



**Mekong River Commission**

# **Weekly Dry Season Situation Report in the Lower Mekong River Basin**

**14-20 March 2023**

Prepared by  
The Regional Flood and Drought Management Centre  
21 March 2023

*The MRC is funded by contributions from its Member Countries and Development Partners, including Australia, Belgium, the European Union, Finland, France, Germany, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United States and the World Bank.*

**Copyright © Mekong River Commission, 2020**

First published (2020)

Some rights reserved

This work is the product of the Mekong River Commission Secretariat. While all efforts are made to present accurate information, the Secretariat does not guarantee the accuracy of the data included in this work. The boundaries, colours, denomination, and other information shown on any map in this work do not imply any judgement on the part of the MRC concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Nothing herein shall constitute or be considered to be a limitation upon or waiver of the privileges and immunities of the MRC, all of which are specifically reserved.

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made and notification is sent to the MRC. The MRC would appreciate receiving a copy of any publication that uses this publication as a source. This publication cannot be used for sale or for any other commercial purpose whatsoever without permission in writing from the MRC.

**Title:** Weekly wet season situation report in the Lower Mekong River Basin for 14-20 Mar 2023.

ISSN: 1728-3248

**Keywords:** River monitoring/drought/weather/the Mekong/the Tonle Sap Lake

For bibliographic purposes, this volume may be cited as:

Mekong River Commission. (2020). *Weekly dry season situation report in the Lower Mekong River Basin for 14-20 Mar 2023*. Vientiane: MRC Secretariat.

Information on MRC publications and digital products can be found at  
<http://www.mrcmekong.org/publications/>

**All queries on rights and licenses should be addressed to:**

Mekong River Commission

Documentation and Learning Centre

184 Fa Ngoum Road, Unit 18, Ban Sithane Neua, Sikhottabong District, Vientiane 01000, Lao PDR

Telephone: +856-21 263 263 | E-mail: [mrccs@mrcmekong.org](mailto:mrccs@mrcmekong.org) | [www.mrcmekong.org](http://www.mrcmekong.org)

## Contents

<b>Figures.....</b>	<b>2</b>
<b>Table .....</b>	<b>3</b>
<b>Key Messages .....</b>	<b>4</b>
<b>1 Introduction .....</b>	<b>6</b>
<b>2 General Weather Patterns .....</b>	<b>7</b>
<b>3 Water Levels in the Lower Mekong River .....</b>	<b>11</b>
<b>4 Flash Flood in the Lower Mekong Basin .....</b>	<b>18</b>
<b>5 Drought Monitoring in the Lower Mekong Basin .....</b>	<b>19</b>
<b>6 Weather and Water Level Forecast and Flash Flood Information .....</b>	<b>22</b>
<b>6.1 Weather and rainfall forecast .....</b>	<b>22</b>
<b>6.2 Water level forecast .....</b>	<b>23</b>
<b>6.3 Flash Flood Information .....</b>	<b>24</b>
<b>6.4 Drought forecast .....</b>	<b>24</b>
<b>7 Summary and Possible Implications .....</b>	<b>28</b>
<b>7.1 Rainfall and its forecast .....</b>	<b>28</b>
<b>7.2 Water level and its forecast .....</b>	<b>28</b>
<b>7.3 Flash flood and its trends .....</b>	<b>29</b>
<b>7.4 Drought condition and its forecast .....</b>	<b>29</b>

## Figures

Figure 1: Summary of weather conditions over the LMB. ....	7
Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.....	8
Figure 3: No tropical storm risk observed on 20 March 2023.....	8
Figure 4: Weekly total rainfall at key stations in the LMB.....	9
Figure 5: Weekly rainfall distribution over the LMB.....	10
Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.....	11
Figure 7. Water level at the Jinghong hydrological station during 14-20 March 2023.....	12
Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR. ....	13
Figure 9. Water levels Vientiane and Paksane in Thailand and Lao PDR. ....	14
Figure 10: Water levels at Nakhon Phanom and Savannakhet of Thailand and Lao PDR. ...	14
Figure 11: Water levels at Stung Treng and Kratie on the Mekong River. ....	15
Figure 12: Seasonal change of inflows and outflows of Tonle Sap Lake. ....	16
Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.....	17
Figure 14: Weekly standardised precipitation index from Mar 13 to 19. ....	19
Figure 15: Weekly Index of Soil Water Fraction from Mar 13 to 19.....	20
Figure 16: Weekly Combined Drought Index during Mar 13-19. ....	21
Figure 17: Accumulated rainfall forecast (24 hrs) of model GFS. ....	23
Figure 18. Monthly forecast of SPI for Mar, Apr, and May 2023.....	25

## Table

Table 1. The monthly change in the flow volume of Tonle Sap Lake. ....	17
Table 2. Weekly River Monitoring Bulletin. ....	26

## Key Messages

Key messages for this weekly report are presented below.

### Rainfall and its forecast

- During Mar 14-20, no rainfall was observed along the Mekong River, from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam.
- There will be warm temperatures for the next 7 days over the Mekong region from 21 to 27 March 2023.

### Water level and its forecast

- The MRC's observed water level (WL) at Jinghong showed an increased WL from 535.59 m to 536.13 m during 14-20 Mar 2023. The outflow increased from 1,040.00 m<sup>3</sup>/s to 1,410.00 m<sup>3</sup>/s between 14 and 20 Mar 2023.
- Along with the increased outflow at Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand went up about 0.42 m during the reporting period and still stayed 0.13 m below its LTA, considered normal. WLs at the monitoring stations at Chiang Khan in Thailand decreased about 0.51 m, staying 0.66 m below its LTA value, while at Vientiane in Lao PDR it decreased about 0.01 m and stayed about 0.74 m below its LTA value. The current WL at Nong Khai in Thailand was about 0.75 m lower than its LTA value, while at Paksane in Lao PDR it was about 0.72 m lower than its LTA level, which considered low water level. WLs from Thailand's Nakhon Phanom to Savannakhet increased between 0.17 m and 0.43 m, but from Khong Chiam to Pakse the WLs decreased about 0.10 m. WLs at these stations are slightly staying close with their LTA value, considered normal. Water levels from the stretches of the river from Stung Treng to Kratie in Cambodia, moreover, were slightly decreasing and still staying higher than their LTA value due to contributed inflows and some rainfall from the upstream part (at Pakse and 3S area in Viet Nam). WL at Kompong Cham is about 0.16 m lower than its LTA value.
- The water volume of the Tonle Sap Lake was slightly lower than its LTA during the same period from 14-20 Mar 2023, considered normal.
- The current water levels for most of the stations are below their LTA value, except at Luang Prabang, Pakse, Stung Treng, Kratie and Neak Luong. WLs at the 2 tidal stations at Tan Chau and Chau Doc fluctuated between their maximum and LTA values, 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 Mar 13-19, the LMB was moderately dry mainly in the middle and lower parts. The drought condition spread over the area and the severe drought was found in Nong Khai, Sakon Nakhon, Nakhon Phanom, Udon Thani, Kalasin, Mukdahan, Roi Et,

Yasothon, Amnat Charoen, Buriram, Nakhon Ratchasima, Sakeo, Surin, Banteay Meanchey, Otdar Meanchey, Siem Reap, Preah Vihea, Battambang, Kompong Thom, Borikhamxay, Khammuane, Savannakhet, Champasack, Sekong, and Attapeu. Those specific drought hotspots are considered normal as they are caused by dry soil moisture phenomenon during dry season.

- For the coming three months, **March** is generally wet in the north and south while middle part is likely to be normal. **April** is forecasted to receive average rainfall all over the region. But **May** is likely to be severely dry over the 3S area and moderately dry in the south-east covering eastern part of Cambodia and Viet Nam.



# 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 **14-20 March 2023**. 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](http://ffw.mrcmekong.org/bulletin_wet.php).

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

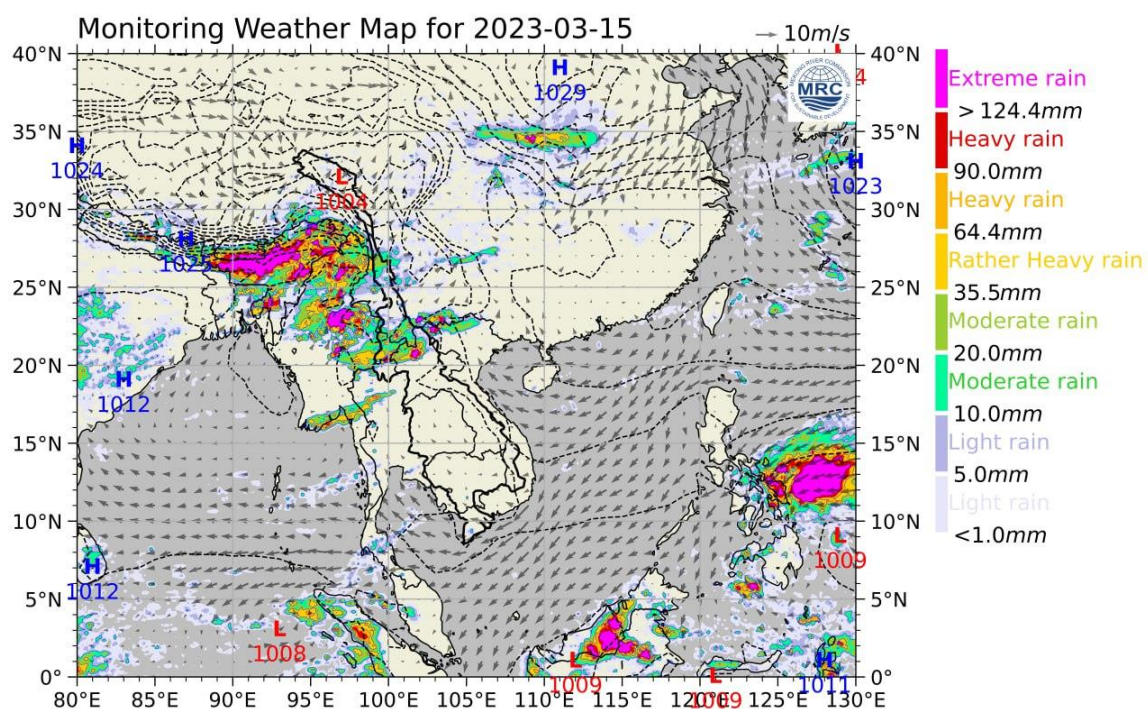
Flash flood information is accessible at: <http://ffw.mrcmekong.org/ffg.php>

## 2 General Weather Patterns

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

Since the end of February 2022, the warm weather has appeared because the influentially high-pressure air mass areas prevail 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 continue warm 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 raise sharply as commonly chilly weather, specifically at the upper portion of the northern and north-eastern parts together with very hot weather in mountainous areas (within the Mekong region).

