Mekong River Commission

Weekly Dry Season Situation Report in the Lower Mekong River Basin

13-19 April 2021

Prepared by
The Regional Flood and Drought Management Centre
20 April 2021

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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 the period from **13-19 April 2021**. 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. All water level indicated in this report refers to an above zero gauge of each station.

The report covers the following topics that are updated weekly:

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

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

The TMD states that during April hot weather occurs together with low-pressure air mass cells along with more heat prevailing over the Mekong region. They mention that the high-pressure air mass which are prevailing over the Mekong region started to weaken since early March. The TMD also predicts that summer thunderstorms are likely to occur and may cause some considerable rainfall in April, with higher amount compared to historical records of rainfall in the Mekong region between April and May.

Figure 1 presents the weather map of 19 April 2021, showing a low pressure is dominating the upper part of the Lower Mekong Basin.

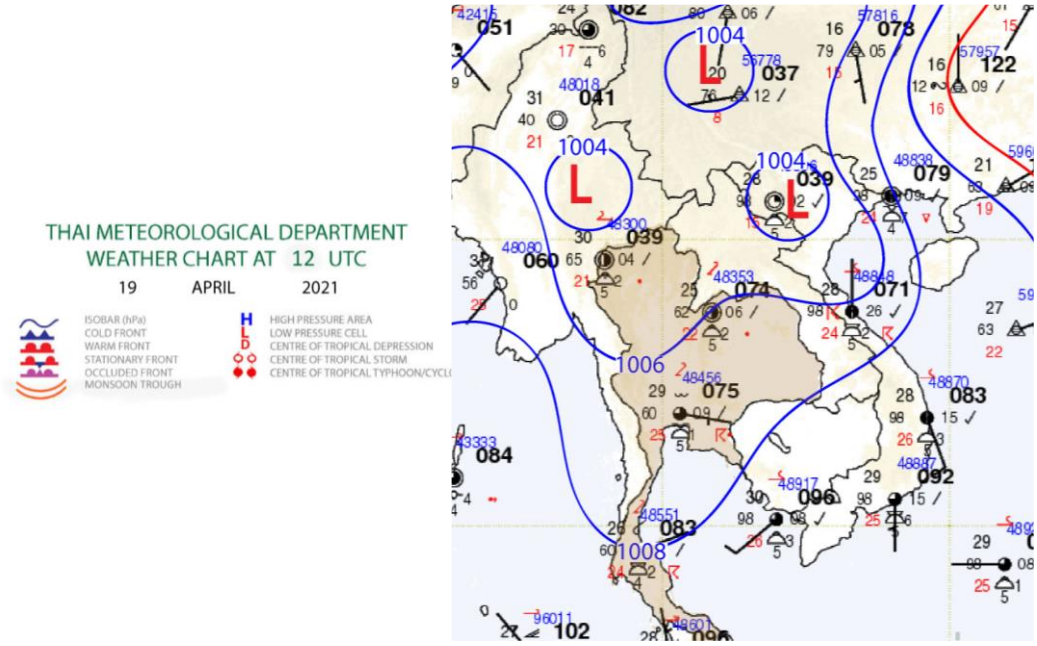


Figure 1: Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), highest probability of warmer conditions is predicted over of the Mekong region covering northern Lao PDR, Thailand, Cambodia, and Viet Nam during a period from 19 April to 2 May 2021. However, during this time, the ASMC says that warmer and wet condition may still influence the region.

Figure 2 shows the outlook of comparative warm conditions from 19 April to 2 May 2021 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

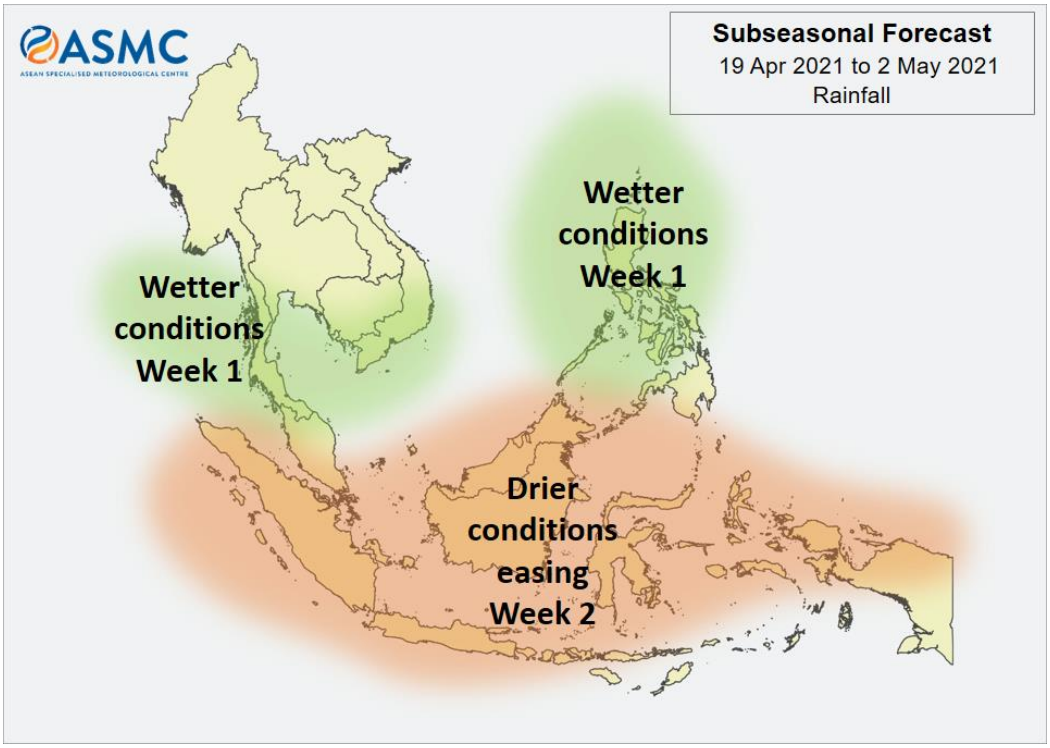


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

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

The low-pressure line is dominating the upper part of LMB during 20 April 2021, as shown in Figure 1. This low-pressure line can cause some rainfall that likely takes place in the upper and lower parts, including the Central Highland of Viet Nam and the 3S area of Mekong region in the next few days. However, based on Tropical Strom Risk (TSR), as displayed in Figure 3, there was no sign of tropical depression (TD), tropic storm (TS) or typhoon (TY) in the Mekong region up to 20 April 2021.

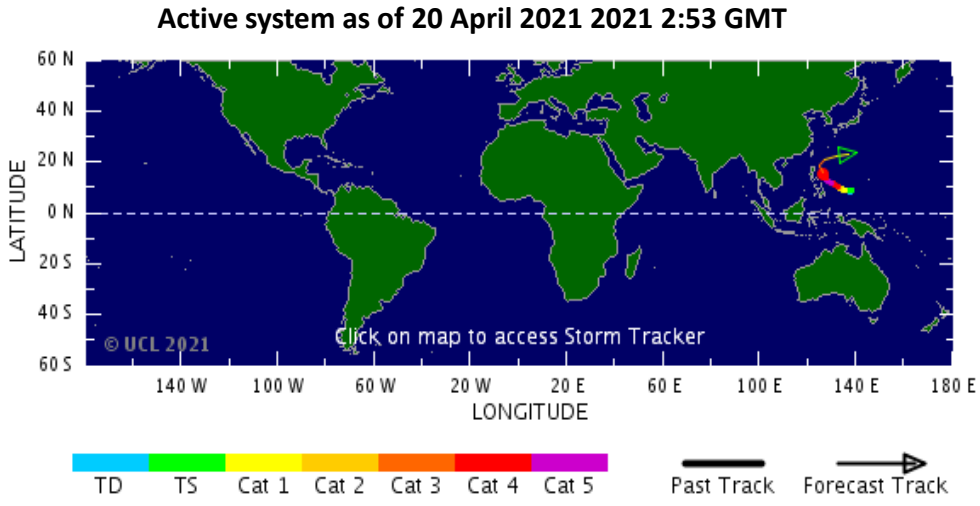


Figure 3: A Tropical Depression risk observed on 20 April 2021.

2.2 Rainfall patterns over the LMB

This week, rainfall was observed at most key stations from Chiang Saen to Paksane and the lower part from Mukdahan to Tan Chau, varying from 0.50 mm to 88. 50 mm. The total rainfall in this week compared with average rainfall in March 2021 is shown in Figure 4.

