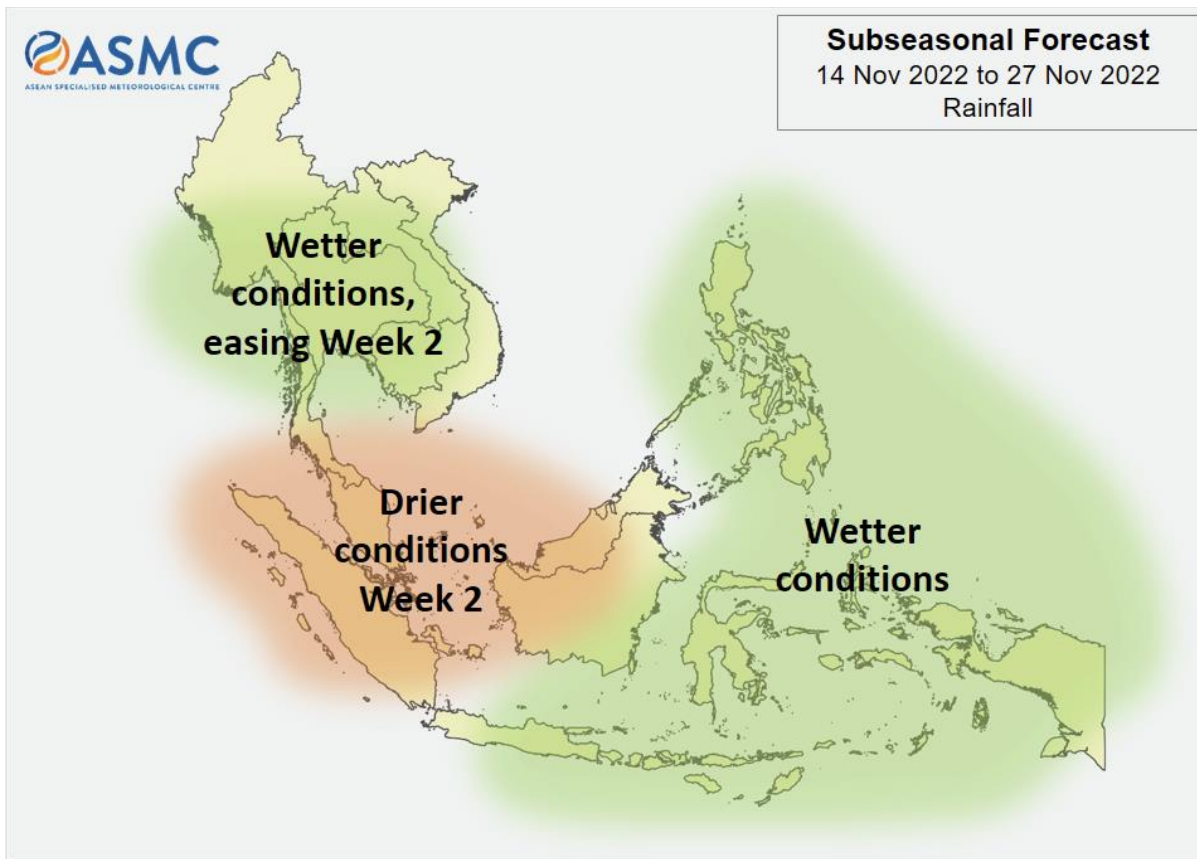


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

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

There was tracking storm covering the LMB during 15-21 November 2022, showing no low-pressure line over the LMB. No movement of storm was detected over Viet Nam, as displayed in [Figure 3](#).

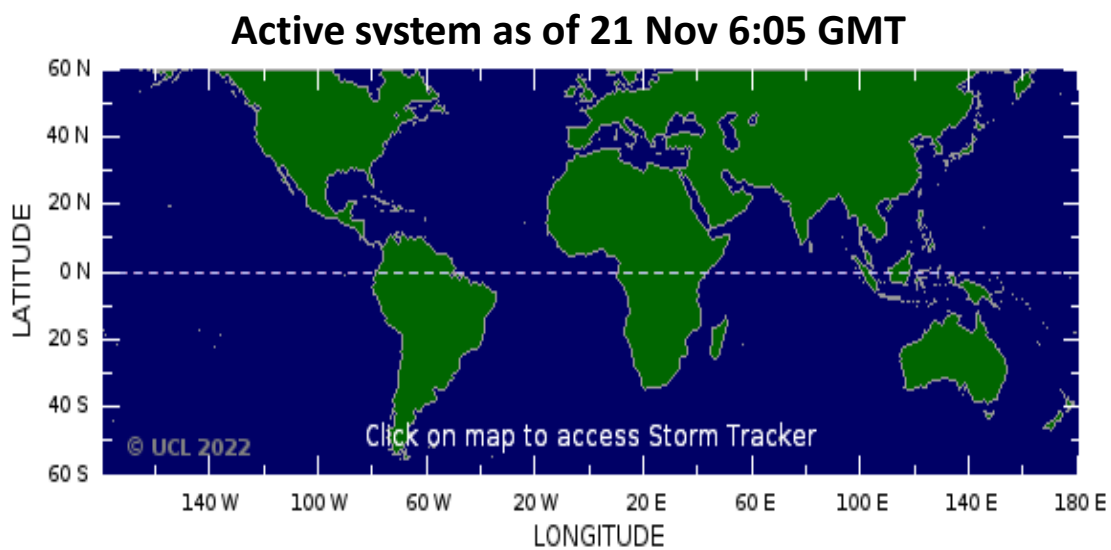


Figure 3: No tropical storm risk observed on 21 November 2022.

Rainfall patterns over the LMB

This week from 15 to 21 November 2022, rainfall was observed at Chiang Sean and at the lower part from Kratie in Cambodia to Tan Chau and Chau Doc in Viet Nam of the Lower Mekong Basin. The rainfall at Chiang was about 104.20 mm, while the lower part varied from 1.30 mm to 46.40 mm. The highest rainfall of this week report was at Chiang Saen in Thailand which reached up to 104.20 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 higher, compared with its LTA and last week rainfall in some of the key stations.

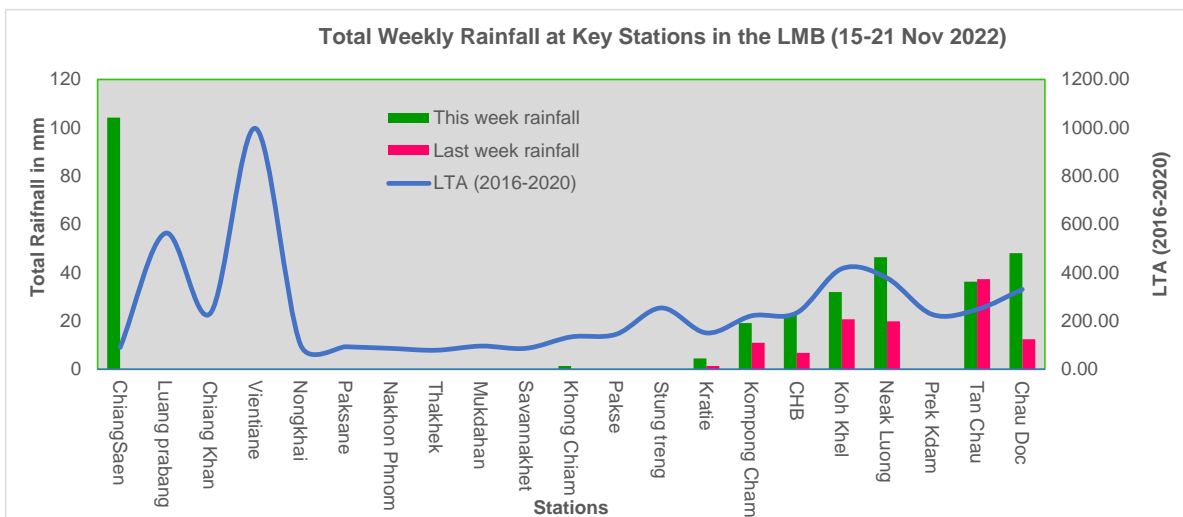


Figure 4: Weekly total rainfall at key stations in the LMB.

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 15 to 21 November 2022.