[Figure 1](#) presents the weather map on 15 March 2023, indicating that no low-pressure cell was active in the South-Sea of Viet Nam, having no impact in the LMB. Generally, the Mekong region is influenced by easterly wind from the Western-north Pacific with a convergence area located in Myanmar's coastline. Under this weather condition, there is moderate rainfall occurring at the northern parts of LMB (northern Thailand and Lao PDR), and no rainfall occurring from central to southern LMB.



**Figure 1: Summary of weather conditions over the LMB.**

According to the ASEAN Specialised Meteorological Centre (ASMC), a highest probability of drier condition is predicted over the lower part of the Mekong region covering Lao PDR and Thailand from 20 March to 2 April 2023. **Figure 2** shows the outlook of weather condition from 20 Mar to 2 April 2023 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

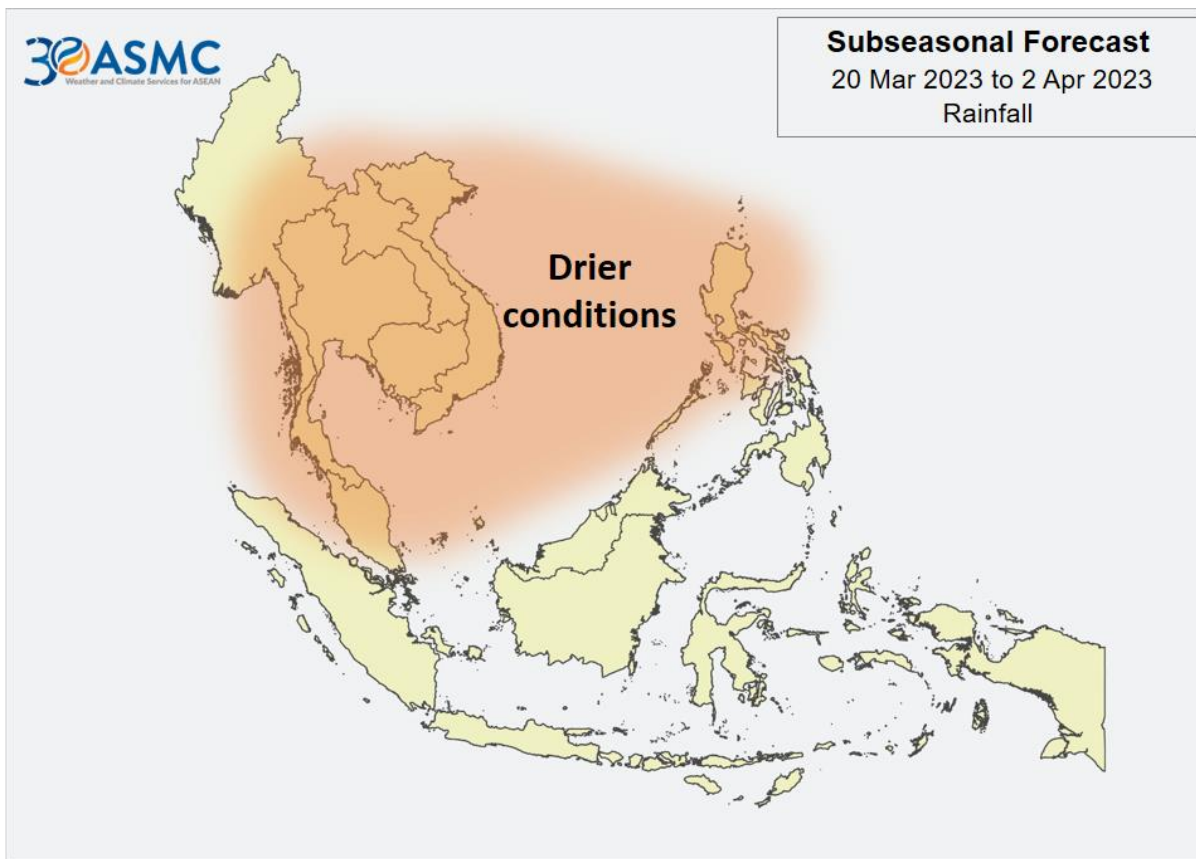


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

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

There was a tracking storm covering the LMB during 14-20 March 2023, 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 20 Mar 2023, 6:33 GMT

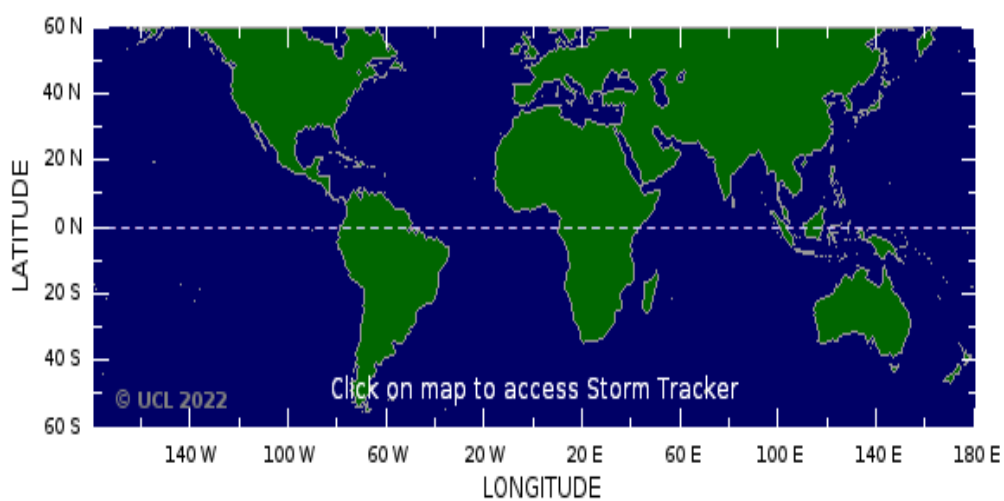
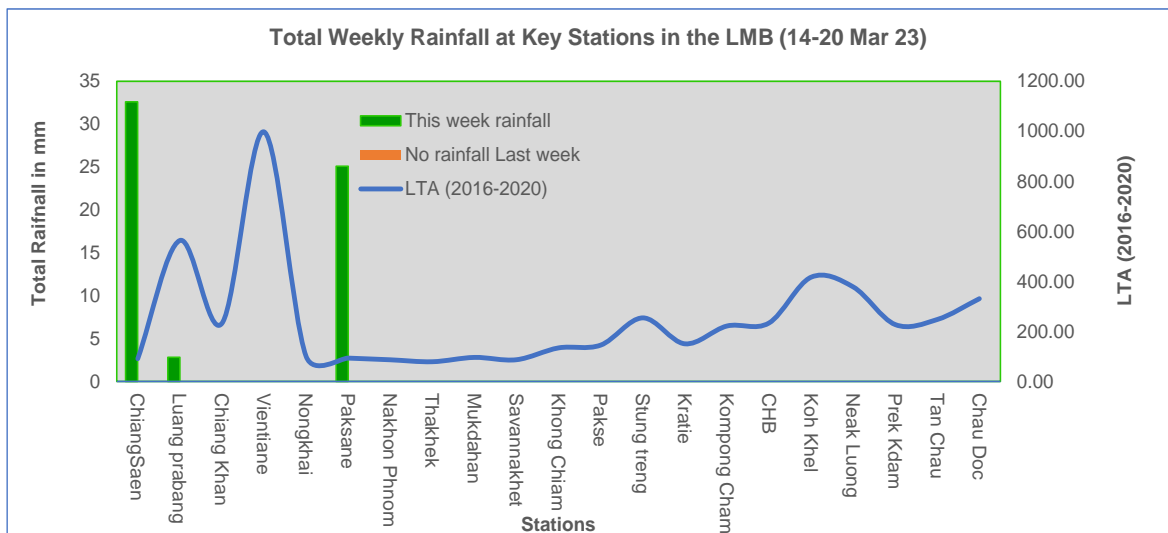


Figure 3: No tropical storm risk observed on 20 March 2023.

## Rainfall patterns over the LMB

This week from 14 to 20 March 2023, slightly rainfall of about 35.00 mm was observed from Chiang Saen in Thailand, Luang Prabang to Pakse in Lao PDR along the Mekong River of the Lower Mekong Basin (LMB). 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](#).