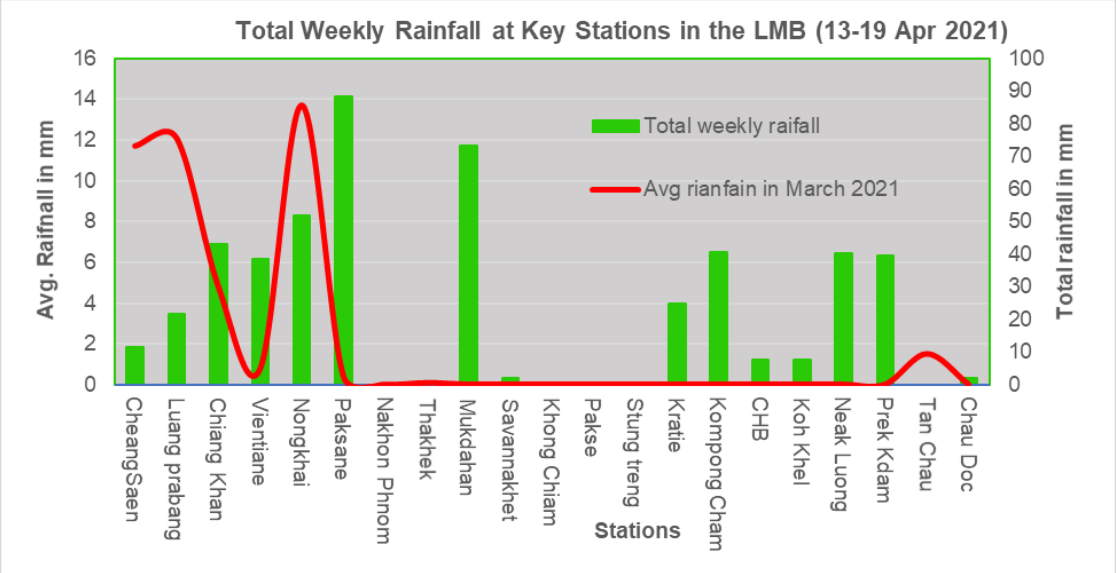


Figure 4: Weekly total rainfall at key stations in the LMB during 13-19 April 2021.

To verify area rainfall distribution, Figure 5 shows a map of the weekly accumulated rainfall based on observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 13 to 19 April 2021.

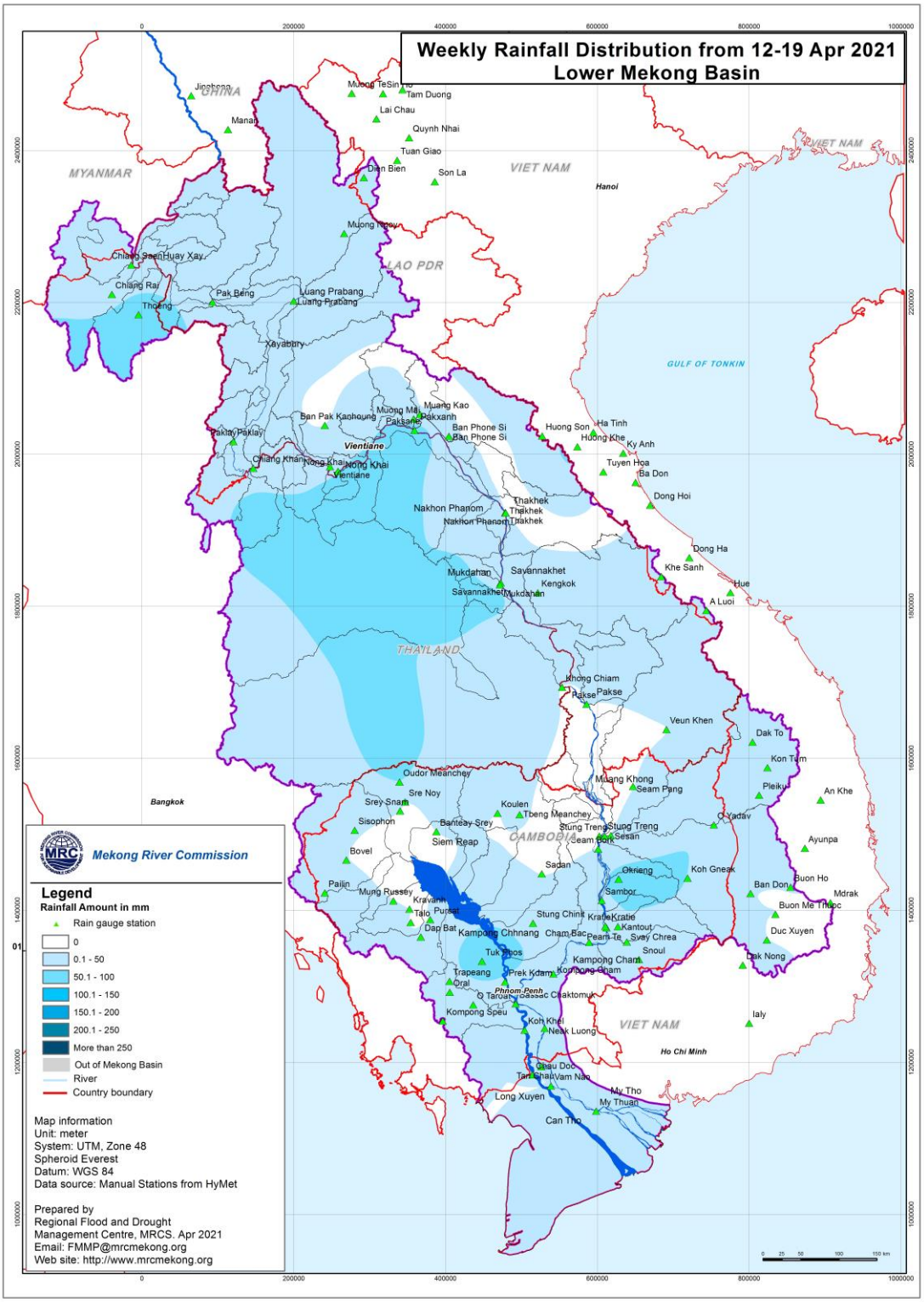


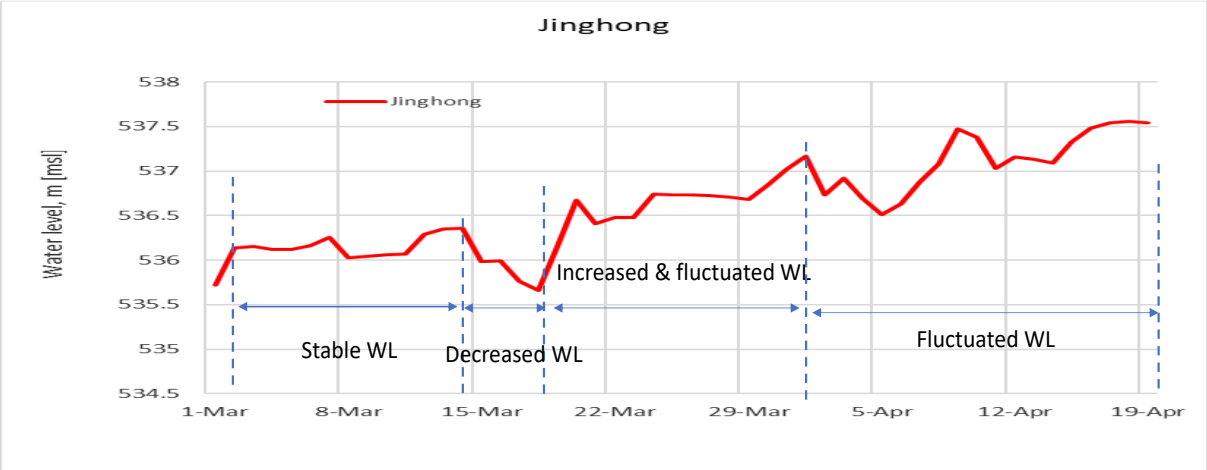
Figure 5: Weekly rainfall distribution over the LMB during 13-19 Apr 2021.

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.

According to MRC's observed water level data, the outflow at Jinghong hydrological station increased from 2,268 cubic metres per second (m^3/s) on Monday last week to 2,604 m^3/s today (April 19). Amid water-level fluctuation in the upstream part of the LMB, water levels in the LMB region increased during the mentioned period and were more apparent from Chiang Saen in Thailand to Paksane in Lao PDR, and from the stretches of the river between Nakhon Phanom in Thailand and Pakse in Lao PDR, and Stung Treng to Kompong Cham in Cambodia. Water level fluctuation from 1 Mar to 19 Apr 2021 at Jinghong Dam is presented in the graph below.



Near-real time of hydro-meteorological monitoring at Jinghong Station is presented at https://portal.mrcmekong.org/monitoring/river-monitoring-telemetry.

Based on hydrological phenomenon, the contribution of inflow water from the upstream of Lancang-Mekong in China to the Mekong mainstream is about 25% in total during the dry season from November to May. The whole inflow of water into the lower Mekong basin is influenced not only by the Mekong-Lancang upstream but also by downstream dam operation at Mekong mainstream and its tributaries during the Dry Season.