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

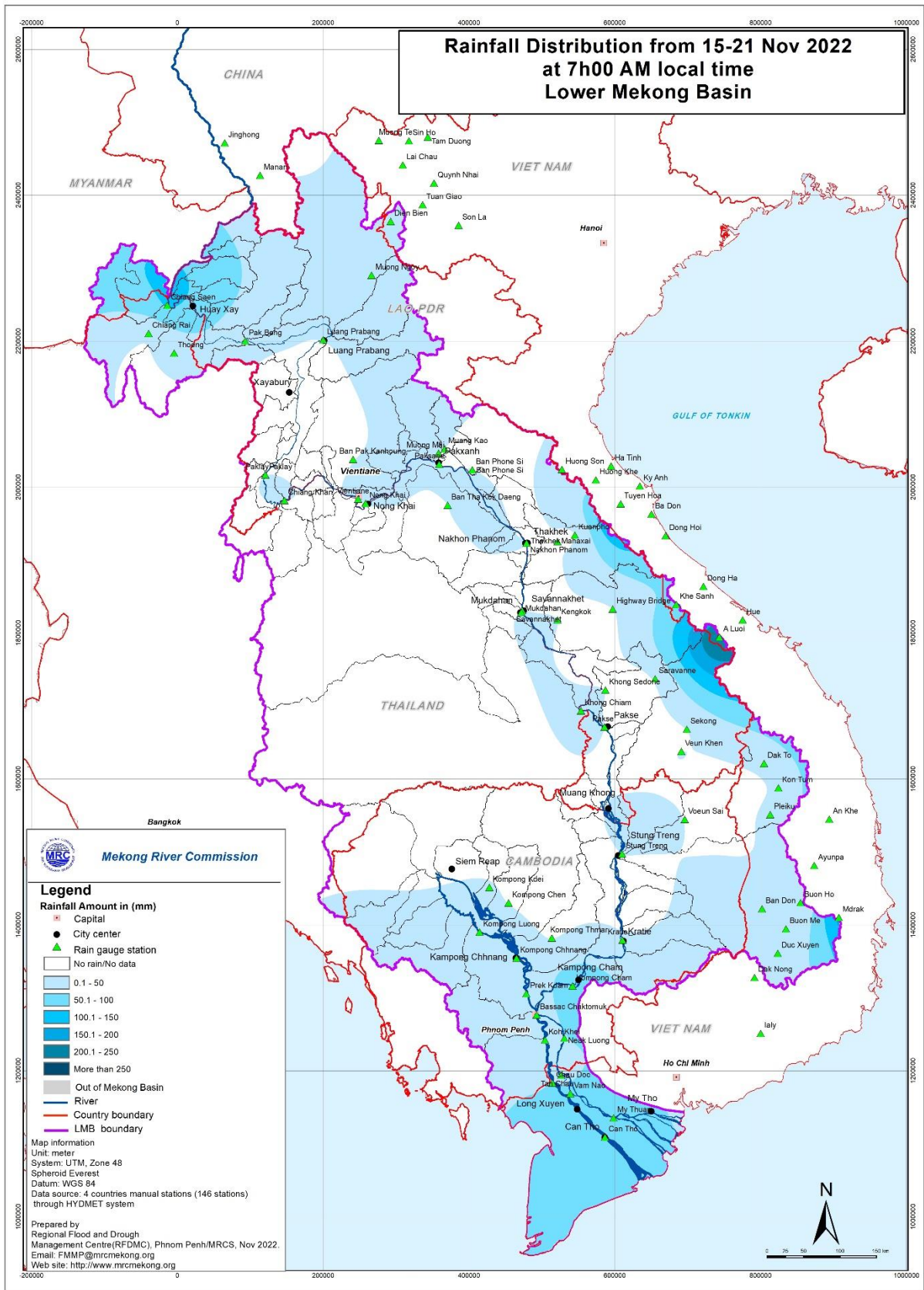


Figure 5: Weekly rainfall distribution over the LMB.

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**.

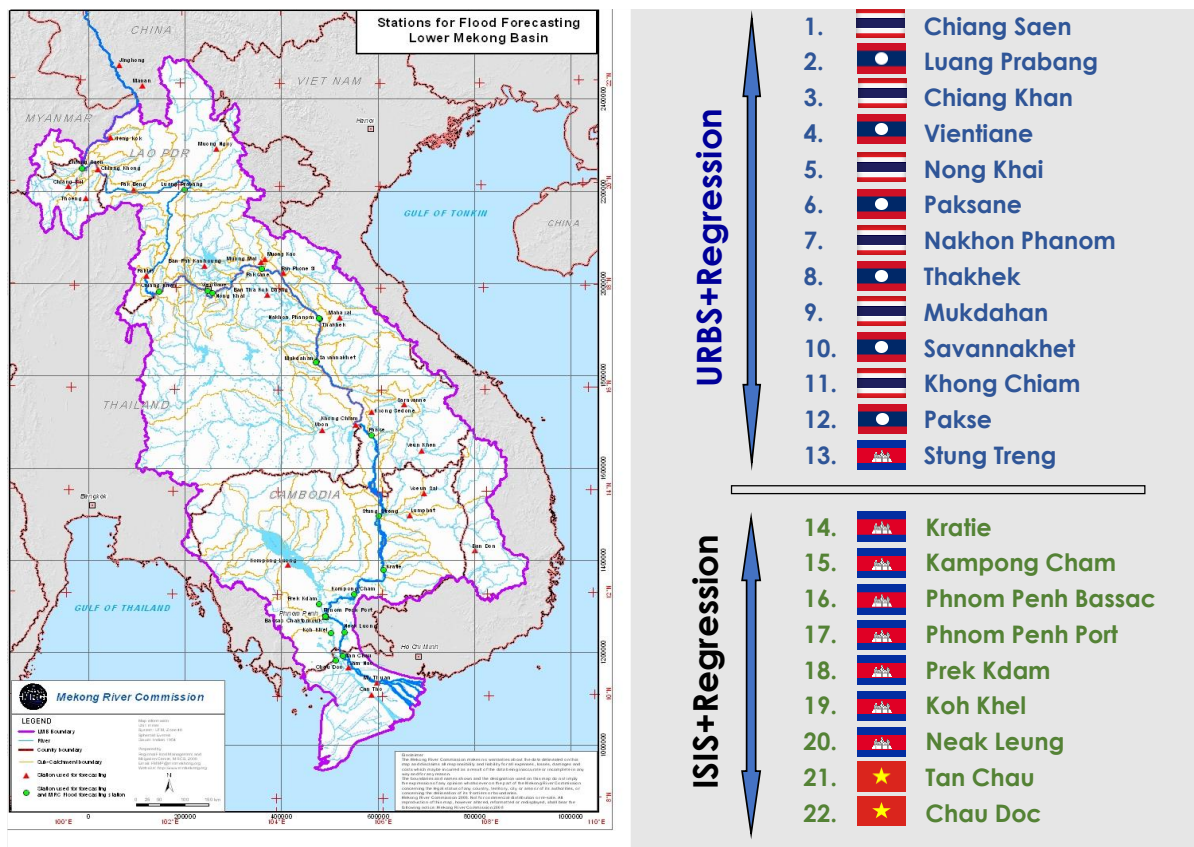


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

The MRC’s observed water level (WL) at Jinghong showed an increase of about **0.10 m from 535.80 m on 15 Nov to 535.90 on 21 Nov 2022 (recorded on 7:00 am)**. The outflow was up from 1,180.00 m³/s on 15 Nov to 1,250.00 m³/s on 21 Nov 2022.

[Figure 7](#) below presents water level that increased at the Jinghong hydrological station¹, indicating the trend of fluctuating water level up to 21 November 2021.