**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 14 to 20 Mar 2023.

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



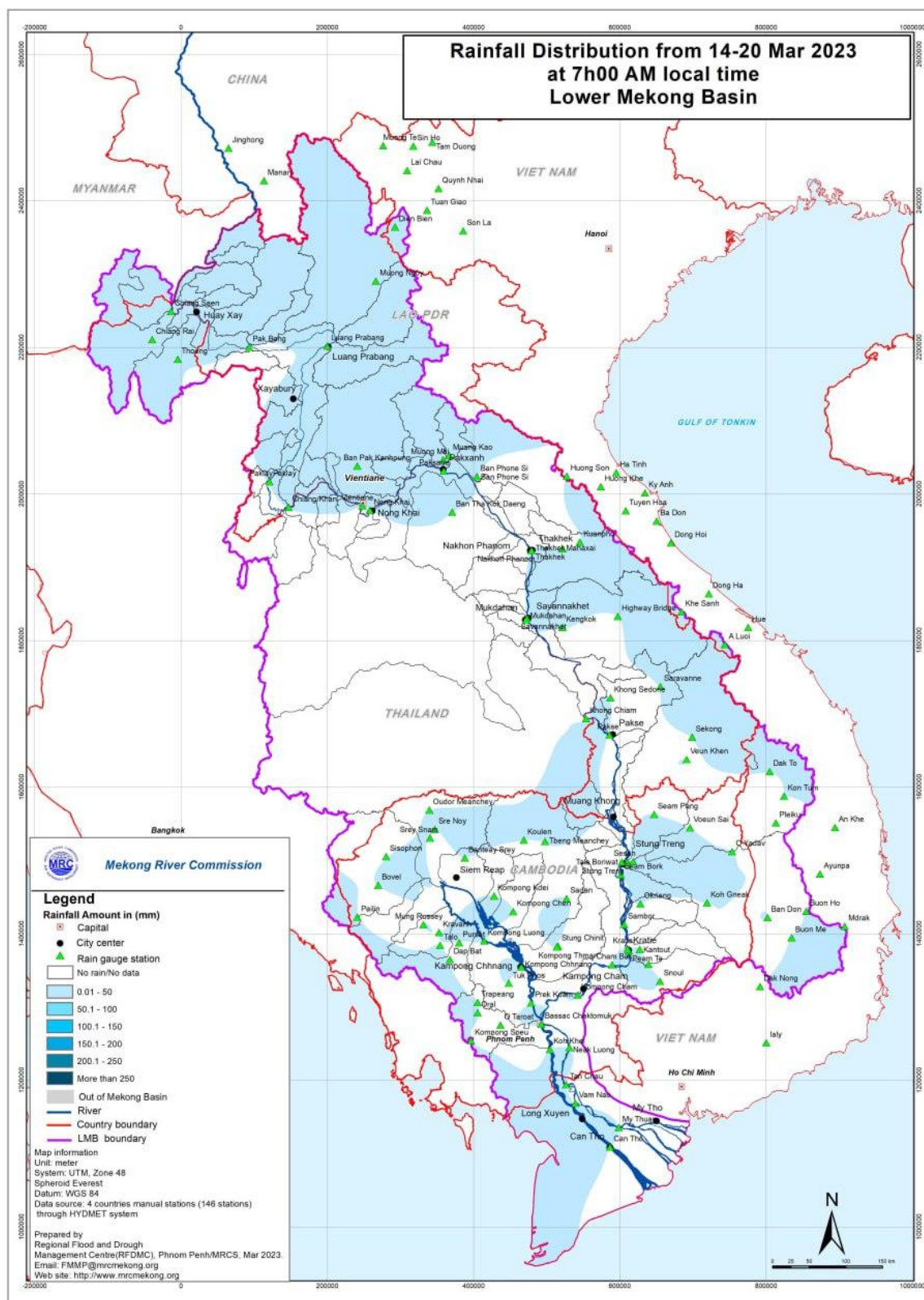
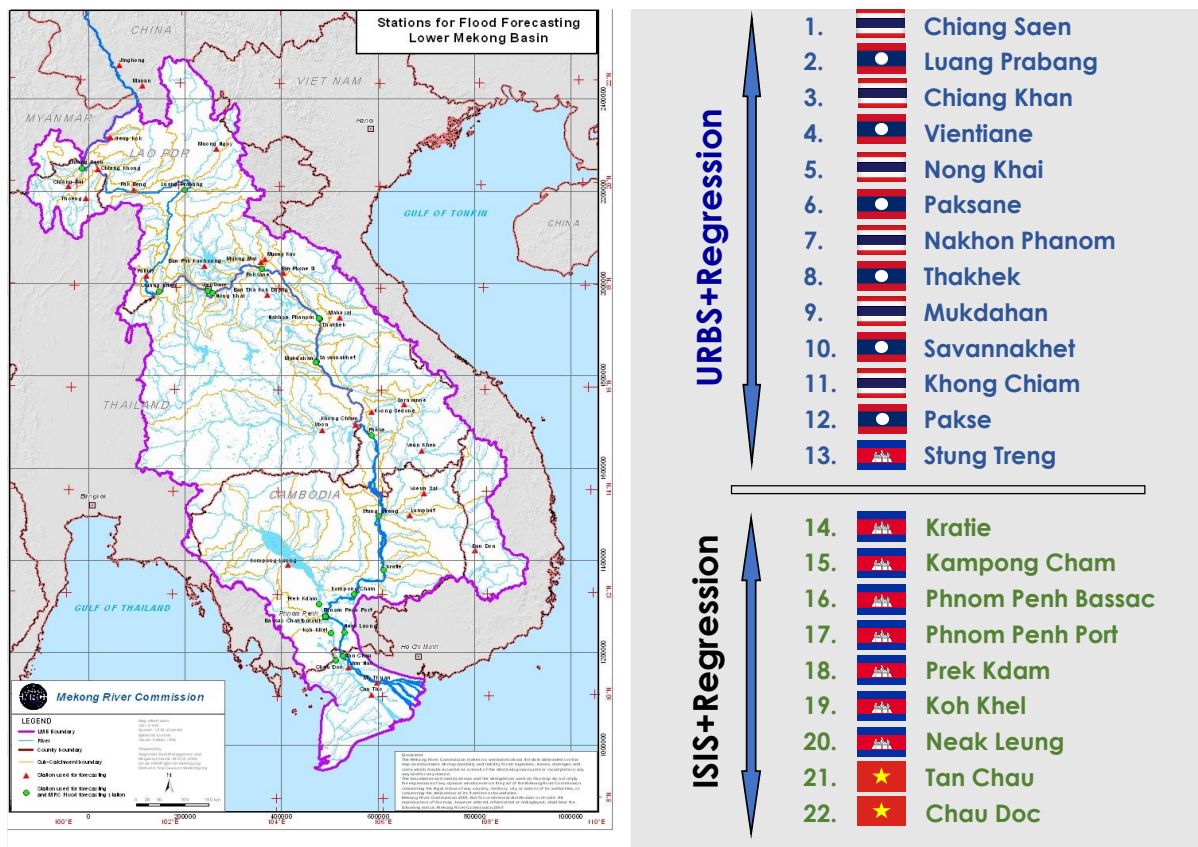


Figure 5: Weekly rainfall distribution over the LMB.

### 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.

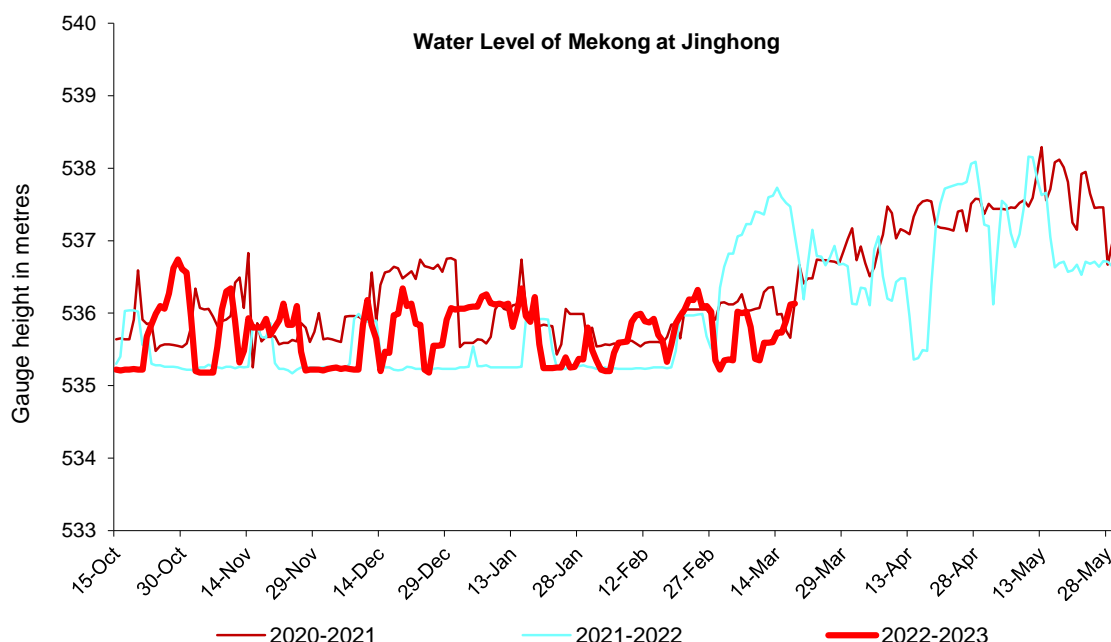
The key stations along the LMB and their respective model application for River Flood Forecasting during the wet season from June to October and River Monitoring during the dry season from November to May are presented in [Figure 6](#). The hydrograph for each key station is available from the MRC's 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 0.54 m from 535.59 m to 536.13 m between 14 and 20 Mar 2023 (recorded on 7:00 am). The outflow increased from 1,040.00 m<sup>3</sup>/s to 1,410.00 m<sup>3</sup>/s between 14 and 20 Mar 2023.

[Figure 7](#) below presents water level that decreased at the Jinghong hydrological station<sup>1</sup>, indicating the trend of fluctuating water level up to 20 March 2023.