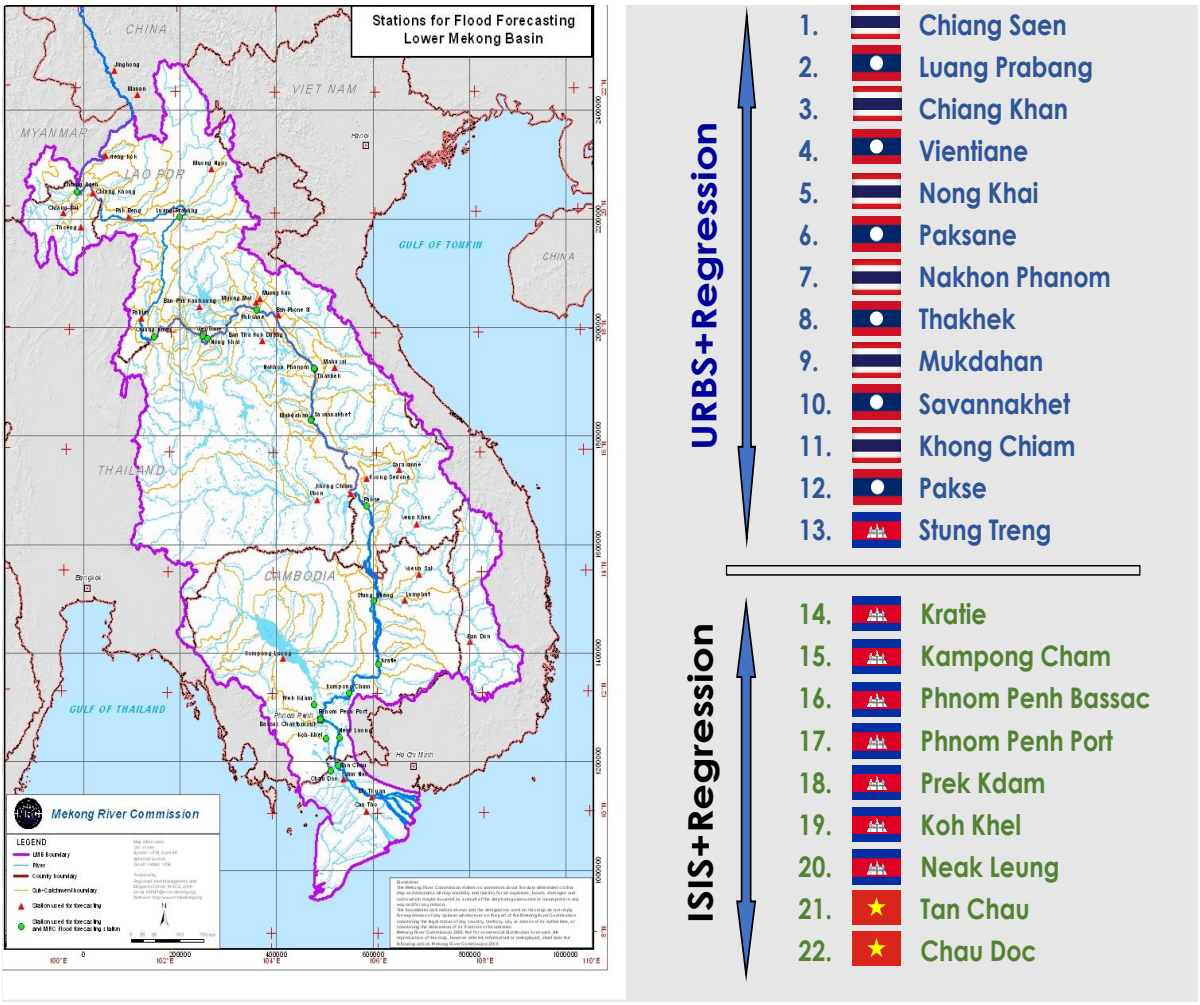


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

Chiang Saen and Luang Prabang

The water level from 13 to 19 April 2021 at Thailand's Chiang Saen increased from 3.34 metres to 3.38 metres. This week's water level is about 0.19 metres higher than its historical maximum (Max). When compared to last week, the level this week is higher.

The water level at Luang Prabang station in Lao PDR increased from 8.86 metres to 9.23 metres, during the reporting period. This level shows 2.13 metres above its historical maximum value. This phenomenon is caused by dam operations located upstream and Xayaburi and rainfall in the surrounding areas.

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 wet and dry seasons**.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of Xayaburi Dam) increased from 5.18 metres to 5.49 metres during this week, showing about 0.06 metres above its maximum

value. This situation is probably influenced by Xayaburi dam operation and rainfall upstream. It is also noted that water levels downstream at Vientiane followed the same trend which increased from 2.68 metres to 3.10 metres, showing about 0.56 metres higher than its maximum value. For Nong Khai, water level increased about 0.50 metres compared to last week and stayed close to its maximum value, while water level at Lao PDR's Paksane increased 0.50 metres and was about 1.12 metres higher than its LTA. It is considered a rapid rise of water levels, during this week. **The increased water levels at Chiang Khan and Paksane are shown in Figure 7** .

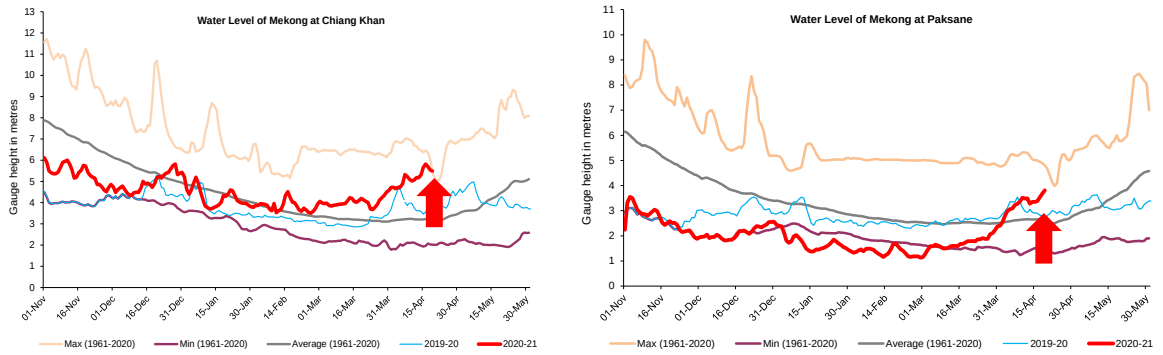


Figure 7: Water levels at Chiang Khan and Paksane in Thailand and Lao PDR.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom to Pakse in Thailand and Lao PDR slightly increased by about 0.05 metres and stayed about 0.70 metres above their LTAs values, during the reporting period. The weekly water levels at Nakhon Phanom and Pakse are shown in Figure 8.

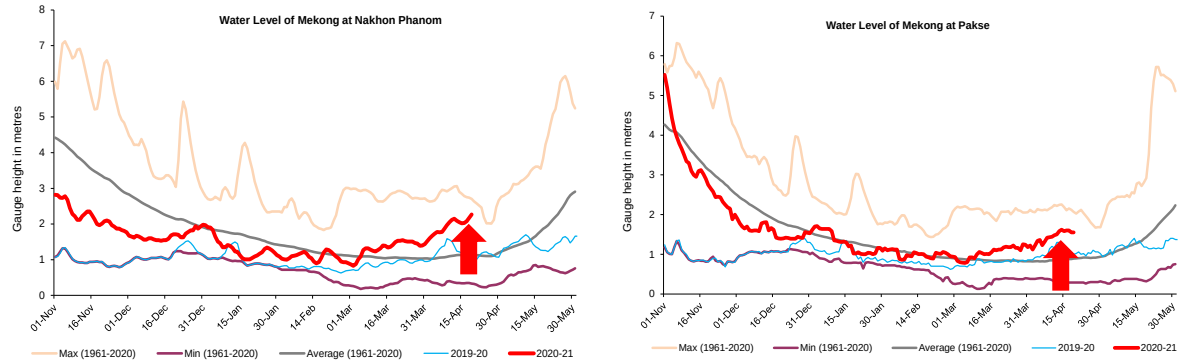


Figure 8: Water levels at Nakhon Phanom and Pakse of Thailand and Lao PDR.

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

With contribution of flows from the upstream part of the Mekong River and the 3S river (Sekong, Se San and Sre Pok), the water levels at Stung Treng to Kompong Cham in Cambodia still increased. This week water levels were about 0.61 metres higher than their LTAs at Stung Treng and 1.24 metres at Kratie, while at Kompong Cham they were about 0.26 metres higher than their LTAs, as shown in Figure 9 (Stung Treng and Kratie).

At Neak Luong on the Mekong River and Koh Khel on the Bassac River followed the tidal effect which increased about 0.10 metres from April 13 to 19 and stayed close to their LTAs. Also, from Chaktomuk on the Bassac River to Prek Kdam on the Tonle Sap River, water levels are close to their LTAs. For the Tonle Sap Lake, water level revealed lower than its LTA (observed at Kompong Luong), expressing as a critical situation.