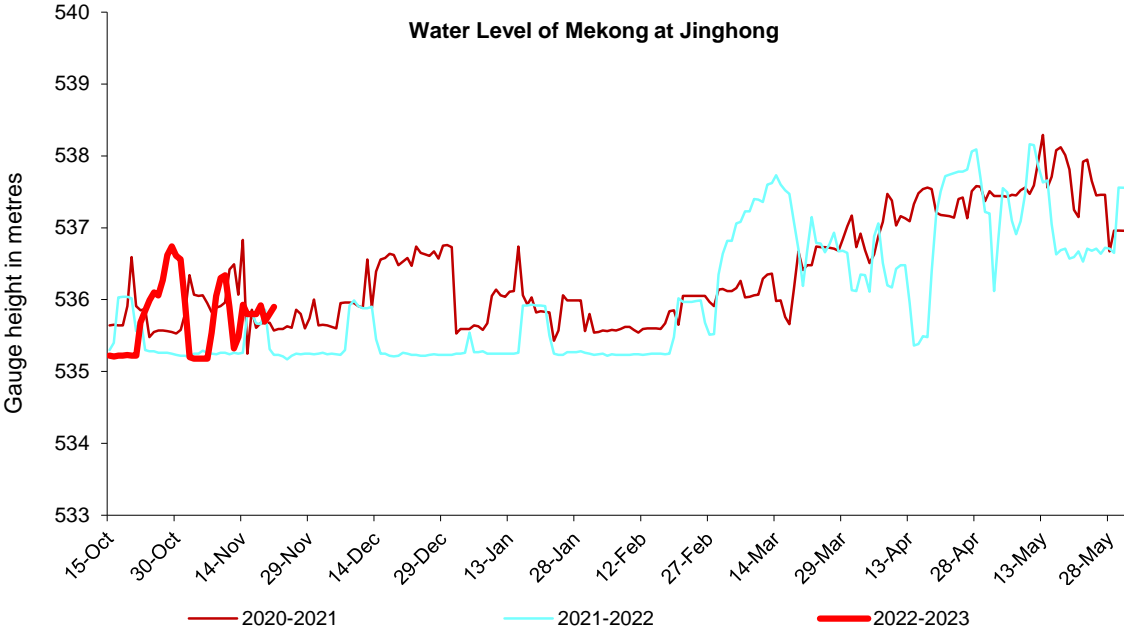


Figure 7. Water level at the Jinghong hydrological station during to 21 Nov 2022.

Along with the increased outflow from Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand increased about 0.23 m from 15 to 21 November 2022 and stayed about 0.54 m lower than its long-term average (LTA), which considered low water level. WLs at the monitoring stations from Chiang Khan in Thailand decreased 0.18 m and stayed 1.04 m below its LTA, while at Vientiane in Lao PDR decreased about 0.61 m and stayed about 0.79 m below its LTA value. The current WLs from Nong Khai in Thailand decreased 0.01 m and stayed 1.62 m and at Paksane in Lao PDR it increased about 0.07 m and stayed 1.63 m lower than its LTA value considered low water level. Water levels from Nakhon Phanom to Mukdahan in Thailand increased from 0.01 m to 0.09 m, which still considered low water levels. WL from Savannakhet Pakse in Lao PDR decreased between 0.07 m and 0.40 m. WLs at Savannakhet was 0.08 m higher than its historical minimum level which considered critical. 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). They showed about 0.22 m and 0.87 m lower than their LTA level at Stung Treng and Kratie respectively, considering low water levels. At Kompong Cham, the WL was down about 0.77 m, staying about 1.27 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 November 15-21 at Thailand’s Chiang Saen increased from 2.30 m to 2.53 m, staying about 0.54 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 9.22 m to 8.98 m, during the reporting period. Compared to last week, the figure shows it is up by about 0.28 m. The water level at this station was 1.93 m higher than its LTA 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.**

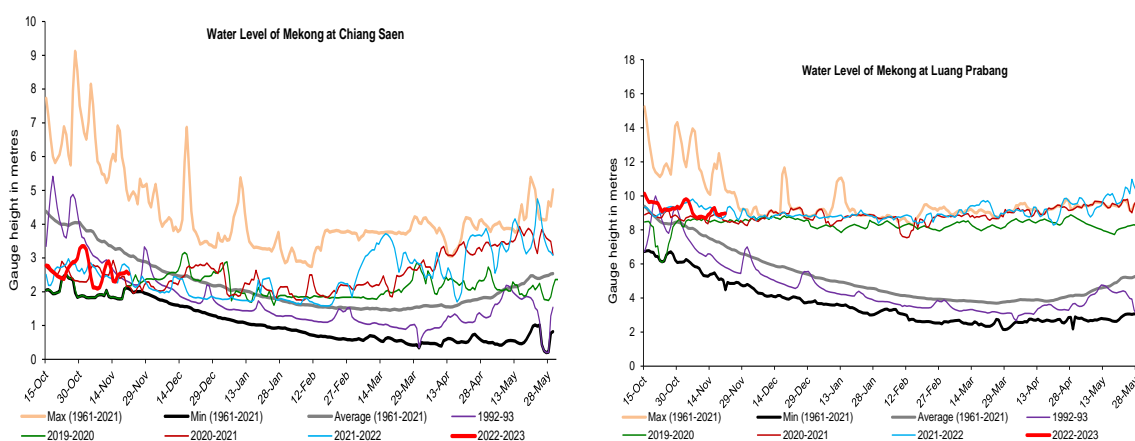


Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) decreased about 0.18 m, during the reporting week. It showed 1.04 m lower than its LTA. Furthermore, water level downstream at Vientiane in Lao PDR decreased from 3.46 m to 2.85 m and was about 0.79 m lower than its LTA during 15-21 November 2022. At Nong Khai station in Thailand, the water level was stable during the reporting period. It varied from 2.68 m to 2.52 m and showed 1.62 m lower than its LTA value, **which considered low water level**. At Paksane in Lao PDR, water levels increased about 0.07 m, from 3.12 m to 3.19 m. The recently decreased and increased water levels were obvious due to inflow from upstream, some rainfalls in the sub-catchment area and water released from upstream. The water levels at Vientiane and Paksane are shown in [Figure 9](#) below.

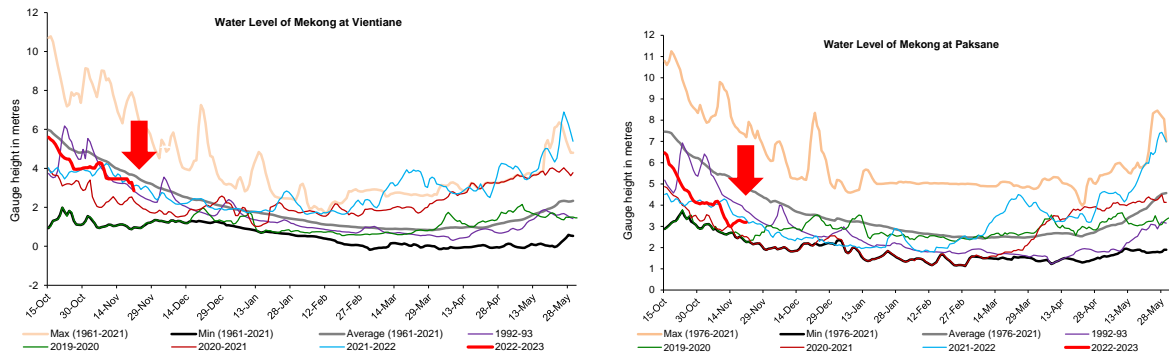


Figure 9. Water levels Veintiane and Paksane in Thailand and Lao PDR.

Nakhon Phanom to Pakse

Similarly, water levels from Nakhon Phanom to Mukdahan in Thailand increased between 0.01 m and 0.09 m, during the reporting period, while from Savannakhet to Pakse in Lao PDR decreased between 0.07 m and 0.40 m. **Water levels at these stations were staying below their LTA level.** The current WL at Savannakhet is staying about 0.08 higher than its historical minimum level, **which considered critical.** [Figure 10](#) shows the water levels at Nakhon Phanom and Pakse stations.

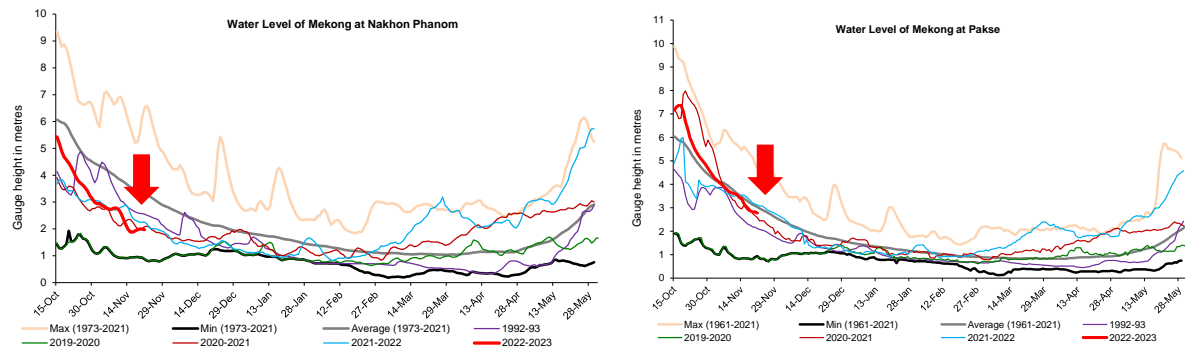


Figure 10: Water levels at Nakhon Phanom and Savannakhet of Thailand and Lao PDR.