**Figure 7. Water level at the Jinghong hydrological station during 14-20 March 2023.**

Amit the decreased outflow from Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand increased 0.42 m from 4 to 20 Mar 2023 and stayed about 0.13 m lower than its long-term average (LTA), which considered normal. WLs at the monitoring station at Chiang Khan in Thailand decreased 0.51 m and stayed 0.66 m lower than its LTA, while at Vientiane in Lao PDR it decreased about 0.01 m and stayed about 0.74 m below its LTA value, considered low water levels. The current WLs from Nong Khai in Thailand, furthermore, increased 0.17 m and stayed 0.75 m lower than its LTA, while at Paksane in Lao PDR it increased about 0.34 m and stayed 0.72 m lower than its LTA value. WLs at these stations were considered low. Water levels from Nakhon Phanom in Thailand to Savannakhet increased between 0.17 m and 0.43 m, while from Khong Chiam in Thailand to Pakse in Lao PDR decreased about 0.05 m. Water levels from the stretches of the river from Stung Treng to Kratie in Cambodia, moreover, were decreasing about 0.25 m. The water levels at and at Kompong Cham decreased about 0.16 m due to inflow and contributed rainfall from the upstream part. WLs at Stung Treng and Kratie were staying about 0.33 m and 0.75 m higher than their LTA value, respectively. WL at Kompong Cham was staying about 0.12 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

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

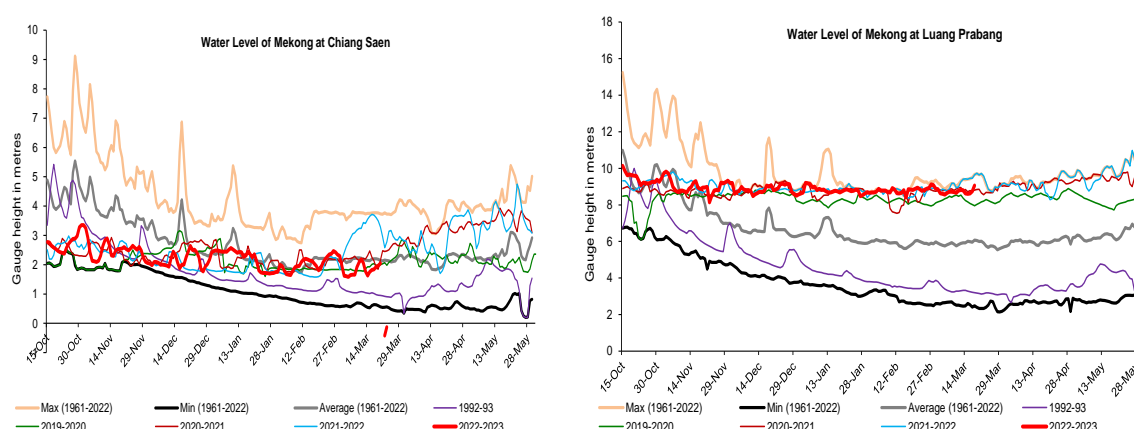
May. The whole inflow of water into the LMB is influenced by rainfall at the Mekong mainstream and its tributaries during the wet season.

### Chiang Saen and Luang Prabang

Water level during 14-20 Mar 2023 at Thailand's Chiang Saen increased from 1.63 m to 2.05 m, staying about 0.13 m lower than its Long-Term-Average (LTA), which is considered normal level. When compared to last week, this week's water level is relatively higher.

Water level at the Luang Prabang station in Lao PDR increased from 8.82 m to 9.06 m, during the reporting period. Compared to last week, the figure shows it is up about 0.24 m. The water level at this station was 3.01 m higher than its LTA value and about 0.65 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.**

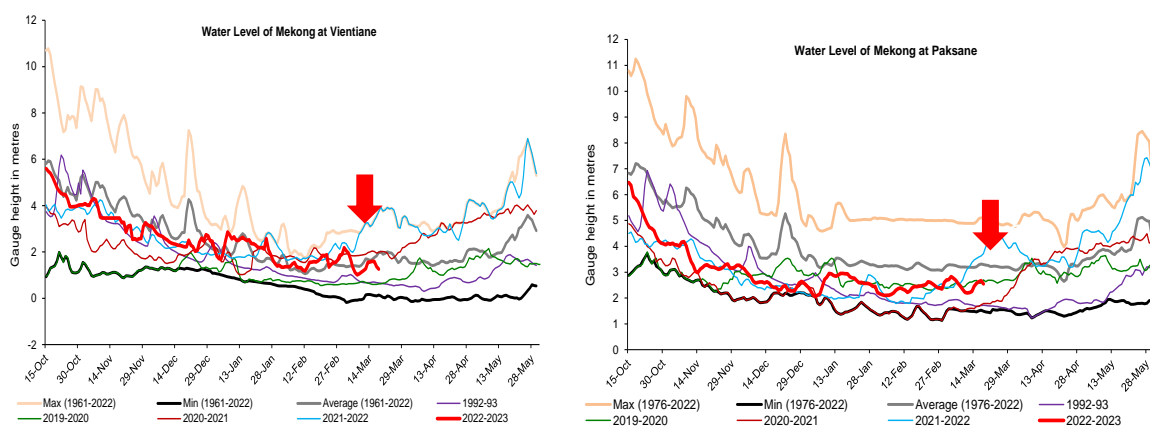


**Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.**

### Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) decreased about 0.51 m, during the reporting week. It showed 0.66 m below its LTA. However, water level downstream at Vientiane in Lao PDR slightly decreased from 1.27 m to 1.26 m and stayed about 0.74 m lower than its LTA during 14-20 Mar 2023. At Nong Khai station in Thailand, the water level increased about 0.17 m during the reporting period. It showed 0.75 m lower than its LTA value, which still considered low water level. At Paksane in Lao PDR, water level increased about 0.34 m staying about 0.72 m lower than its LTA value. The recently decreased water levels were obviously due to low inflow from upstream and water operation from upstream and some rainfalls in the sub-catchment area. The water levels at Vientiane and Paksane are shown in [Figure 9](#) below.

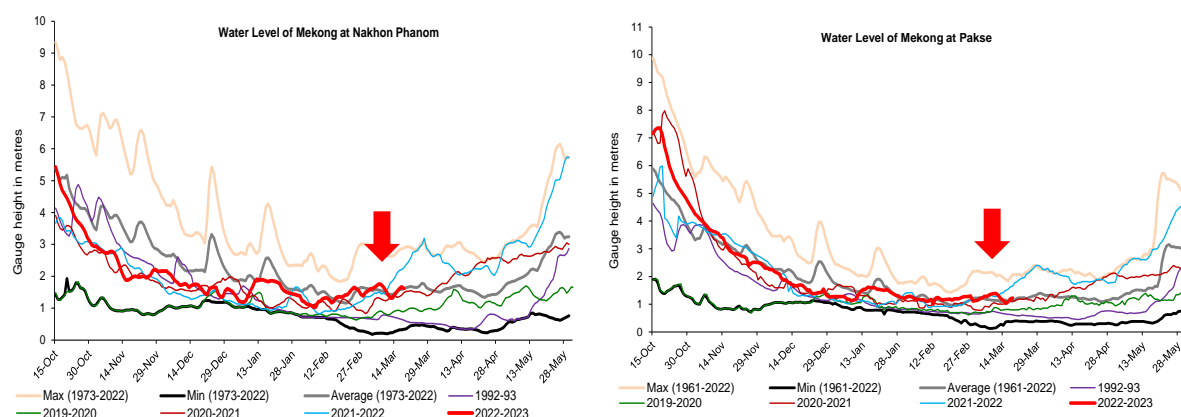




**Figure 9. Water levels Vientiane and Paksane in Thailand and Lao PDR.**

### Nakhon Phanom to Pakse

Moreover, water levels from Nakhon Phanom in Thailand to Savannakhet in Lao PDR increased between 0.17 and 0.43 m, which staying slightly close to their LTA level. Water level from Khong Chiam in Thailand to Pakse in Lao PDR decreased about 0.07 m. The water levels of those stations were slightly close to their LTA value, considered normal. [Figure 10](#) shows the water levels at Nakhon Phanom and Pakse stations.

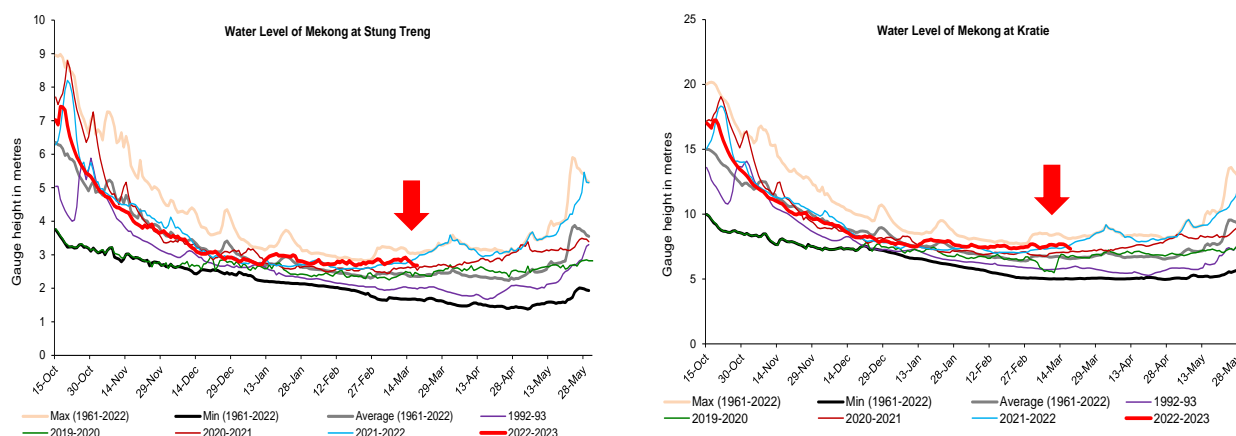


**Figure 10: Water levels at Nakhon Phanom and Savannakhet of Thailand and Lao PDR.**

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

Due to no 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 14-20 Mar 2023. The water levels Stung Treng decreased about 0.21 m, while at Kratie it decreased about 0.23 m. However, water levels at Stung Treng and Kratie are remaining about 0.33 m and 0.75 m higher than their LTA value. Water levels at these two stations were considered high during the dry season (as showed in [Figure 11](#)).

This week, the water levels at Kompong Cham were down about 0.10 m and stayed 0.12 m below their LTA value, which considered normal.