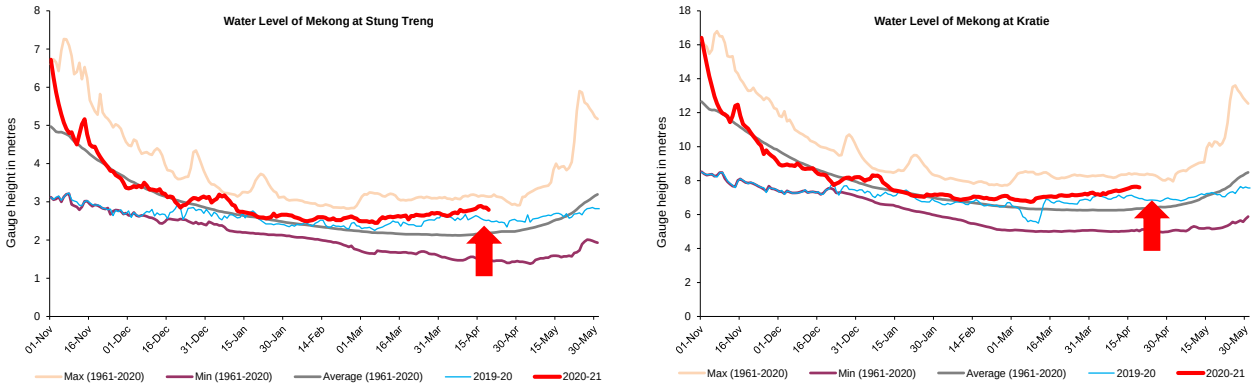


Figure 9: Water levels at Stung Treng and Kompong Cham on the Mekong River.

Tidal stations at Tan Chau and Chau Doc

Like last week, from 13 to 19 April 2021, water levels at the tidal stations of Viet Nam's Tan Chau and Chau Doc fluctuated out of the maximum and minimum ranges due to daily tidal effects from the sea, which was **considered as a very critical condition**.

The Tonle Sap Flow

At the end of the wet season, when water levels along the Mekong River decrease, flows of the Tonle Sap Lake (TSL) returns to the Mekong mainstream and then to the Delta. This phenomenon normally takes place from mid-October to early November. The delay of the outflow was due to the heavy rain from last October in some of the inflow tributaries around the TSL area.

Figure 10 shows the seasonal changes of the outflow of the TSL at Prek Kdam in comparison with the flows of 2018 and 2019, and their LTA level (1997–2019). Up to 19 April 2021 of this reporting period, **it is observed that the main outflow from the TSL has started since 15 November 2020**. The outflow condition in late 2020 was lower than its average flows but looks similar to the 2020's flow and is higher than 2019 condition. Since water levels at Prek Kdam on the Tonle Sap river, Neak Luong on the Mekong and Chaktomuk, and Koh Khel on the Bassac rivers are lower than their LTAs levels, the outflow of the TLS Lake is expected to slightly increase starting from next week.

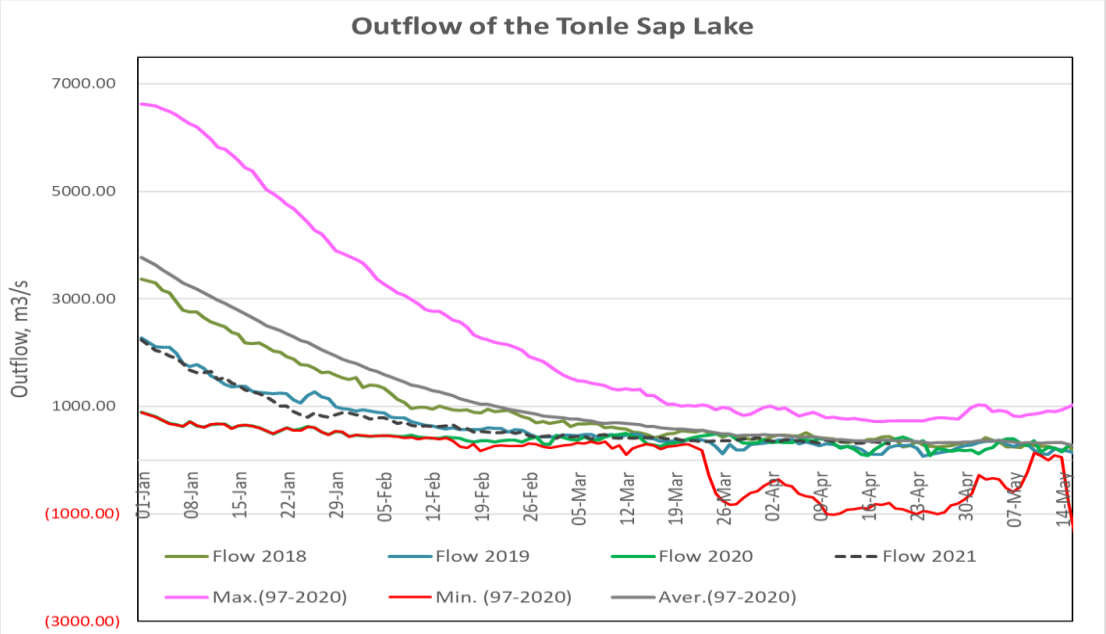


Figure 10: Seasonal change of inflows and outflows of Tonle Sap Lake.

The water volume of the Lake up to this point has been considered critical as it is still lower than its long-term average level. Figure 11 shows seasonal changes in monthly flow volumes up to April 19 for the TSL compared with the volumes in 2018, 2019, their LTAs, and the fluctuating levels (1997–2019). **It shows that up to April 19, the water volumes of the Lake were higher than 2020 and close to those of 2019 during the same period**. This is clearly displayed in Table 1, which indicates that the TSL has been affected by water levels from the Mekong River, the tributaries, and rainfall in the surrounding sub-catchments.

The increased inflows, from the Mekong River and tributaries, of the TSL in October of the 2020 wet season have resulted in a higher flow in 2020 than in 2019. 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 TSL during the wet season. The data show that about half of the annual inflow volume into the Lake has originated from the Mekong mainstream. Thus, flow alterations in the mainstream could have direct impacts on the Tonle Sap Lake water levels and on its hydrology.

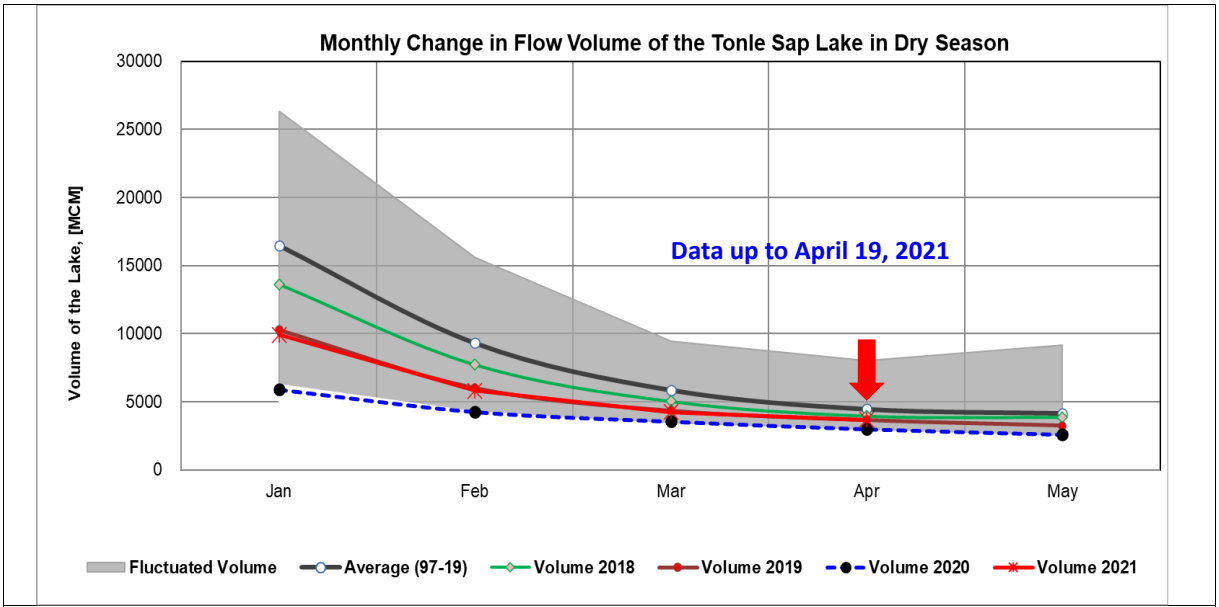


Figure 11: The seasonal change in monthly flow volume of Tonle Sap Lake.