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 15-21 November 2022. This week water level from Stung Treng to Kratie decreased about 0.45 m and 0.87 m, respectively. Water levels at Stung Treng and Kratie are staying about 0.22 m and 0.64 m lower than their LTA value respectively, while water level at Kompong Cham was about 1.27 m below their LTA (as showed in [Figure 11](#)).

This week, the Water levels at Stung Treng, Kratie and Kompong Cham were lower to their LTA, which considered low water levels.

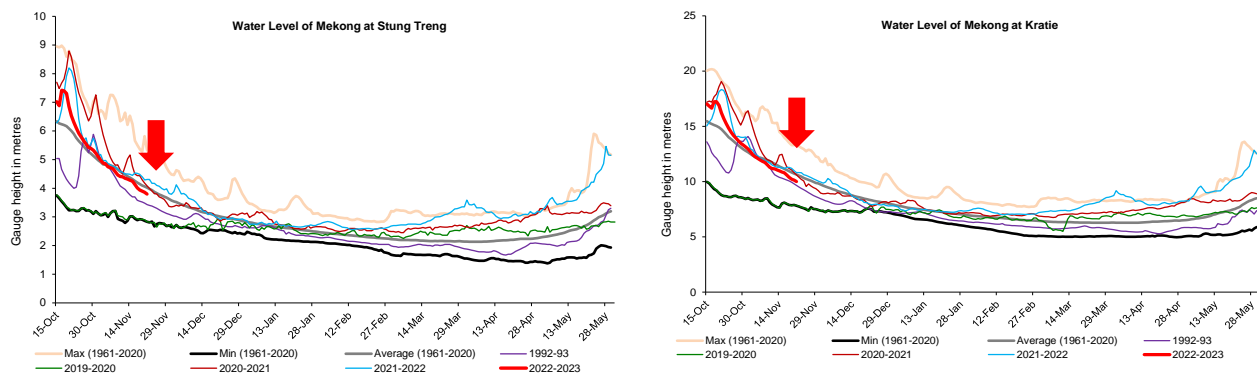


Figure 11: Water levels at Stung Treng and Kratie on the Mekong River.

At Chaktomuk on the Bassac River, due to less contributed flows from upstream catchment, the water level was down by about 0.68 m and stayed 1.31 m lower than its LTA value; while at Koh Khel, water level decreased about 0.55 m, staying 0.58 m lower than its LTA value. The water level at Prek Kdam on the Tonle Sap Lake decreased about 0.47 m and was about 0.12 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 15 to 21 November 2022 at Viet Nam's Tan Chau and Chau Doc were fluctuating between their LTA and minimum values due to daily tidal effects from the sea. The fluctuation levels were between 1.94 m and 2.05 m. In Tan Chau and Chau Doc, the fluctuation of water levels at these stations were lower than its LTA level, which **considered critical.**

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 November 21 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 early outflow of 2022 is also 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 21 November 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 November 21, **the water volume of the Tonle Sap Lake was higher than its LTA (11% higher) 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.

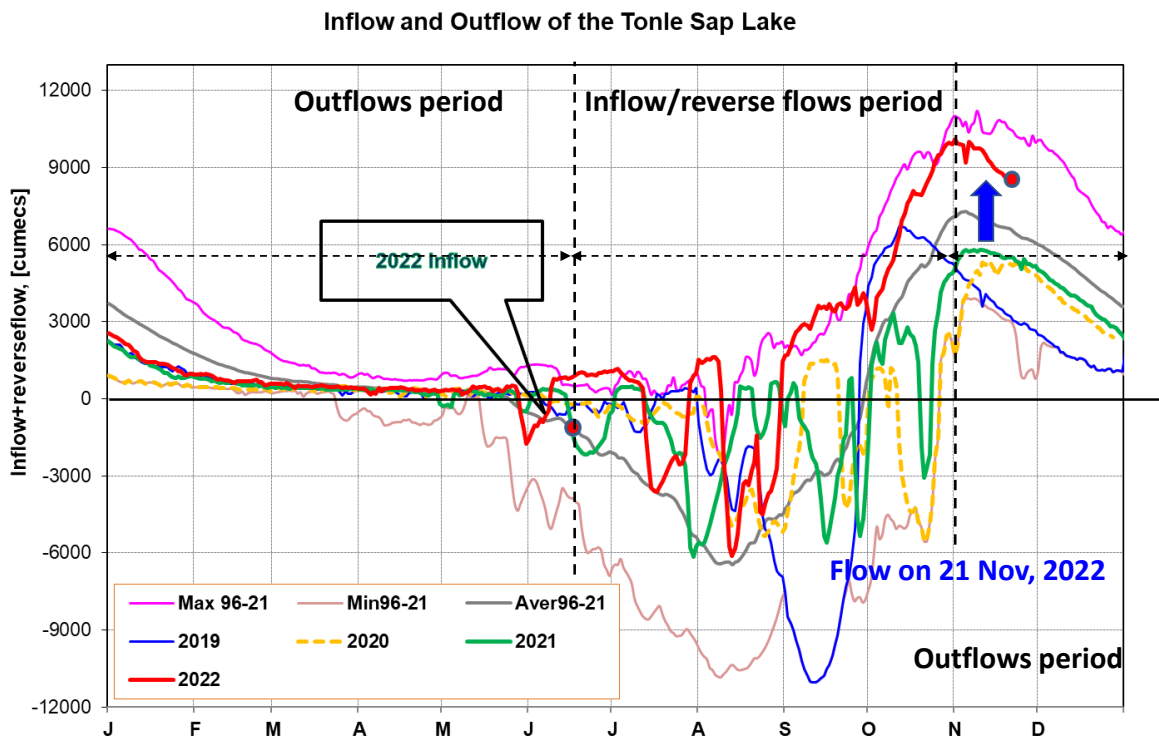


Figure 12: Seasonal change of inflows and outflows of Tonle Sap Lake.

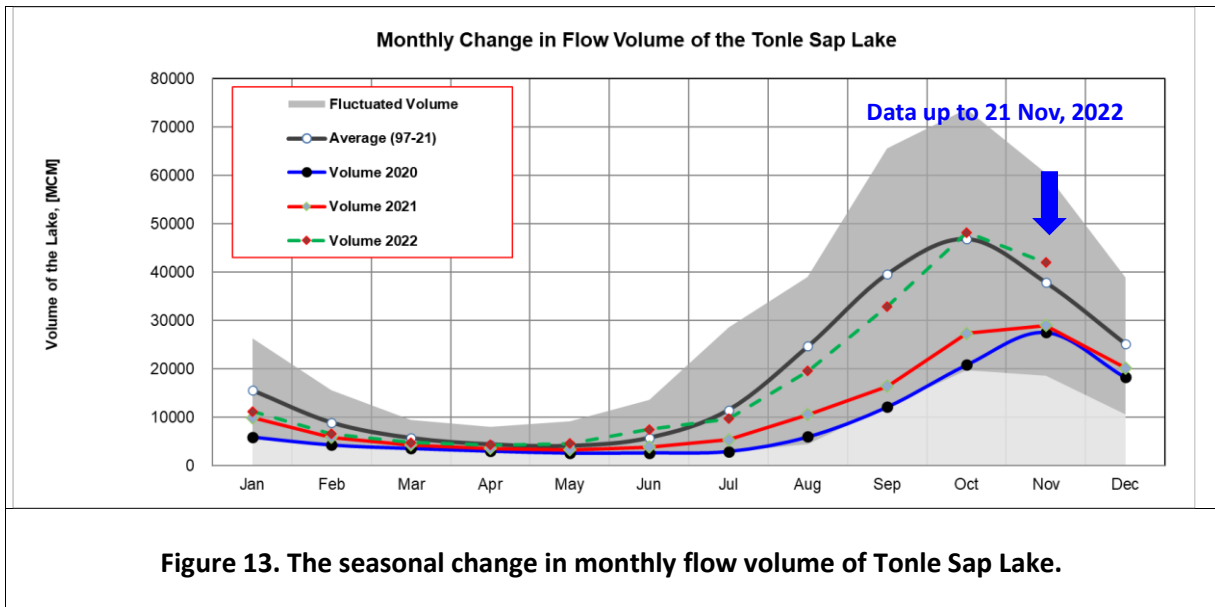


Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.