**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 0.09 m and stayed 0.29 m lower than its LTA value; while at Koh Khel, water level decreased about 0.38 m, staying 0.07 m lower than its LTA value. It was observed that the WLs at Koh Khel and Neak Luong were affected by tidal from downstream stations of Tan Chau and Chau Doc in Viet Nam, during the dry season period. However, water level at Prek Kdam on the Tonle Sap Lake decreased about 0.18 m and was about 0.03 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 absence of rainfall and less 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 mostly 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 14 to 20 Mar 2023 at Viet Nam's Tan Chau and Chau Doc were fluctuating between their LTA and maximum values due to daily tidal effects from the sea. The fluctuated levels were between -0.05 m and 1.29 m. In Tan Chau and Chau Doc, the fluctuation of water levels at these stations were higher 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 to the Mekong River and then to the Delta. This phenomenon normally takes place between September and October. Based on flow observation at Prek Kdam, 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 (1997-2022). Up to March 20 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 2020, 2021 and 2022 outflow conditions. It is noted that the outflow in early 2023 is still slightly lower 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 20 March 2023 for the Lake compared with the volumes in 2020, 2021, 2022 and their LTA, and the fluctuation levels (1997–2021). It shows that up to 20 March 2023, **the water volume of the Tonle Sap Lake was staying slightly lower than its LTA (about 96 %) and higher than 2020, 2021, 2022 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 normal***.

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.

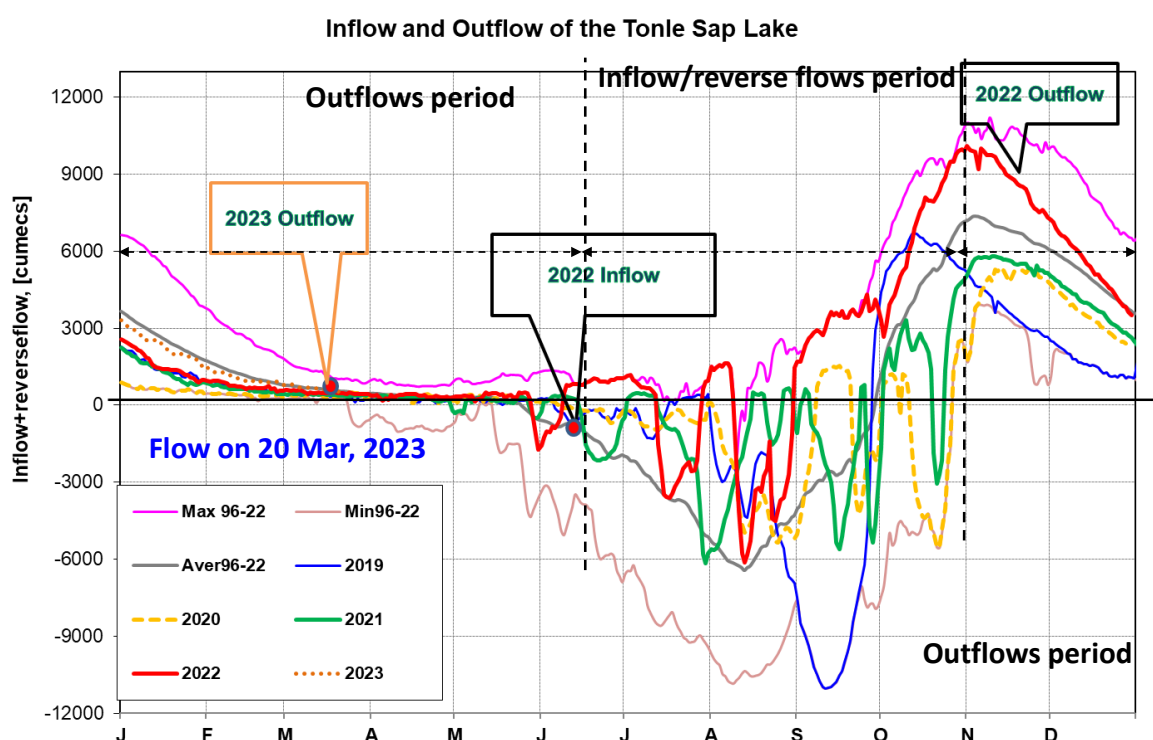
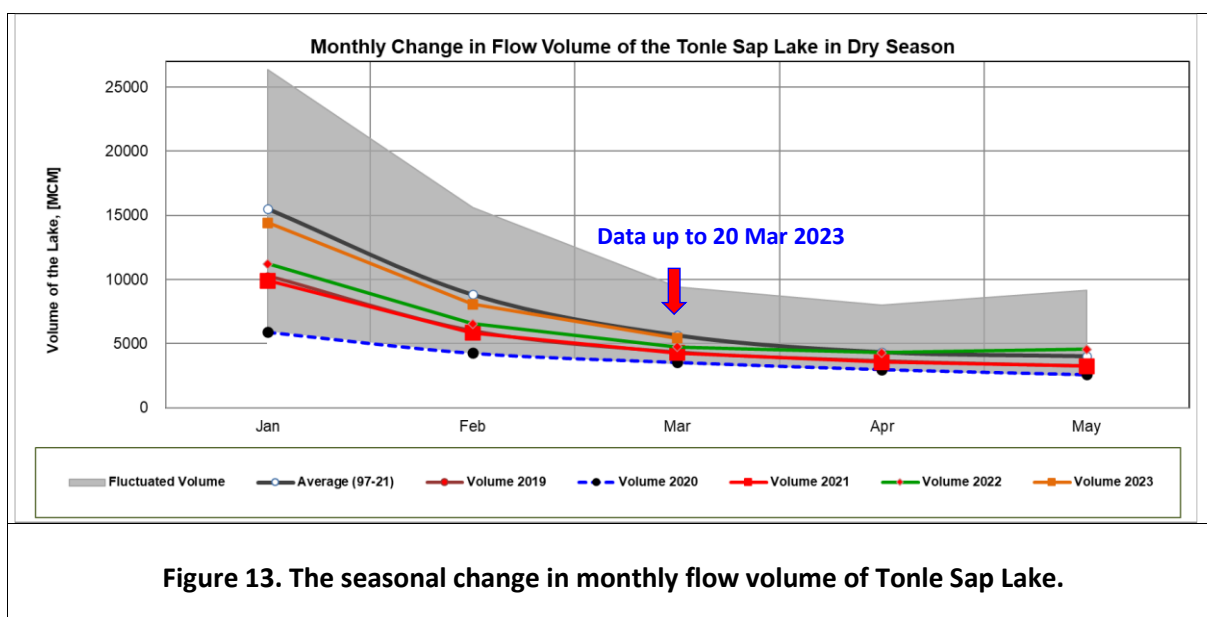


Figure 12: Seasonal change of inflows and outflows of Tonle Sap Lake.



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

Month	LTA (97-22) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]	Volume 2023 [MCM]	Volume in 2023 [%], compared with its LTA
Jan	15523.23	26357.53	5906.80	10285.31	5906.80	9923.80	11214.32	14422.11	92.91
Feb	8837.89	15596.22	4198.60	6019.30	4264.19	5832.97	6558.79	8069.29	91.30
Mar	5654.18	9438.24	3347.07	4354.62	3553.99	4264.88	4736.52	5436.93	96.16
Apr	4346.65	8009.14	2866.91	3667.47	2992.61	3556.68	4288.31		
May	4030.23	9176.93	2417.81	3266.43	2594.92	3240.78	4556.83		
Jun	5708.30	13635.01	2468.70	3517.06	2641.88	3798.29	7489.04		
Jul	11493.25	28599.56	2925.86	4001.99	2925.86	5346.73	9703.79		
Aug	24666.69	39015.12	4433.46	7622.71	5941.07	10547.80	19554.70		
Sep	39634.03	65632.35	12105.31	24194.19	12105.31	16382.34	32860.34		
Oct	46873.44	73757.23	19705.50	30358.38	20799.13	27318.21	48199.12		
Nov	37823.16	60367.33	18534.61	19112.65	27546.80	28982.93	39452.53		
Dec	25126.11	38888.95	10563.49	10577.29	18251.65	20170.76	25346.65		
	Critical situation, comapred with historical Min values								
	Normal condition, compared with LTA (Long term average)								
	Low volume situation, comapred with LTA values								
Unit: Million Cubic Meter (1 MCM= 0.001 Km <sup>3</sup> )				LTA: Long-Term-Average					

## **4 Flash Flood in the Lower Mekong Basin**

During 14-20 March 2023, the LMB was affected by two main weather factors. These include (i) the low heat covered from the upper parts and from the East Sea part then extended to the upper and middle parts and (ii) the active northeast monsoon prevailed over the Gulf of Thailand. These conditions caused hot weather and thunderstorms in some areas 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.