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

Month	Average Volume (97-19) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2018 [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]
Jan	16452.95	26357.53	6272.01	13633.41	10285.31	5906.80	9923.80
Feb	9312.36	15596.22	4281.41	7729.72	6019.30	4264.19	5832.97
Mar	5868.92	9438.24	3350.92	5037.06	4354.62	3553.99	4264.88
Apr	4474.98	8009.14	2875.42	3956.47	3667.47	2992.61	3681.29
May	4166.07	9176.93	2417.81	3864.00	3266.43	2594.92	
Jun	6034.10	13635.01	2470.54	5919.18	3517.06	2641.88	
Jul	12502.58	28599.56	3832.51	12024.96	4001.99	2925.86	
Aug	26934.35	39015.12	7554.93	22399.65	7622.71	5941.07	
Sep	42644.05	65632.35	22180.73	53639.54	24194.19	12105.31	
Oct	49698.19	73757.23	24276.79	48193.08	30358.38	20799.13	
Nov	39542.58	60367.33	18576.01	31036.07	19112.65	27546.80	
Dec	26325.13	38888.95	10869.43	18469.21	10577.29	18251.65	
	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^3)							

4 Flash Flood in the Lower Mekong Basin

From April 13 to 19, the LMB was affected by four main weather factors. These include (i) the moderate high-pressure which covered the upper part of the LMB; (ii) the southerly and south-easterly wind which prevailed over the central part of the LMB last week, causing hot weather in some northern areas of middle part of the LMB; (iii) the northeast monsoon which prevailed over the Gulf of Thailand; and (iv) the thunderstorms with gusty wind which occurred in several areas of middle part (including Thailand and Lao PDR) of the LMB, causing heavy rain in those mentioned areas during the last day of last week.

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

5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from 10 to 16 April 2021

Drought monitoring data for 2021 are available from Saturday to Friday every week; thus, the reporting period is normally three days delayed compared to Flood and Flash Flood reports. We adopt the Index of Soil Water Fraction (ISWF) data obtained from FFGS during wet season. The products are limited for dry season. The RFDMC, therefore, temporarily uses the products of forecasted SMA to replace the weekly soil moisture monitoring for the time being. Further contact with the developer, HRC, will soon be carried out to solve the soil moisture monitoring issue.

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

Meteorological drought condition of the LMB from 10 to 16 April 2021, as shown in Figure 12, was much wetter than last week from March 27 to April 02. Most parts of the LMB received average and above average rainfall during the monitoring week, except some areas of Lam Dong and Dak Lak of Viet Nam in the lower part of the region which received below average rainfall.

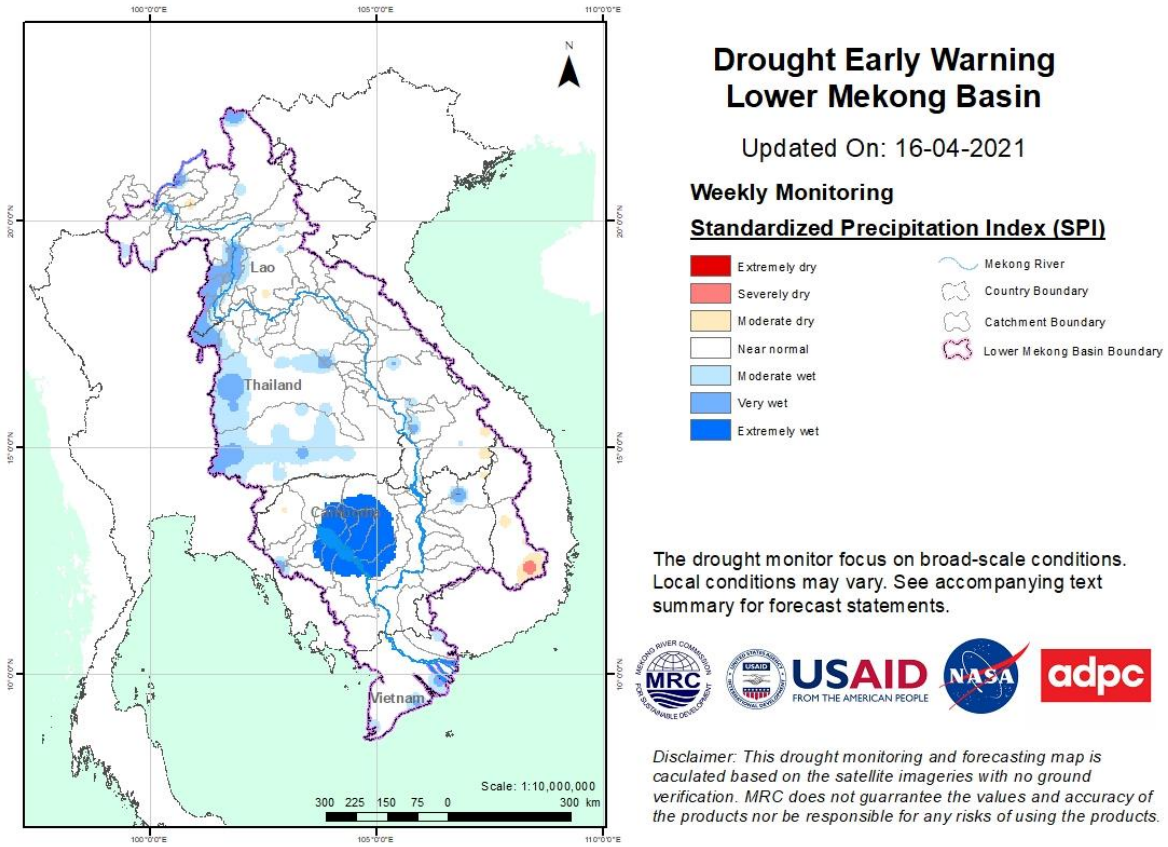


Figure 12: Weekly standardized precipitation index from 10 to 16 Apr 2021.

- **Weekly Soil Moisture Anomaly (SMA)**

Soil moisture condition from 10 to 16 April 2021, as displayed in Figure 13, was much better than the condition last week (Apr 3 to 9). The overall condition of soil moisture was normal and wet for most of the LMB areas, except some areas of Chaiyaphum and Nakhon Ratchasima which were at moderate dry.

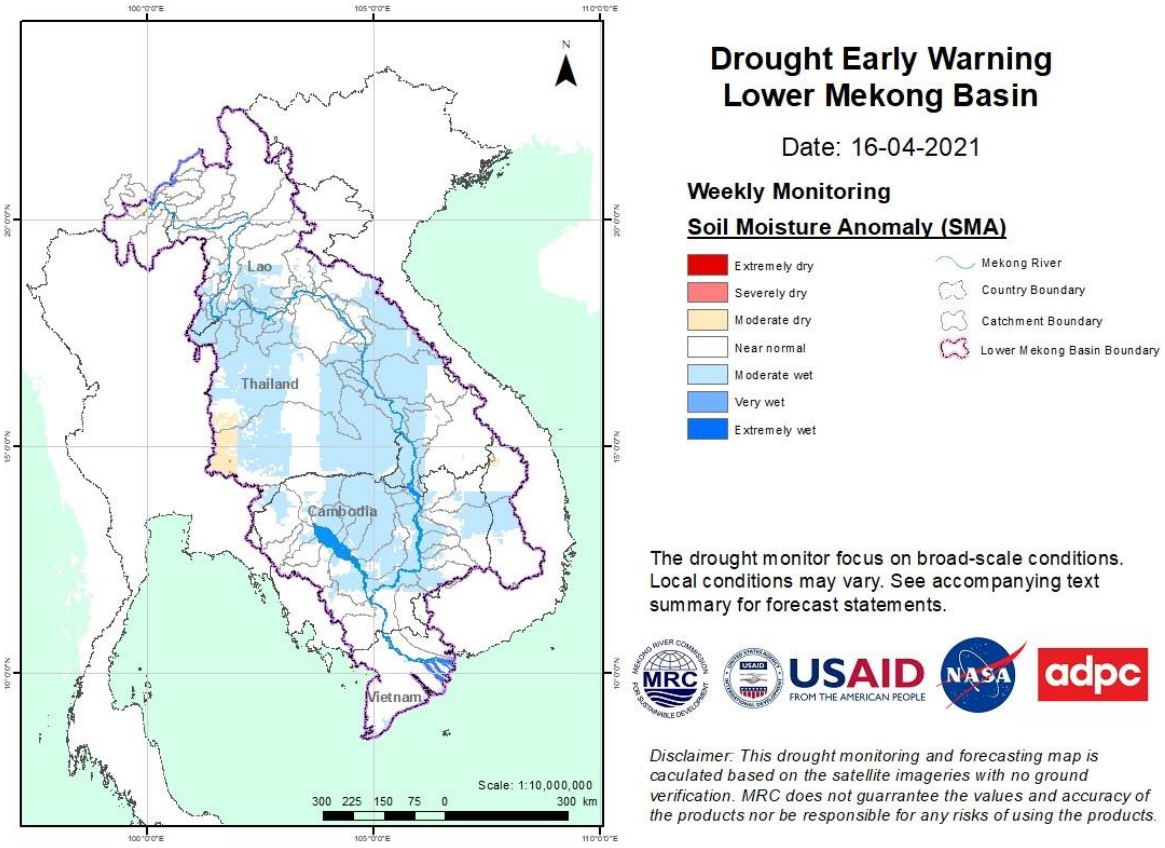


Figure 13: Weekly Soil Moisture Anomaly from 10 to 16 Apr 2021.

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

The overall drought condition through combined drought index from 10 to 16 April 2021, as displayed in Figure 14, shows normal condition in all parts of the LMB region. Like last week (April 3 to 9), the region received average and above average rainfall during the monitoring week.