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 | 41931.10 | 110.86 |
| 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) | | | | | | LTA: Long-Term-Average | | | |

4 Flash Flood in the Lower Mekong Basin

During 15-21 November 2022, the LMB was affected by two main weather factors. These include (i) active low-pressure cell covered coastal areas of lower Viet Nam and Cambodia and (ii) the active northeast monsoon prevailed over the Gulf of Thailand. These conditions caused generally cool weather in the morning 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 06 to 12 November 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)**

Meteorological drought condition of the LMB from November 13 to 19, as shown in [Figure 11](#), was normal in most parts of the region except **Banteay Meanchey, Battambang, Pursat, Kampong Speu, Kampong Chhnang, Kampong Thom, Kratie, Stung Treng, Preah Vihea, Ratanakiri, and Champasack** in the north of the LMB was at moderate drought due to below average rainfall. No severe meteorological drought threat was found.

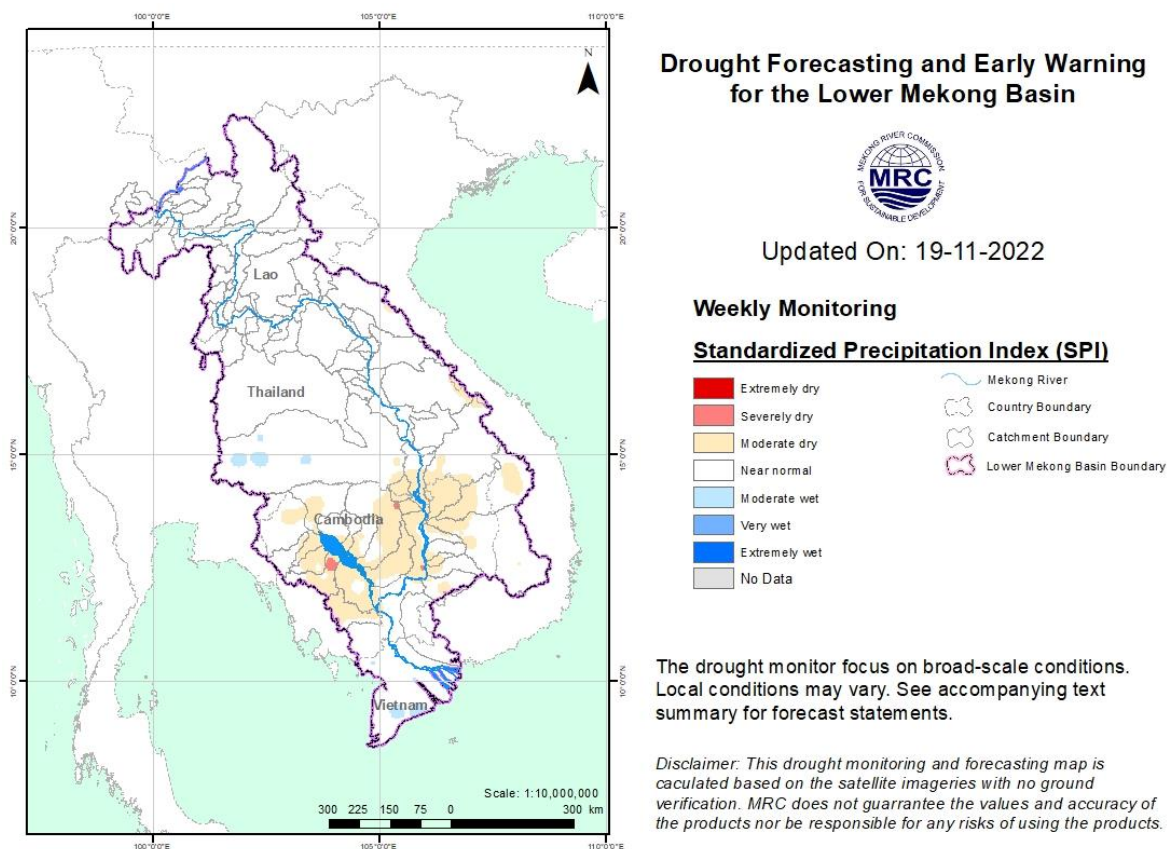


Figure 14: Weekly standardised precipitation index from November 13 to 19.

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

With relatively less rainfall in the northern and southern parts of the region, soil moisture condition from November 13 to 19, as displayed in [Figure 12](#), were severely dry in most areas of the LMB especially the north and the south. However, this condition is normal during dry season.

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.

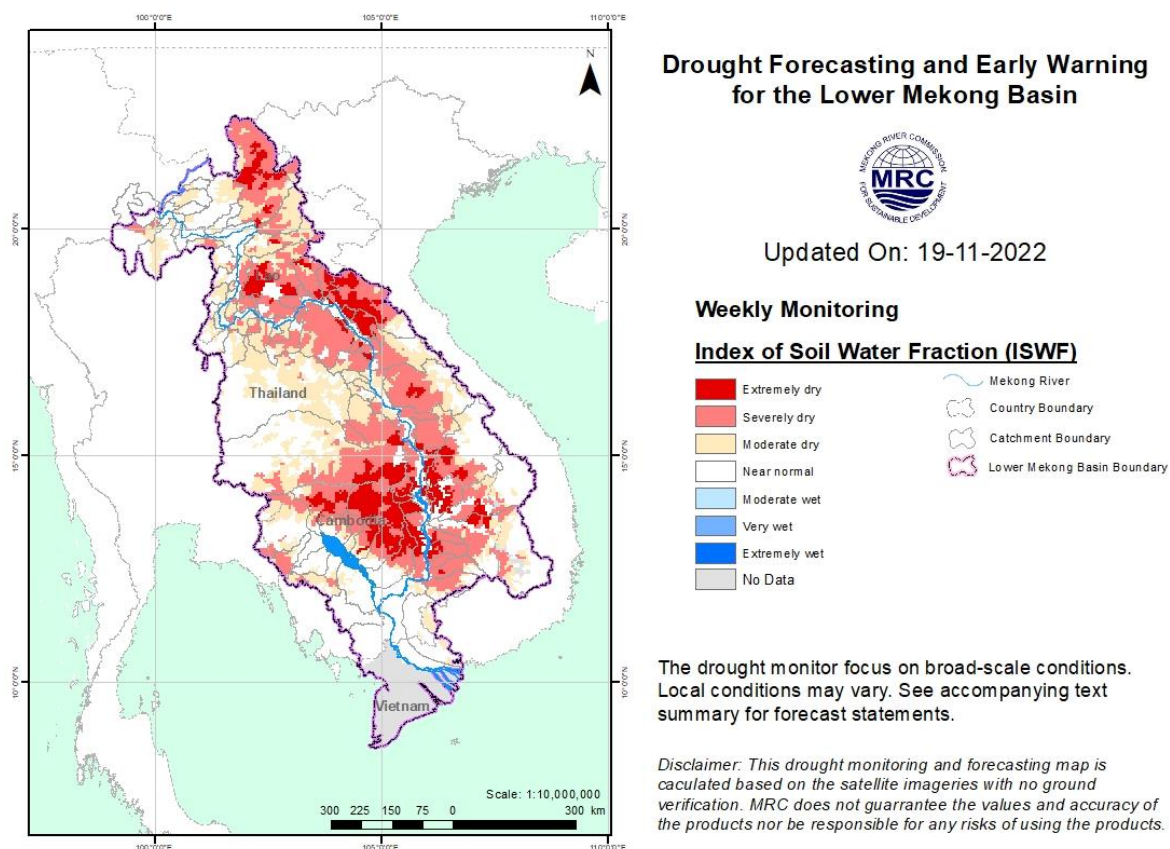


Figure 15: Weekly Index of Soil Water Fraction from November 13 to 19.

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

The combined drought indicator, as displayed in [Figure 13](#), reveals that during November 13 to 19 the LMB was facing some moderate and severe droughts mainly in the northern and southern parts of the LMB covering **Phongsaly, Xiengkhuang, Xaysomboun, Vientiane, Borikhamxay, Khammuane, Savannakhet, Saravane, Champasack, Attapeu, Si Saket, Ubon Ratchathani, Ordar Meanchey, Siem Reap, Preah Vihea, Stung Treng, Ratanakiri, Mondulkiri,**

Kratie, Pursat, Battambang, and Kampong Thom due to severely dry soil moisture as described above. The other areas, however, were normal during the reporting week.