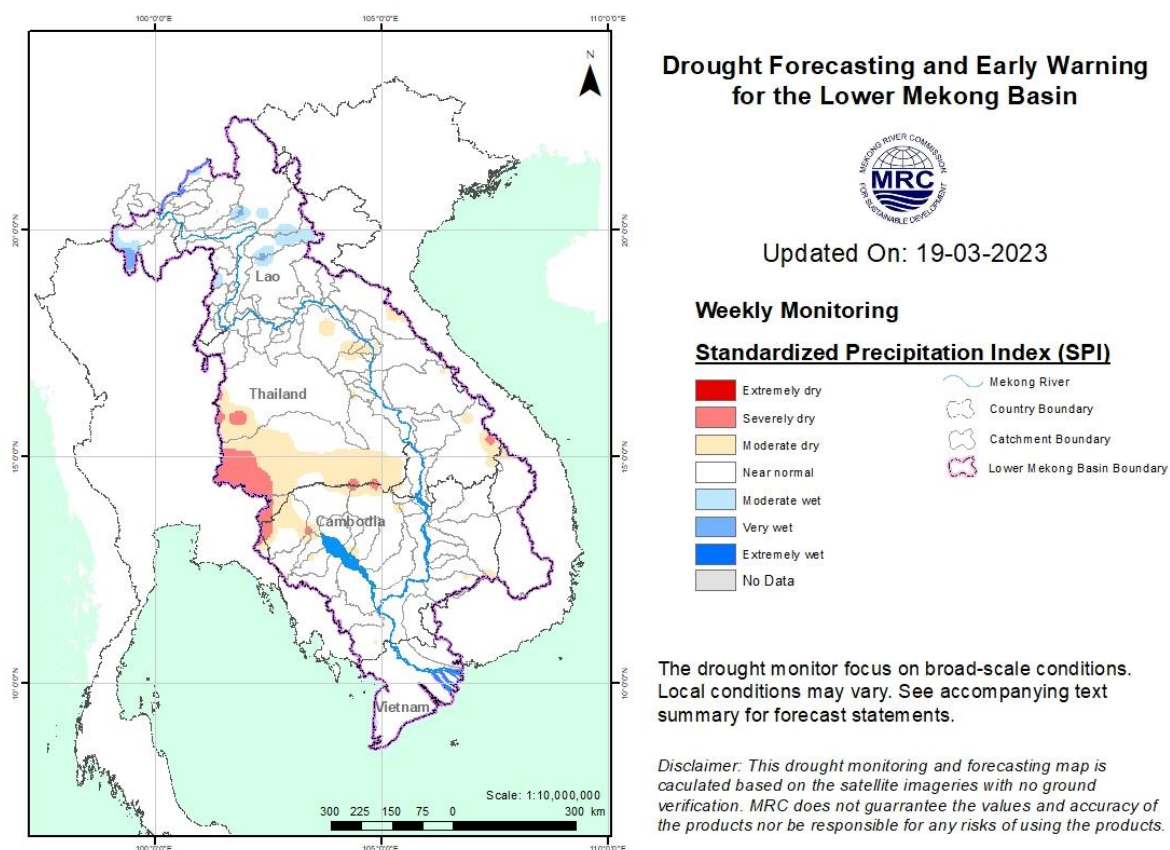
## 5 Drought Monitoring in the Lower Mekong Basin

### Weekly drought monitoring from 13 to 19 March 2023

Drought monitoring data for 2023 are available from Monday to Sunday every week; thus, the reporting period is normally delayed by one day compared to Flood and Flash Flood reports. We adopt the Index of Soil Water Fraction (ISWF) data obtained from FFGS to represent soil moisture of agricultural indicator for both dry and wet seasons.

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

Meteorological drought condition of the LMB from Mar 13 to 19, as shown in [Figure 11](#), was moderately and severely dry in the eastern part covering Thailand and Cambodia. The drought areas covered Chaiyaphum, Nakhon Ratchasima, Surin, Buriram, Si Saket, Sakeo, Bateay Meanchey, Otdar Meanchey, Battambang, and Sekong.



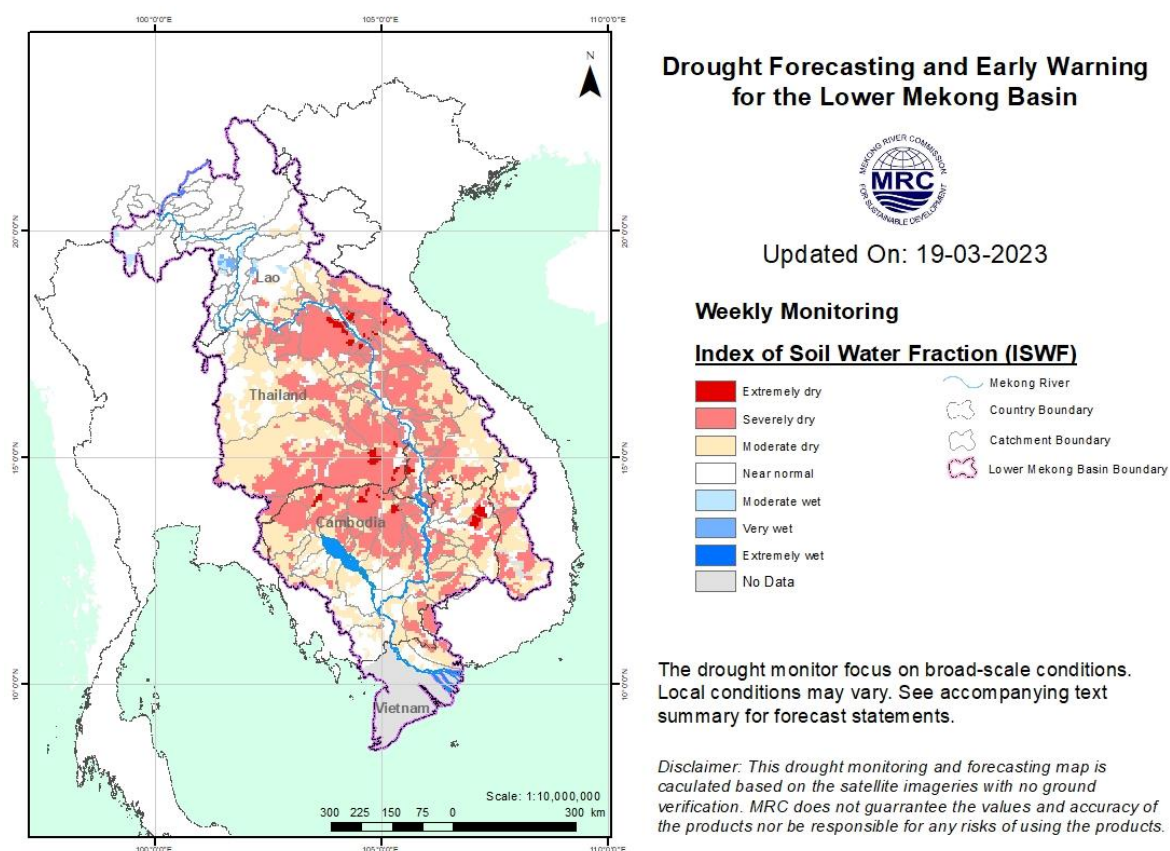
**Figure 14: Weekly standardised precipitation index from Mar 13 to 19.**



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

With relatively less rainfall in the middle and southern parts of the region, soil moisture condition from Mar 13 to 19, as displayed in [Figure 12](#), were severely dry in some areas in the middle and southern parts 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.

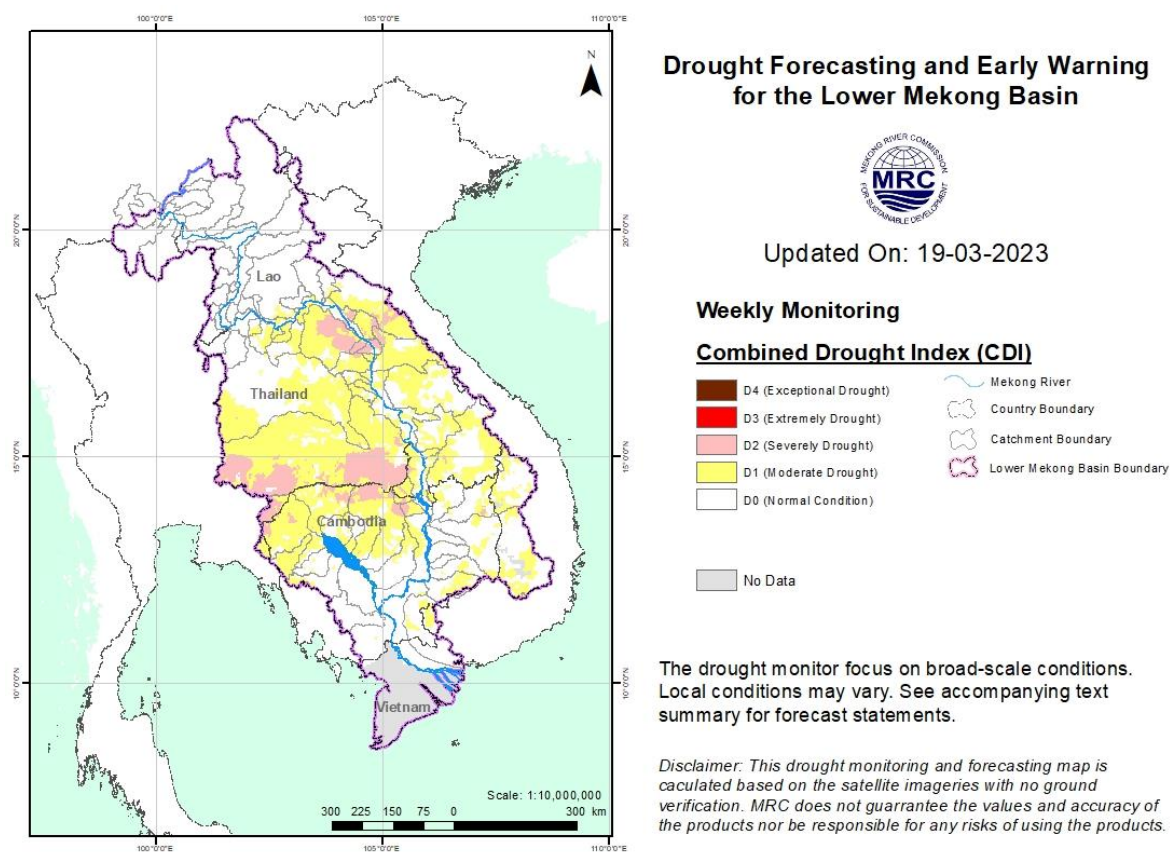


**Figure 15: Weekly Index of Soil Water Fraction from Mar 13 to 19.**

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

The combined drought indicator, as displayed in [Figure 13](#), reveals that during Mar 13-19 the LMB was moderately dry mainly in the middle and lower parts. The drought condition spread over the area and the severe drought was found in Nong Khai, Sakon Nakhon, Nakhon Phanom, Udon Thani, Kalasin, Mukdahan, Roi Et, Yasothon, Amnat Charoen, Buriram, Nakhon Ratchasima, Sakeo, Surin, Banteay Meanchey, Otdar Meanchey, Siem Reap, Preah Vihea, Battambang, Kompong Thom, Borikhamxay, Khammuane, Savannakhet, Champasack, Sekong,

and Attapeu. Those specific drought hotspots are considered normal as they are caused by dry soil moisture phenomenon during dry season.