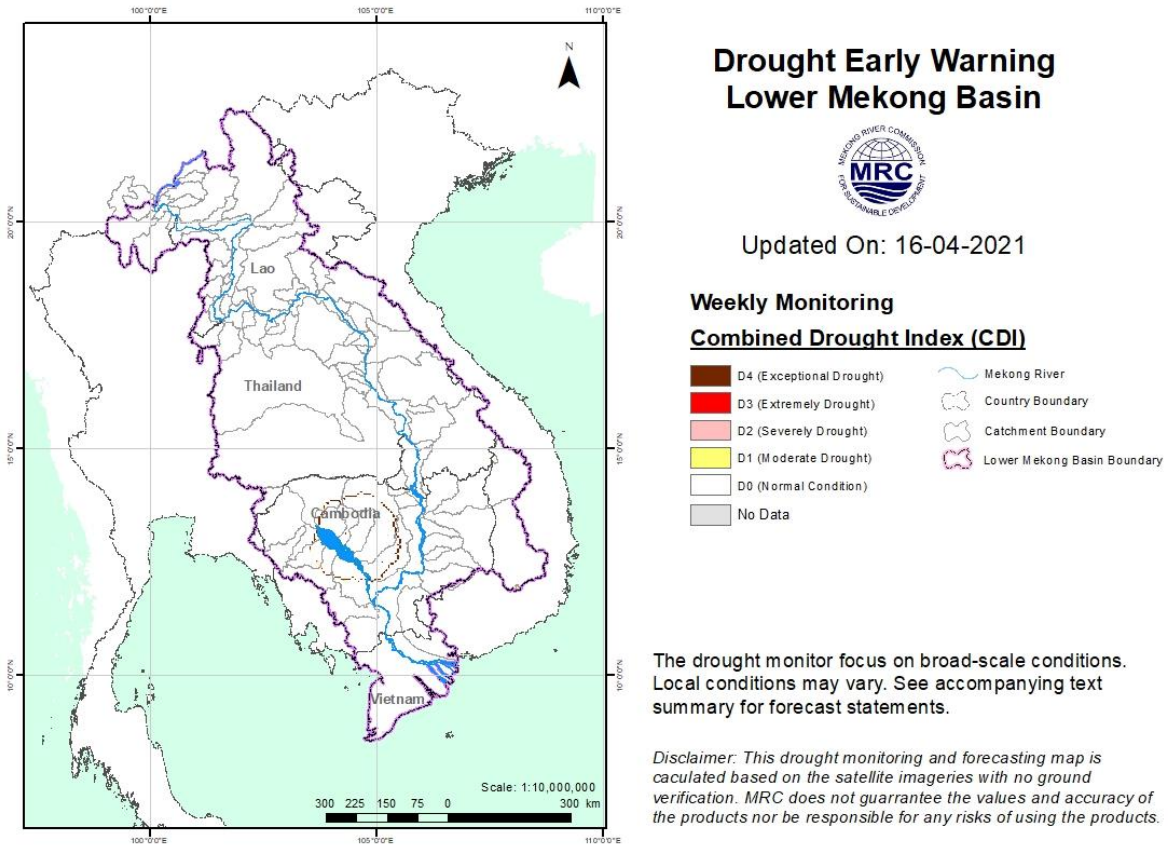


Figure 14: Weekly Combined Drought Index from 10 to 16 Apr 2021.

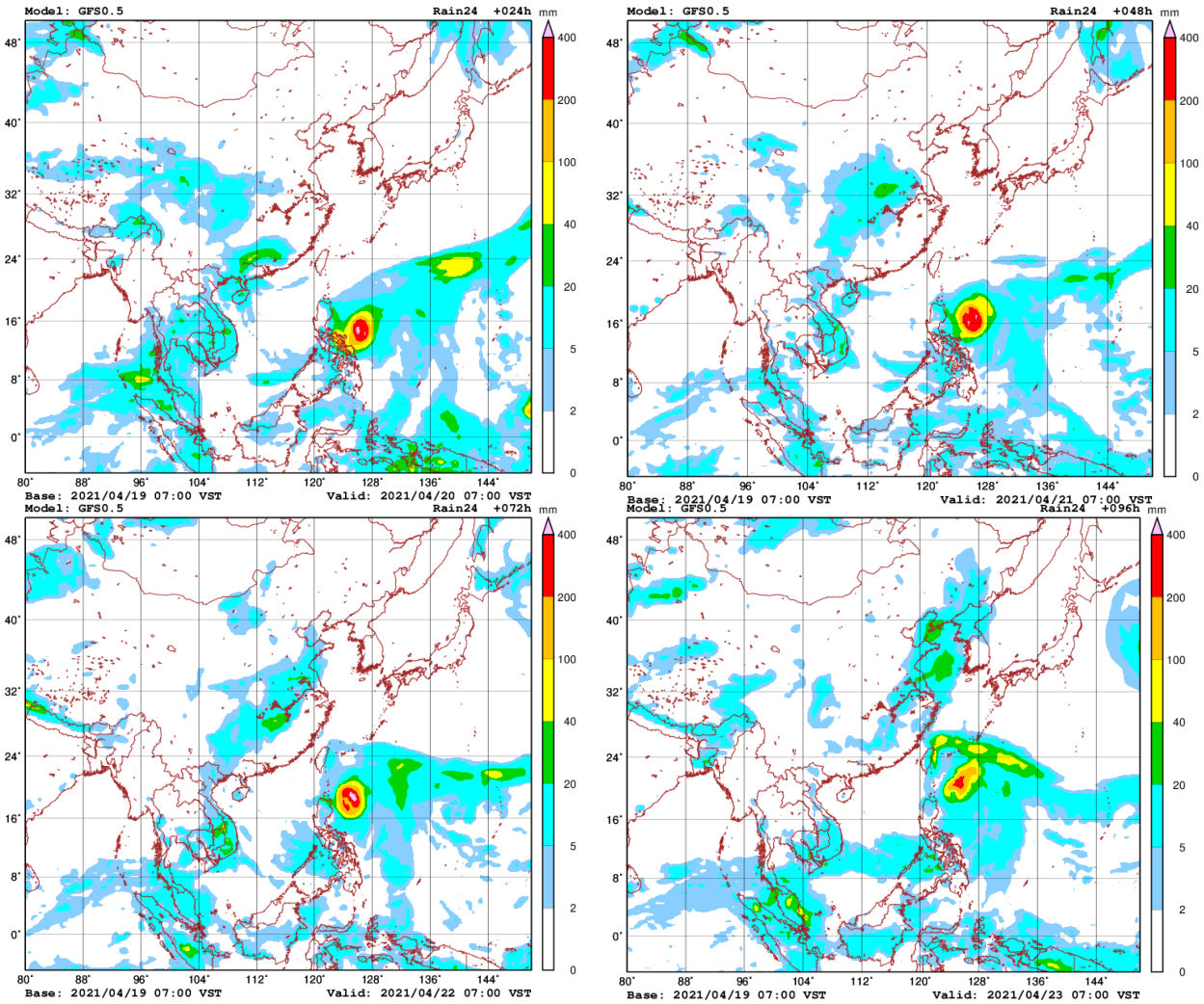
More information on Drought Early Warning and Forecasting (DFEW) as well as the explanation is available here: http://droughtforecast.mrcmekong.org/templates/view/our-product. DFEW provides not only weekly monitoring and forecasting information but also three-month forecasts of drought indicators with seasonal outlook which are usually updated every month based on international weather forecast models. Details on drought forecast is 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, there might be three factors affecting the LMB, as have been the case. They include (i) high-pressure which likely continues to cover the upper part of the LMB, (ii) the south-easterly wind which likely appears in the middle part of the LMB, and (iii) the on-going prevailing northeast monsoon from the Gulf of Thailand to the lower part of the LMB. From April 20 to 25, small (5-10 mm/24 hrs) amount of rainfall may take place in some areas, however on April 26, moderate rainfall (20 –40 mm/24hrs) may occur in some areas at middle part of the LMB.

Figure 15 shows accumulated rainfall forecast (24 hrs) of the GFS model from 20 -26 Apr 2021.