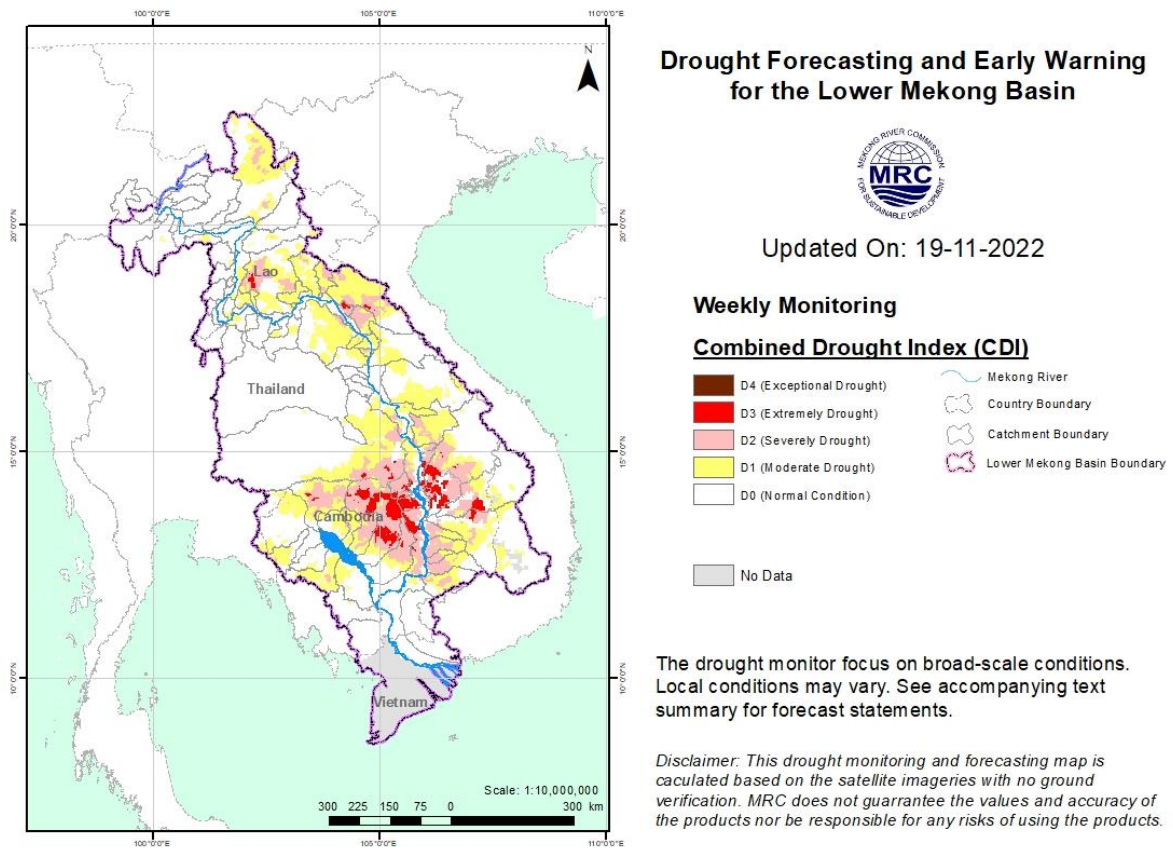


Figure 16: Weekly Combined Drought Index during November 13-19.

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.

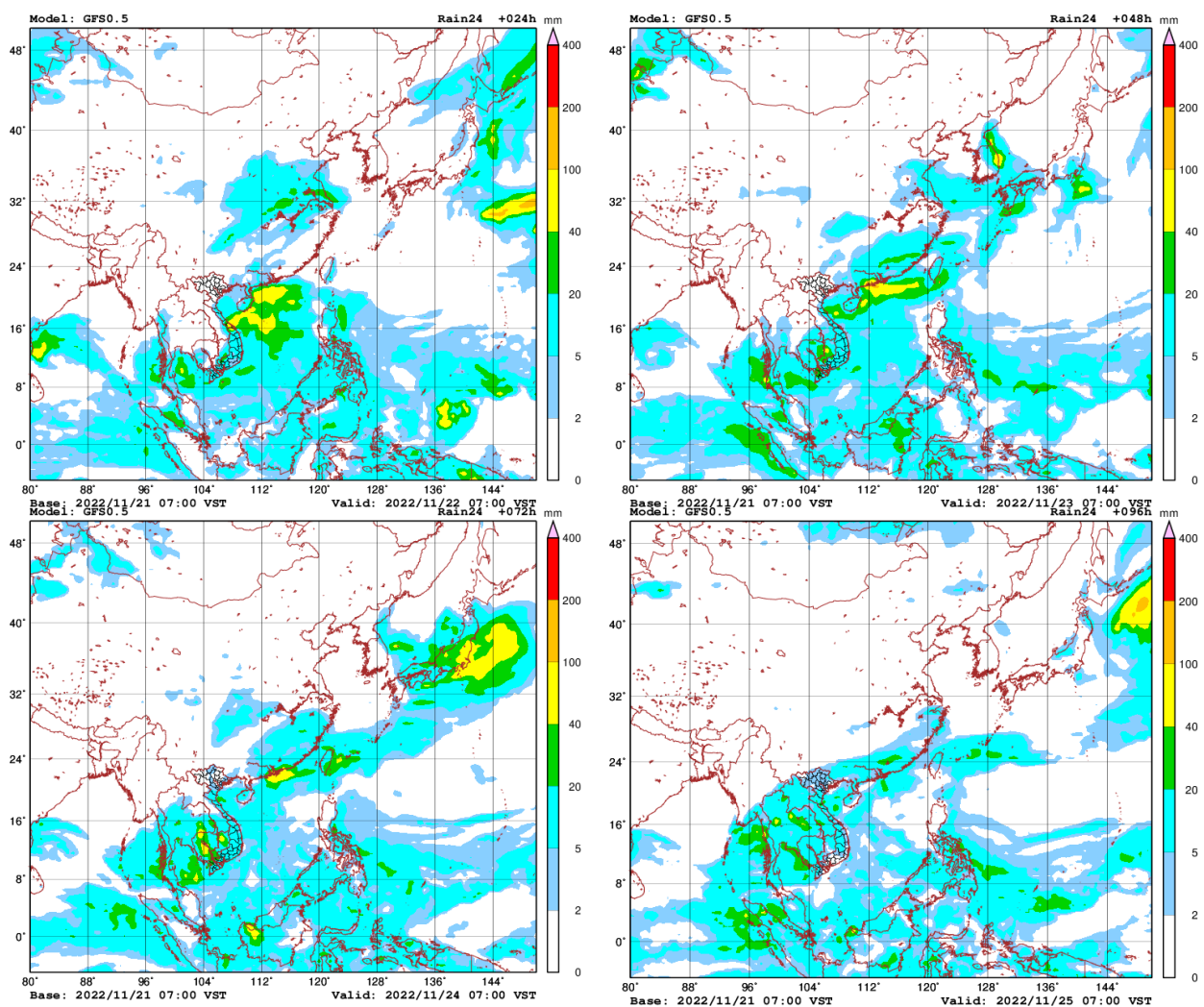
6 Weather and Water Level Forecast and Flash Flood Information

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) low pressure in the upper and middle parts and (ii) the on-going prevailing Southwest Monsoon from the Gulf of Thailand to the lower part of the LMB.

During 22-28 November 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 22-28 November 2022.