**Figure 16: Weekly Combined Drought Index during Mar 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.



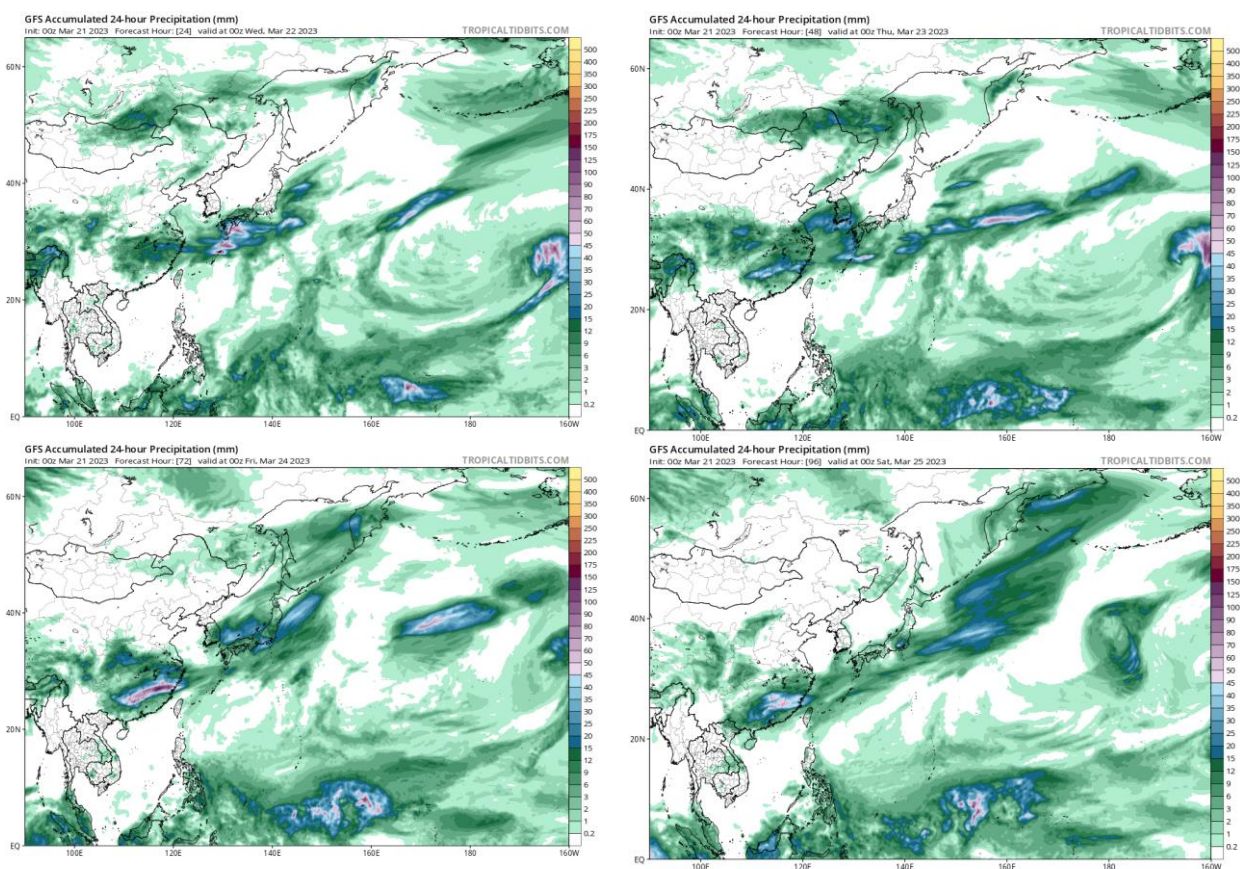
## 6 Weather and Water Level Forecast and Flash Flood Information

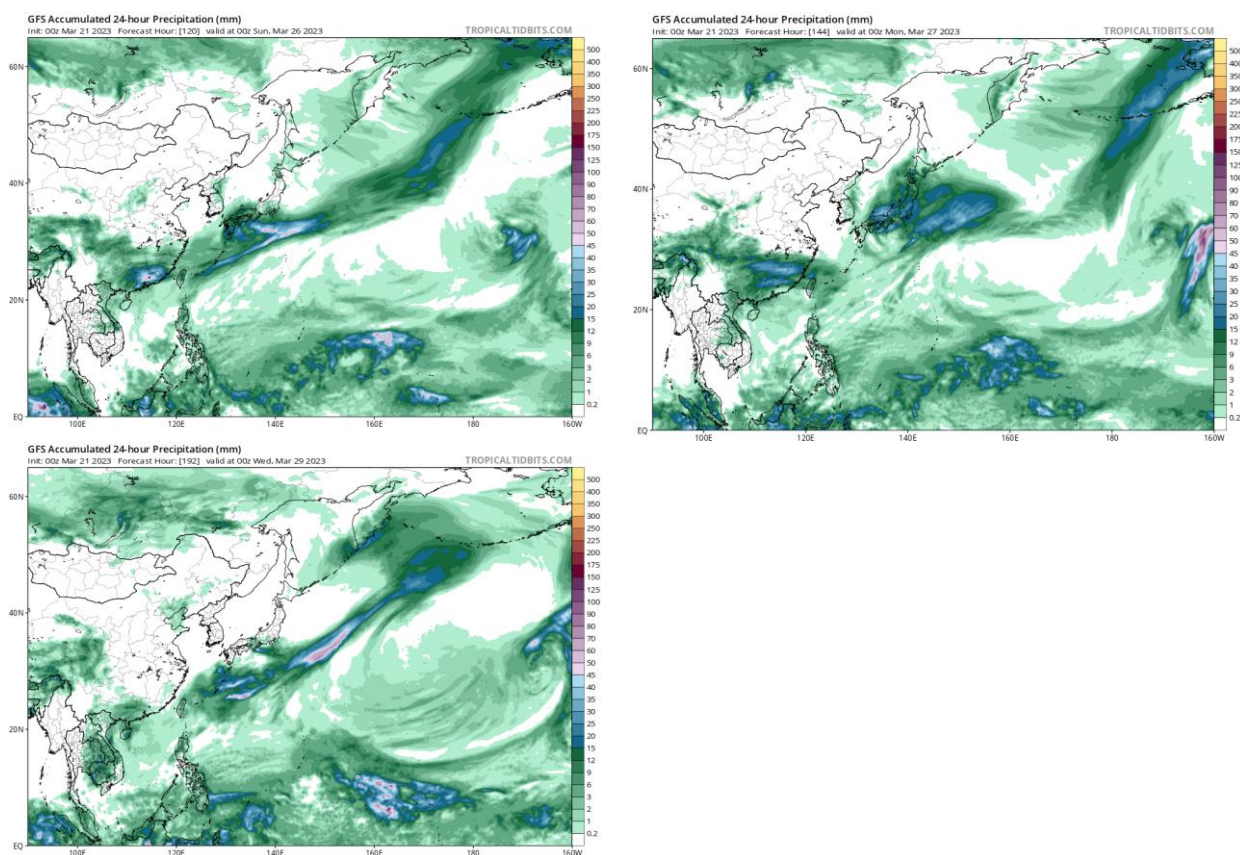
### 6.1 Weather and rainfall forecast

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) the heat low would cover 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 21-27 March 2023, 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 21-27 March 2023.





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

## 6.2 Water level forecast

### Chiang Saen and Luang Prabang

Based on March 20's weekly river monitoring bulletin, the weekly forecast water level at Chiang Saen in Thailand is expected to increase from 2.05 m to 2.15 m in the next seven days. The trend of water levels at these stations will continue staying below its LTA.

For Luang Prabang in Lao PDR, the water level is likely increasing about 0.40 m during the same period. The current water level is about 3.01 m higher than its LTA and about 0.65 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 0.38 m for the next seven days. At Vientiane in Lao PDR and Nong Khai in Thailand WLS will be up between 0.10 m and 0.15 m in the next seven days. At Paksane in Lao PDR, water level will decrease about 0.17 m due to some effect of inflows from the upper catchments. No rainfalls are forecasted in the area due to no 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 decrease between 0.03 m and 0.45 m. Water levels at these stations will stay lower than their LTA level. Next week no precipitation is forecasted in the area.

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

From Stung Treng on the Mekong River in Cambodia, the water level will likely go down about 0.10 m, while at Kratie it will be down about 0.45 m over the next seven days. For Kompong Cham, the WL will be down about 0.38 m and stay lower than its LTA. No 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 0.15 m and 0.37 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. No 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 down between their LTA and minimum values following daily tidal effects from the sea.

[Table 3](#) shows the weekly River Monitoring Bulletin issued on March 20. Results of the started weekly river monitoring bulletin are also available at [http://ffw.mrcmekong.org/bulletin\\_wet.php](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](#).