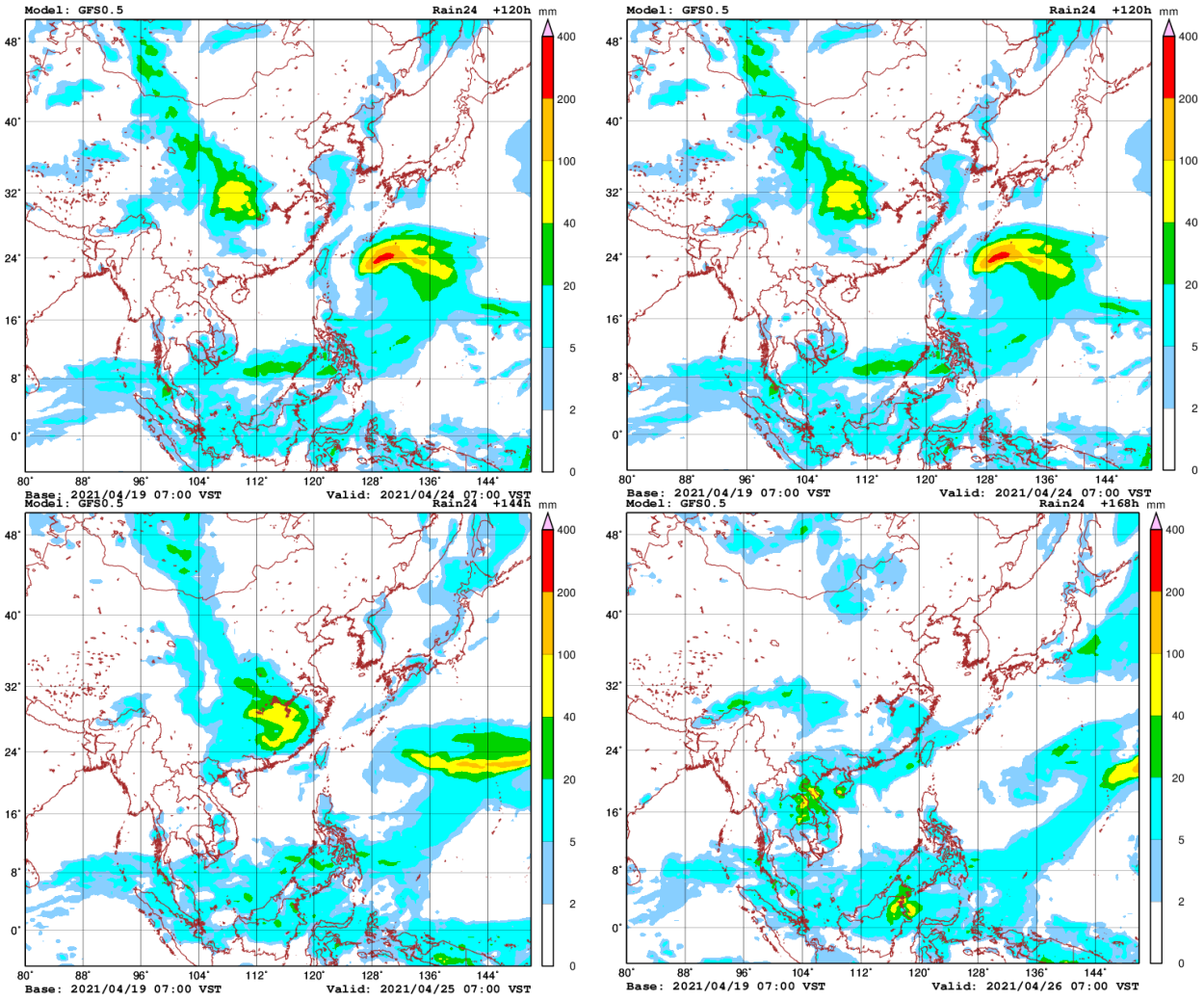


Figure 15: Accumulated rainfall forecast (24 hrs) of model GFS.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on April 19's weekly river monitoring bulletin, the weekly forecast water level at Chiang Saen in Thailand is expected to decrease from 3.38 metres to 2.88 metres in the next seven days. However, the trend of water levels at this station will continue staying above its LTA.

For Luang Prabang in Lao PDR, the water level will decrease from 9.28 to 9.05 metres during next week. The current water level is higher than its maximum value. For next week, some amount of precipitation is forecasted for the areas between Chiang Saen and Luang Prabang stations.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand is forecasted to go down by about 0.12 metres, while at Vientiane in Lao PDR the water level is forecasted to decrease about 0.03 metres. From Nong Khai to Paksane, water levels will decrease by about 0.03 metres in the next seven days. Rainfall is forecasted for the areas between Chiang Khan and Paksane for next week.

The water levels will remain higher than their LTAs at Chiang Khan, Vientiane, and Nong Khai, while at Paksane water levels will continue staying above their LTAs.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR may slightly decrease by about 0.10 metres in the next seven days. Water levels from Nakhon Phanom to Pakse in Thailand and Lao PDR will stay higher than their LTAs. Precipitation is forecasted for the areas between Nakhon Phanom and Pakse for next week.

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

From Stung Treng to Kampong Cham along the Mekong River in Cambodia, water levels will slightly decrease by about 0.12 meters in the next seven days. Precipitation is forecasted for the area between Stung Treng and Kratie during next week.

Water levels of the Tonle Sap Lake at Prek Kdam and Phnom Penh Port, as well as at Phnom Penh, Chaktomuk on the Bassac River, will slightly increase by about 0.12 metres over the next seven days.

With the trend, water levels at these stations will be staying close to their LTA levels, particularly from the Bassac at Phnom Penh to Koh Khel as well as Tonle Sap at Prekdam to Phnom Penh Port, including the Tonle Sap Lake. Precipitation is forecasted for the low-lying area of Cambodia next week.

Tidal stations at Tan Chau and Chau Doc

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

Table 2 shows the weekly River Monitoring Bulletin issued on April 19. Results of the weekly river monitoring bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php.

6.3 Flash Flood Information

Flash flood events are likely not to happen in the LMB within next week. During 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 on the upcoming months until June 2021. The MRC's Drought Forecasting and Early Warning System (DFEWS) adopts an ensemble model, which averages all scenarios called the North America Multi-Model Ensemble (NMME).

The global scale of rainfall prediction is used to see how the rain distribution looks like for the coming months. Figure 16 shows the ensemble mean of daily average precipitation (mm/day) each month from April to July 2021 produced by the NMME.

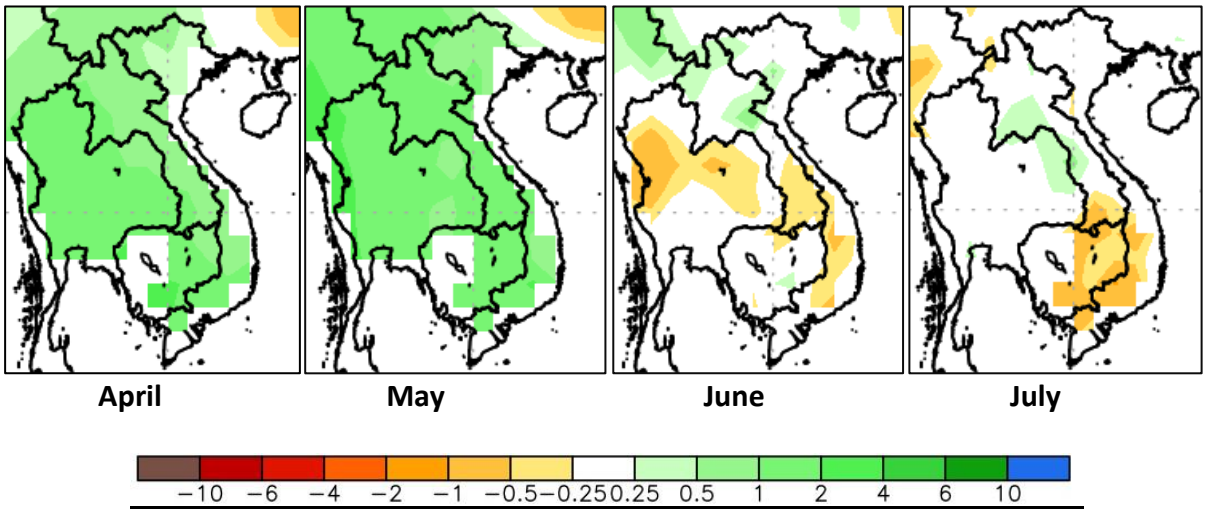


Figure 16: Daily average of monthly rainfall anomaly forecast from April to July 2021.

The ensemble prediction model forecasts that the LMB is likely to receive relatively high rainfall during April and May but below average rainfall during June and July. In June, the model shows that below average rainfall is likely to take place mainly in Thailand, southern Lao PDR, and Central Highland of Viet Nam. While in July it shows below average rainfall concentrates mainly in southern part of the LMB region covering eastern areas of Cambodia and south-eastern part of Viet Nam.
It seems that dry season this 2021 is a bit wetter than last year 2020 and rain might come early in the wet season than in 2019 and 2020.

On the contrary, the forecasted combined drought index in Figure 17, a combination of forecasted SPI and SMA, shows a bit different results when downscaling to a regional level. The initial computational run of the models shows that May is likely to experience moderate to exceptional droughts covering half central-eastern areas of the LMB starting from Vientiane and Nong Khai down to 3S areas and Central Highland of Viet Nam. The results also show that moderate and severe drought might take place in June over the bordering areas between Lao PDR and Thailand, but the situation is not serious.

Note: we are under the process of full model running at the moment and hope to verify the results in the next week report.