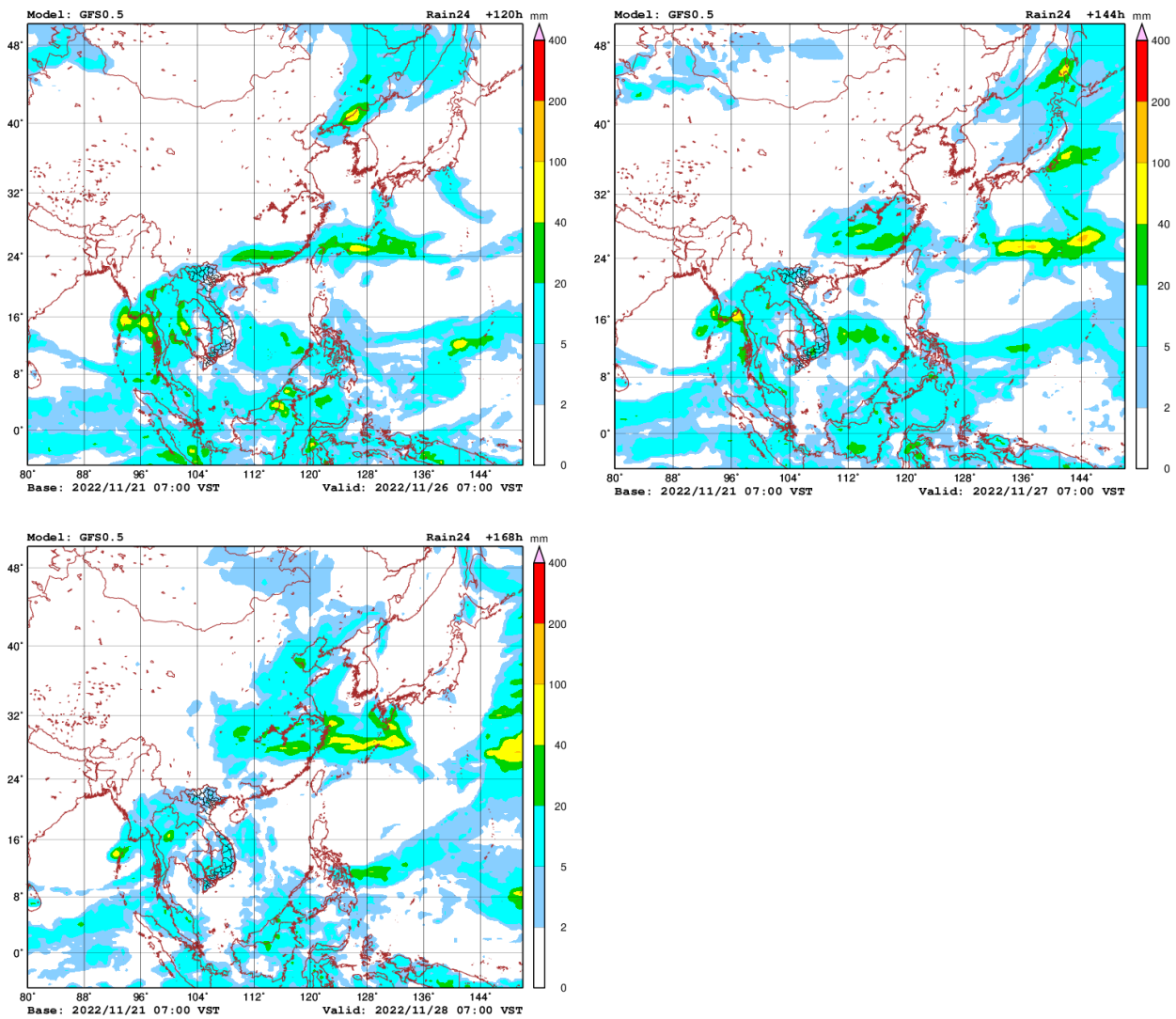


Figure 17: Accumulated rainfall forecast (24 hrs) of model GFS.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on November 14's weekly river monitoring bulletin, the weekly forecast water level at Chiang Saen in Thailand is expected to decrease from 2.53 m to 2.35 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 increasing about 0.03 m, from 8.98 m to 9.01 m during the same period. The current water levels are higher than its LTA value.

Chiang Khan, Vientiane-Nong Khai and Paksane

Water level at Chiang Khan station in Thailand is forecasted to be up about 0.17 m for the next seven days. However, from Vientiane in Lao PDR and Nong Khai in Thailand WLS will increase about 0.14 m in the next seven days. At Paksane in Lao PDR, water level will remain unchanged due to some effect of inflow from the upper catchments. Some 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 Savannakhet in Lao PDR will slightly increase about 0.15 m in the next seven days. However, water levels from Khong Chiam in Thailand to Pakse in Lao PDR will decrease by about 0.05 m. Water levels at these stations will stay lower than their LTA level. 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 0.10 m and 0.40 m over the next seven days. 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 about 0.35 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 November 21. 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. 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.

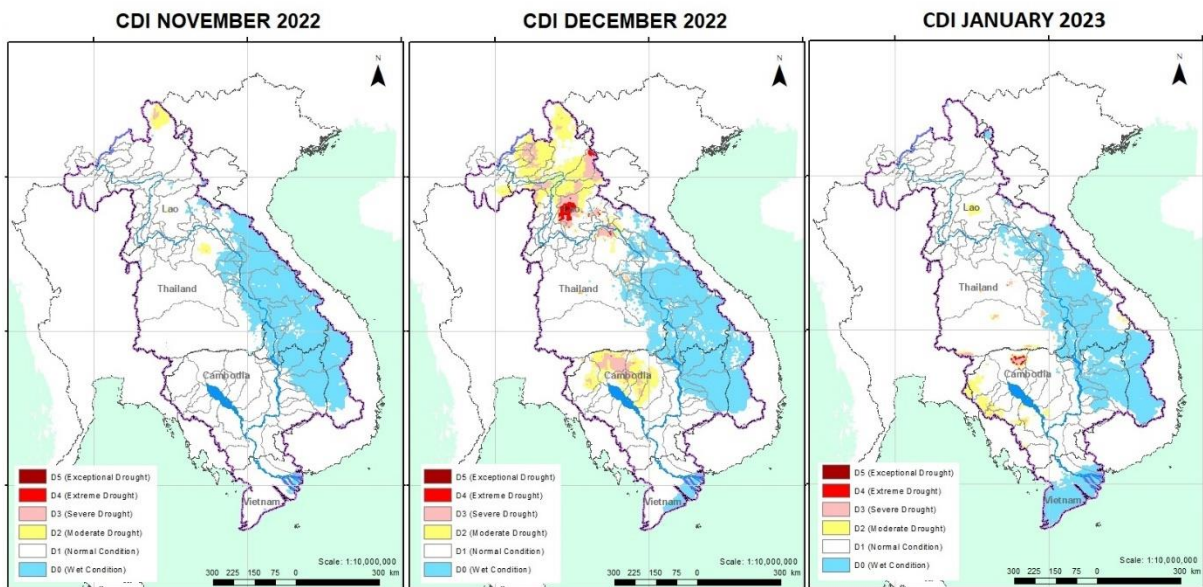


Figure 18. Monthly forecast of CDI for November and December 2022 and January 2023.

Figure 15 above shows that November is generally wet with the wettest areas in the eastern part. While **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. Similar to November, 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: floodforecast@mrcmekong.org