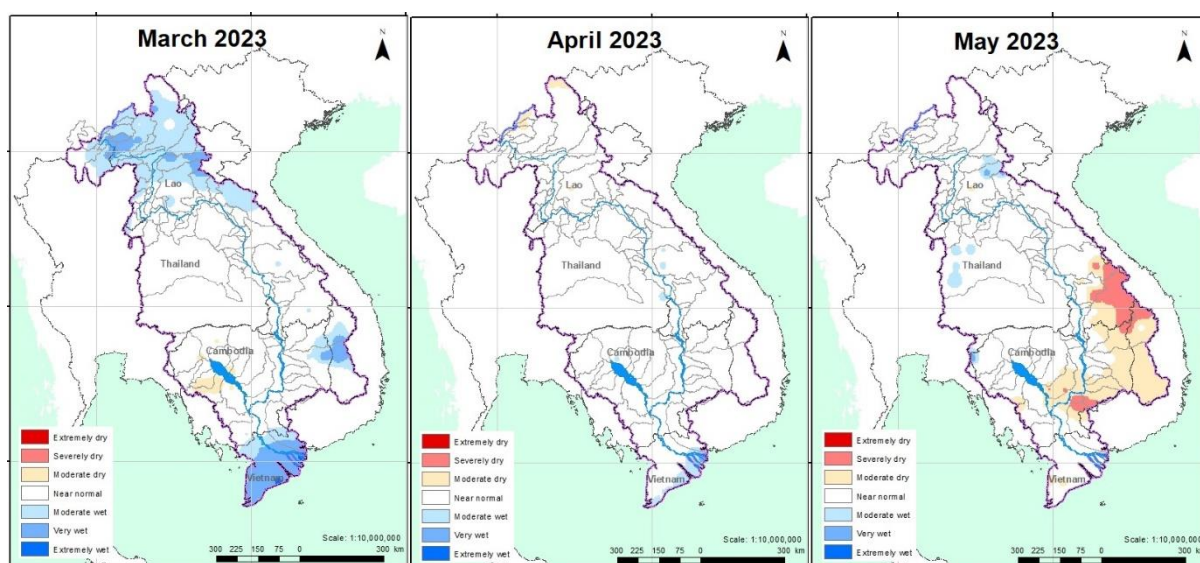
## **6.4 Drought forecast**

There are several climate-prediction models with different scenarios in the upcoming months. 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 NMME-based SPI forecasts for Mar, April, and May 2023 in over the LMB area.



**Figure 18. Monthly forecast of SPI for Mar, Apr, and May 2023.**

Figure 18 above shows that in **March** is generally wet in the north and south while middle part is likely to be normal. **April** is forecasted to receive average rainfall all over the region. But **May** is likely to be severely dry over the 3S area and moderately dry in the south-east covering eastern part of Cambodia and Viet Nam.

**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: 21 March to 27 March 2023

Date: 20 March 2023

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)						
		19-Mar											
Jinhong		0.0	-	-	536.12	536.13							
Chiang Saen		2.8	357.110	0.00	1.97	2.05	2.17	2.20	2.35	2.45	2.50	2.34	2.13
Luang Prabang		0.0	267.195	2.53	8.74	9.06	9.13	9.16	9.22	9.25	9.35	9.40	9.45
Chiang Khan		0.0	194.118	1.91	3.86	3.62	3.76	3.80	3.83	3.87	3.90	3.96	4.00
Vientiane		0.0	158.040	-0.28	1.37	1.26	1.01	1.16	1.21	1.25	1.30	1.33	1.40
Nongkhai		0.0	153.648	0.33	1.32	1.22	1.01	1.14	1.18	1.21	1.24	1.26	1.31
Paksane		0.0	142.125	0.10	2.67	2.55	2.42	2.23	2.32	2.34	2.35	2.36	2.38
Nakhon Phanom		0.0	130.961	0.18	1.67	1.62	1.48	1.33	1.13	1.20	1.22	1.23	1.25
Thakhek		0.0	129.629	1.38	3.14	3.08	2.93	2.77	2.55	2.63	2.67	2.69	2.72
Mukdahan		0.0	124.219	0.72	1.91	1.94	1.88	1.73	1.56	1.33	1.41	1.45	1.48
Savannakhet		0.0	125.410	-0.65	1.25	1.27	1.25	1.15	1.27	1.14	1.18	1.21	1.24
Khong Chiam		0.0	89.030	1.02	2.17	2.24	2.30	2.21	2.04	1.85	1.61	1.72	1.79
Pakse		0.0	86.490	0.03	1.19	1.23	1.27	1.22	1.12	1.00	0.83	0.91	0.98
Stung Treng		nr	36.790	0.32	2.68	2.68	2.72	2.74	2.72	2.67	2.60	2.55	2.60
Kratie		nr	-1.080	3.06	7.44	7.33	7.23	7.17	7.10	7.05	7.00	6.93	6.87
Kompong Cham		nr	-0.930	0.65	2.80	2.70	2.63	2.55	2.50	2.45	2.42	2.38	2.32
Phnom Penh (Bassac)		nr	-1.020	1.58	2.18	1.94	1.90	1.84	1.81	1.78	1.76	1.74	1.72
Phnom Penh Port		-	0.000	0.14	1.15	0.91	0.87	0.82	0.78	0.75	0.73	0.72	0.71
Koh Khel		nr	-1.000	1.52	2.14	1.92	1.85	1.80	1.76	1.72	1.70	1.69	1.72
Neak Luong		nr	-0.330	0.81	1.90	2.01	2.03	1.92	1.83	1.77	1.72	1.67	1.64
Prek Kdam		nr	0.080	0.58	1.19	1.08	1.04	1.00	0.97	0.94	0.92	0.91	0.89
Tan Chau		0.0	0.000	-0.37	0.69	1.11	1.36	1.45	1.50	1.42	1.20	1.00	0.80
Chau Doc		nr	0.000	-0.60	0.84	1.29	1.55	1.66	1.72	1.62	1.40	1.20	1.00

### 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/bulletin_wet.php); <http://ffw.mrcmekong.org/reportflood.php>

## 7 Summary and Possible Implications

### 7.1 Rainfall and its forecast

This week, no rainfall was observed along the Mekong River from Chiang Saen station down to the lower part at Tan Chau and Chau Doc in Viet Nam. Compared with last week's amount, the rainfall this week was considered low in the Mekong region.

Based on the forecasted rainfall from satellite using GFS data, no rainfall is forecasted in the areas from the lower part of Cambodia to the 3S area and Mekong Delta in Viet Nam from 21 to 27 March 2023. This indicates that the warm and hot weather in dry season has spread all over the LMB.

### 7.2 Water level and its forecast

The MRC's observed water level (WL) at Jinghong showed an increased level from 535.59 m to 536.13 m between 14 and 20 Mar 2023 (recorded on 7:00 am increased from 1,040.00 m<sup>3</sup>/s to 1,410.00 m<sup>3</sup>/s between 14 and 20 Mar 2023).

Mekong water levels this week remain in a normal condition—with 5 out of 22 stations will see water levels below their long-term average. In general, this hydrological condition is influenced by the inflows from the upper Mekong River in China and dam operations in the tributaries of the Lower Mekong River Basin.

Stay updated with our river monitoring and forecasting to better prepare for flood and drought events. Find more details at <https://www.mrcmekong.org/>.

The flow volume of the Tonle Sap Lake is slightly lower than its LTA (about 96%). From next week, the flow is expected to be decreasing due to no rainfall forecasted in the inflow catchments of the Tonle Sap Lake.

From Stung Treng to Kompong Cham, the water levels will 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 and higher than their LTA level, which **considered normal**.

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 Mar 13-19, the LMB was moderately dry mainly in the middle and lower parts. The drought condition spread over the area and the severe drought was found in Nong Khai, Sakon Nakhon, Nakhon Phanom, Udon Thani, Kalasin, Mukdahan, Roi Et, Yasothon, Amnat Charoen, Buriram, Nakhon Ratchasima, Sakeo, Surin, Banteay Meanchey, Otdar Meanchey, Siem Reap, Preah Vihea, Battambang, Kampong Thom, Borikhamxay, Khammuane, Savannakhet, Champasack, Sekong, and Attapeu. Those specific drought hotspots are considered normal as they are caused by dry soil moisture phenomenon during dry season.

For the coming three months, **March** is generally wet in the north and south while middle part is likely to be normal. **April** is forecasted to receive average rainfall all over the region. But **May** is likely to be severely dry over the 3S area and moderately dry in the south-east covering eastern part of Cambodia and Viet Nam.



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

Table A1: Weekly observed water levels

2023	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
14-03-2023	535.59	1.63	8.82	4.13	1.27	1.05	2.21	1.32	2.65	1.73	1.10	2.24	1.31	2.89	7.56	2.86	2.03	1.04	2.30	1.48	1.26	-0.05	0.07
15-03-2023	535.60	1.76	8.80	4.14	1.55	1.21	2.25	1.32	2.62	1.67	1.08	2.16	1.20	2.92	7.69	2.84	2.07	1.08	2.34	1.51	1.28	0.00	0.13
16-03-2023	535.73	1.82	8.62	4.22	1.57	1.33	2.46	1.43	2.85	1.69	1.09	2.06	1.14	2.84	7.68	2.82	2.10	1.11	2.35	1.58	1.26	0.06	0.21
17-03-2023	535.73	1.84	8.60	4.18	1.60	1.36	2.57	1.53	2.99	1.76	1.15	2.04	1.03	2.79	7.67	2.68	2.14	1.12	2.36	1.65	1.33	0.26	0.40
18-03-2023	535.89	1.93	8.62	3.96	1.59	1.39	2.63	1.61	3.06	1.86	1.20	2.05	1.08	2.71	7.59	2.86	2.13	1.18	2.30	1.75	1.32	0.42	0.58
19-03-2023	536.12	1.97	8.74	3.86	1.37	1.32	2.67	1.67	3.14	1.91	1.25	2.17	1.19	2.68	7.44	2.80	2.18	1.15	2.14	1.90	1.19	0.69	0.84
20-03-2023	536.13	2.05	9.06	3.62	1.26	1.22	2.55	1.62	3.08	1.94	1.27	2.24	1.23	2.68	7.33	2.70	1.94	0.91	1.92	2.01	1.08	1.11	1.29

Table A2: Weekly observed rainfall

2023	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
14-03-2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-03-2023	0	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-03-2023	7	26.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-03-2023	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-03-2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-03-2023	0	0	2.8	0	0	0	25.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-03-2023	0	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sum</b>	9.0	32.6	2.8	0.0	0.0	0.0	25.1	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



## Mekong River Commission Secretariat

P. O. Box 6101, 184 Fa Ngoum Road, Unit 18 Ban Sithane Neua, Sikhottabong District, Vientiane 01000, Lao PDR  
Tel: +856 21 263 263. Fax: +856 21 263 264 [www.mrcmekong.org](http://www.mrcmekong.org)

© Mekong River Commission 2020