Forecast period from: 22 November to 28 November 2022

Date: 21 November 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) | | | | | | | |
|---------------------|---------|------------------------|----------------------------|--|--|--------|-----------------------------|--------|--------|--------|--------|--------|--------|--|
| | | | | | 20-Nov | 21-Nov | 22-Nov | 23-Nov | 24-Nov | 25-Nov | 26-Nov | 27-Nov | 28-Nov | |
| Jinhong | | 0.0 | - | - | 535.80 | 535.90 | | | | | | | | |
| Chiang Saen | | 0.0 | 357.110 | 0.00 | 2.60 | 2.53 | 2.58 | 2.62 | 2.56 | 2.52 | 2.46 | 2.40 | 2.35 | |
| Luang Prabang | | 0.0 | 267.195 | 2.53 | 8.95 | 8.98 | 9.05 | 9.00 | 9.05 | 9.10 | 9.06 | 9.03 | 9.00 | |
| Chiang Khan | | 0.0 | 194.110 | 1.91 | 5.61 | 5.70 | 5.75 | 5.83 | 5.85 | 5.89 | 5.92 | 5.90 | 5.87 | |
| Vientiane | | 0.0 | 150.040 | -0.26 | 3.28 | 2.85 | 2.85 | 2.88 | 2.93 | 2.94 | 2.97 | 3.00 | 2.97 | |
| Nongkhai | | 0.0 | 153.645 | 0.33 | 2.68 | 2.52 | 2.53 | 2.55 | 2.60 | 2.61 | 2.64 | 2.67 | 2.66 | |
| Paksane | | 0.0 | 142.125 | 0.10 | 3.19 | 3.19 | 3.12 | 3.11 | 3.12 | 3.15 | 3.15 | 3.17 | 3.19 | |
| Nakhon Phanom | | 0.0 | 130.961 | 0.16 | 1.99 | 1.97 | 1.97 | 1.93 | 1.95 | 1.98 | 2.02 | 2.04 | 2.07 | |
| Thakhek | | 0.0 | 129.629 | 1.36 | 3.26 | 3.26 | 3.25 | 3.21 | 3.23 | 3.27 | 3.32 | 3.35 | 3.38 | |
| Mukdahan | | 0.0 | 124.219 | 0.72 | 2.21 | 2.20 | 2.18 | 2.16 | 2.13 | 2.16 | 2.21 | 2.28 | 2.33 | |
| Savannakhet | | 0.0 | 125.410 | -0.65 | 1.04 | 1.03 | 1.03 | 1.03 | 1.02 | 1.05 | 1.07 | 1.12 | 1.15 | |
| Khong Chiam | | 1.3 | 89.030 | 1.02 | 4.02 | 4.01 | 3.98 | 3.93 | 3.88 | 3.83 | 3.89 | 3.96 | 4.06 | |
| Pakse | | 0.0 | 86.490 | 0.03 | 2.82 | 2.78 | 2.76 | 2.72 | 2.70 | 2.68 | 2.71 | 2.75 | 2.81 | |
| Stung Treng | | nr | 36.790 | 0.32 | 3.86 | 3.80 | 3.73 | 3.70 | 3.66 | 3.63 | 3.61 | 3.63 | 3.65 | |
| Kratie | | 3.1 | -1.080 | 3.06 | 10.13 | 10.00 | 9.88 | 9.80 | 9.75 | 9.70 | 9.65 | 9.61 | 9.64 | |
| Kompong Cham | | 1.0 | -0.930 | 0.65 | 6.10 | 6.00 | 5.88 | 5.77 | 5.70 | 5.65 | 5.60 | 5.55 | 5.52 | |
| Phnom Penh (Bassac) | | 0.5 | -1.020 | 1.56 | 5.22 | 5.11 | 5.01 | 4.92 | 4.87 | 4.84 | 4.82 | 4.80 | 4.78 | |
| Phnom Penh Port | | - | 0.000 | 0.14 | 4.15 | 4.04 | 3.95 | 3.87 | 3.82 | 3.78 | 3.76 | 3.74 | 3.72 | |
| Koh Khel | | nr | -1.000 | 1.52 | 4.86 | 4.77 | 4.70 | 4.64 | 4.61 | 4.59 | 4.57 | 4.56 | 4.54 | |
| Neak Luong | | nr | -0.330 | 0.81 | 3.85 | 3.82 | 3.76 | 3.72 | 3.68 | 3.66 | 3.65 | 3.64 | 3.63 | |
| Prek Kdam | | nr | 0.000 | 0.56 | 5.81 | 5.74 | 5.67 | 5.60 | 5.56 | 5.53 | 5.51 | 5.49 | 5.47 | |
| Tan Chau | | 0.0 | 0.000 | -0.37 | 2.04 | 2.05 | 2.08 | 2.09 | 2.12 | 2.08 | 2.06 | 2.02 | 1.98 | |
| Chau Doc | | nr | 0.000 | -0.60 | 1.97 | 2.02 | 2.05 | 2.08 | 2.12 | 2.07 | 2.04 | 2.00 | 1.97 | |

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, moderate rainfall was observed over the Mekong region. At Chiang Saen station rain reached 104.30 mm, while in the lower part from Kratie in Cambodia to Tan Chau and Chau Doc in Viet Nam rain varied from 1.30 mm to 46.40 mm. The highest rainfall was 1.04 mm recorded at Chiang Saen during this reporting week. Compared with last week's amount, the rainfall this week was considered higher 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 November 22-28, varying from 0.10 mm to 70 mm. This indicates that the dry season has started for the LMB.

7.2 Water level and its forecast

The MRC's observed water level at Jinghong showed an increase of about 0.10 m from 535.80 m on 15 Nov to 535.90 m on 21 Nov 2022. The outflow was up from 1,180.00 m³/s on 15 Nov to 1,250.00 m³/s on 21 Nov 2022.

Water levels in the lower part of the monitoring locations in the LMB during this reporting week was increasing from Chiang Saen in Thailand to Luang Prabang in Lao PDR. Water levels at Chiang Khan, Vientiane, Nong Khai, and Paksane slightly decreased staying 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 Kompong Cham were staying also lower than their LTA level, considered low water levels. From 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 15-21 November 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 November 13-19, the LMB was facing some moderate and severe droughts mainly in the northern and southern parts of the LMB covering **Phongsaly, Xiengkhuang, Xaysomboun, Vientiane, Borikhamxay, Khammuane, Savannakhet, Saravane, Champasack, Attapeu, Si Saket, Ubon Ratchathani, Ordar Meanchey, Siem Reap, Preah Vihea, Stung Treng, Ratanakiri, Mondulkiri, Kratie, Pursat, Battambang, and Kampong Thom** due to severely dry soil moisture which is normal during dry season; thus, this is not considered as drought threat for the LMB.

For the coming three months, November is generally wet with the wettest areas in the eastern part. While **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. Similar to November, 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 |
|------------|----------|-------------|---------------|-------------|-----------|----------|---------|---------------|---------|----------|-------------|-------------|-------|-------------|--------|--------------|---------------------|-----------------|----------|------------|-----------|----------|----------|
| 15/11/2022 | 535.80 | 2.30 | 9.22 | 5.88 | 3.46 | 2.53 | 3.12 | 1.88 | 3.25 | 2.17 | 1.10 | 4.40 | 3.18 | 4.25 | 10.87 | 6.77 | 5.79 | 4.69 | 5.32 | 4.29 | 6.21 | 2.05 | 1.97 |
| 16/11/2022 | 535.80 | 2.48 | 9.30 | 5.76 | 3.46 | 2.68 | 3.18 | 1.88 | 3.13 | 2.12 | 1.05 | 4.26 | 3.03 | 4.13 | 10.80 | 6.68 | 5.70 | 4.59 | 5.24 | 4.22 | 6.14 | 2.02 | 1.94 |
| 17/11/2022 | 535.80 | 2.53 | 8.94 | 5.63 | 3.47 | 2.66 | 3.26 | 1.92 | 3.10 | 1.92 | 1.05 | 4.14 | 2.92 | 4.01 | 10.60 | 6.56 | 5.65 | 4.50 | 5.18 | 4.16 | 6.05 | 2.03 | 1.96 |
| 18/11/2022 | 535.92 | 2.54 | 8.86 | 5.86 | 3.47 | 2.52 | 3.29 | 1.97 | 3.21 | 2.14 | 1.05 | 4.07 | 2.86 | 3.94 | 10.38 | 6.40 | 5.49 | 4.38 | 5.06 | 4.06 | 5.98 | 2.02 | 1.96 |
| 19/11/2022 | 535.70 | 2.55 | 8.94 | 5.79 | 3.26 | 2.62 | 3.23 | 2.00 | 3.24 | 2.18 | 1.04 | 4.04 | 2.82 | 3.90 | 10.21 | 6.22 | 5.35 | 4.28 | 4.98 | 4.02 | 5.88 | 2.06 | 2.00 |
| 20/11/2022 | 535.80 | 2.60 | 8.95 | 5.61 | 3.28 | 2.68 | 3.19 | 1.99 | 3.26 | 2.21 | 1.04 | 4.02 | 2.82 | 3.86 | 10.13 | 6.10 | 5.22 | 4.15 | 4.86 | 3.85 | 5.81 | 2.04 | 1.97 |
| 21/11/2022 | 535.90 | 2.53 | 8.98 | 5.70 | 2.85 | 2.52 | 3.19 | 1.97 | 3.26 | 2.20 | 1.03 | 4.01 | 2.78 | 3.80 | 10.00 | 6.00 | 5.11 | 4.04 | 4.77 | 3.82 | 5.74 | 2.05 | 2.02 |

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 |
|------------|------------|--------------|---------------|-------------|------------|------------|------------|---------------|------------|------------|-------------|-------------|------------|-------------|------------|--------------|---------------------|-----------------|-------------|-------------|------------|-------------|-------------|
| 15/11/2022 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 0 | | 0 | 0.7 | 6.2 | 0 | 0 |
| 16/11/2022 | 0 | 97.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 4.4 | 0 | | 4.8 | 11.2 | 0 | 0.6 | 0 |
| 17/11/2022 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 18/11/2022 | 0 | 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13.2 | 3.6 | | 8.8 | 1.4 | 0 | 6.6 | 4 |
| 19/11/2022 | 2 | 4.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.5 | | 18.3 | 33.8 | 0 | 29 | 43 |
| 20/11/2022 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 |
| 21/11/2022 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 0 | 3.1 | 1 | 0.5 | | 0 | 0 | 0 | 0 | 0 |
| Sum | 2.0 | 104.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 0.0 | 0.0 | 4.5 | 80.1 | 22.6 | | 31.9 | 47.1 | 6.2 | 36.2 | 48.0 |



Mekong River Commission Secretariat

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