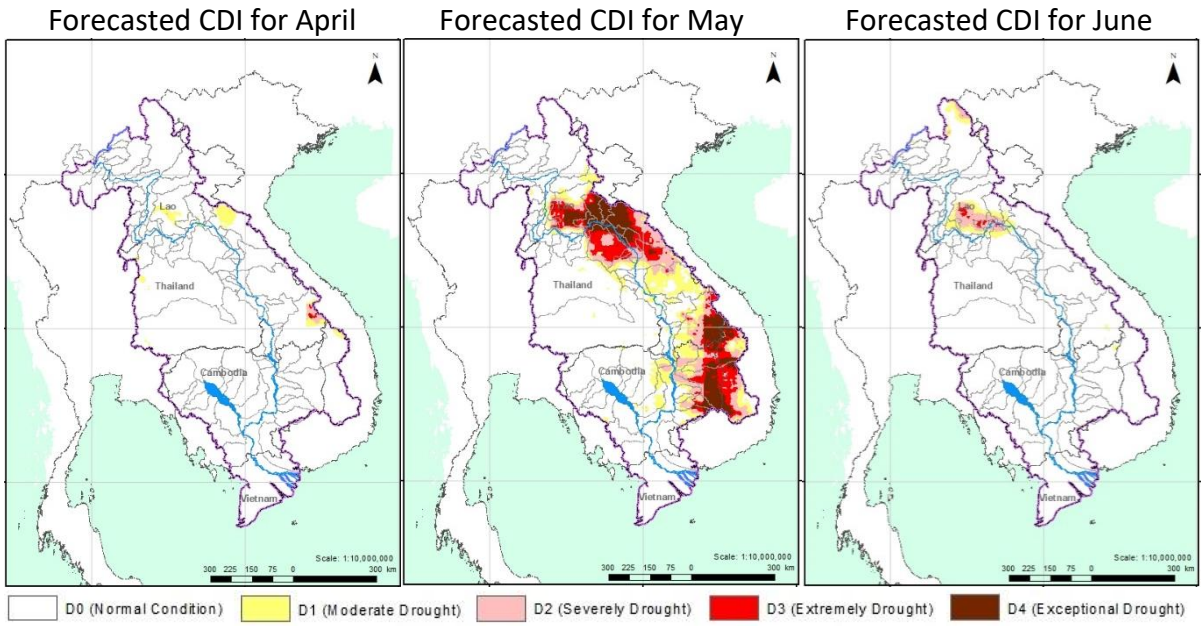


Figure 17: Monthly drought forecast for April, May, and June 2021

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: 20 April to 26 April 2021

Date: 19 April 2021

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)						
		18-Apr			18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr
Jinhong		0.0	-	-	537.56	537.54							
Chiang Saen		1.0	357.110	0.00	3.22	3.38	3.39	3.37	3.27	3.12	3.00	2.92	2.88
Luang Prabang		8.6	267.195	2.53	9.14	9.28	9.38	9.52	9.55	9.48	9.35	9.20	9.05
Chiang Khan		4.2	194.118	1.91	5.54	5.49	5.43	5.50	5.58	5.61	5.55	5.47	5.37
Vientiane		36.8	158.040	-0.28	3.22	3.10	3.07	3.03	3.09	3.14	3.17	3.13	3.05
Nongkhai		16.8	153.648	0.33	2.70	2.62	2.58	2.54	2.62	2.67	2.71	2.66	2.60
Paksane		64.7	142.125	0.10	3.68	3.81	3.75	3.72	3.69	3.74	3.78	3.81	3.77
Nakhon Phanom		0.0	130.961	0.18	2.17	2.27	2.35	2.31	2.29	2.27	2.30	2.33	2.35
Thakhek		0.0	129.629	1.38	3.43	3.53	3.62	3.57	3.53	3.50	3.54	3.59	3.62
Mukdahan		0.0	124.219	0.72	2.31	2.43	2.51	2.56	2.53	2.51	2.50	2.52	2.54
Savannakhet		0.0	125.410	-0.65	1.18	1.18	1.23	1.25	1.23	1.22	1.22	1.23	1.24
Khong Chiam		0.0	89.030	1.02	2.60	2.66	2.83	2.94	3.01	2.95	2.91	2.88	2.92
Pakse		0.0	86.490	0.03	1.55	1.55	1.70	1.80	1.85	1.82	1.78	1.76	1.80
Stung Treng		nr	36.790	0.32	2.85	2.79	2.78	2.89	2.98	3.02	3	2.96	2.94
Kratie		nr	-1.080	3.06	7.64	7.60	7.52	7.50	7.63	7.73	7.78	7.75	7.70
Kompong Cham		nr	-0.930	0.65	2.88	2.82	2.77	2.68	2.65	2.79	2.91	2.97	2.93
Phnom Penh (Bassac)		nr	-1.020	1.58	1.98	2.01	2.03	2.00	2.03	2.10	2.17	2.20	2.17
Phnom Penh Port		nr	0.000	0.14	1.00	1.03	1.05	1.02	1.06	1.13	1.20	1.23	1.20
Koh Khel		nr	-1.000	1.52	2.04	2.05	2.06	2.08	2.11	2.15	2.19	2.22	2.20
Neak Luong		nr	-0.330	0.81	1.24	1.27	1.24	1.21	1.16	1.12	1.17	1.22	1.25
Prek Kdam		nr	0.080	0.58	1.03	1.04	1.06	1.03	1.07	1.12	1.17	1.20	1.17
Tan Chau		0.0	0.000	-0.37	-0.31	-0.26	-0.09	0.15	0.45	0.68	0.85	1.00	1.13
Chau Doc		0.0	0.000	-0.60	-0.27	-0.23	-0.04	0.22	0.53	0.78	0.95	1.11	1.24

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

During this reporting week, rainfall was recorded from Chiang Saen to Paksane and the lower part from Mukdahan to Tan Chau, varying from 0.50 mm to 88. 50 mm.

Based on the forecasted satellite data, rainfall is forecasted for some areas of the LMB from 10 to 60 mm for the next 7 days. The forecasting model using GFS data, on the other hand, shows that no significant rainfall (>70mm) is likely to take place in the Mekong region from 20 to 26 April 2021.

7.2 Water level and its forecast

According to MRC's observed water level data, the outflow at Jinghong hydrological station increased from 2,268 cubic metres per second (m^3/s) on Monday last week to 2,604 m^3/s today (April 19). Amid water-level fluctuation in the upstream part of the LMB, water levels in the LMB region increased during the mentioned period and were more apparent from Chiang Saen in Thailand to Paksane in Lao PDR, and also from the stretches of the river between Nakhon Phanom in Thailand and Pakse in Lao PDR, and Stung Treng to Kompong Cham in Cambodia. For the Mekong Delta in Viet Nam at Tan Chau and Chau Doc, water levels have been varying in between maximum and minimum levels due to the influence by the sea tidal, which considered very critical condition.

Water levels from Chiang Khan to Vientiane in Thailand and Lao PDR will likely be affected by Xayaburi dam in the next few weeks.

Over the next few days, water levels across most monitoring stations from Chiang Khan to Vientiane are expected to decrease about 0.10 metres and at Nakhon Phanom to Pakse will decrease about 0.10 metres. This situation continues to put most stations' water levels higher than their LTAs.

The starting date of the outflow from the Tonle Sap Lake into the Mekong mainstream took place on November 15, slightly late compared to the normal event. Due to heavy rainfall in late October 2020, the water volume of the Lake at this reporting point is higher than that in 2020. However, it is lower than its LTA which is considered critical. From next week, the flow might continue to slightly increase due to predicted rainfalls in the inflow catchments and the increased water levels along the lower part of the Mekong and Bassac rivers.

From Stung Treng to Kompong Cham, the water levels will slightly increase and remain higher than their LTAs. Moreover, 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, the water levels will be matched with their LTAs. It is noted that water levels at Tonle Sap Lake have connection with water levels at Prek Kdam, which will also slightly increase.

The situation in Tan Chau on the Mekong River and Chau Doc on the Bassac River is expected to remain unchanged but influenced by the tidal effects.

The low rainfall during the past months in 2020 (except in October) is believed to be one of the main factors causing low water levels at most of the stations along the Mekong mainstream.

Since the beginning of this year (2020), water levels in the LMB have been lower than their LTAs for all monitoring stations (from upper to lower stretches within the LMB). Like many parts of the world, the Mekong region was affected by the prolonged El Nino event, the phenomenon that usually causes extreme heat and insufficient rainfall. This climate change impact has been observed since 2019. Therefore, the main cause of low water levels in the Mekong mainstream from June to October 2020 could be the unusual low rainfall as results of the climate change affecting the LMB.

For a more complete preliminary analysis of the hydrological conditions in the LMB over January–July 2020, please refer to this Situation Report.

The contribution to the Mekong River's flow from the Upper Mekong Basin 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 small predicted amounts of rainfall for the upcoming week as mentioned earlier in section 6.1, flash floods are likely not to happen in the region.

7.4 Drought condition and its forecast

Drought condition of the LMB from 10 to 16 April 2021 was like the condition last week (April 3 to 9). There was no drought threat in the LMB.

The downscaling model of the NMME for the LMB region shows that April and June are likely to receive above average rainfall for Cambodia, Lao PDR, Thailand, and Viet Nam but below average rainfall in May. It seems that rain might come early in the wet season than in 2019 and 2020.

Annex A: Tables for weekly updated water levels and rainfall at the Key Stations from 13-19 April 2021

Table A1: Weekly observed water levels in metres

2021	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
13-04-2021	537.13	3.14	9.12	5.18	2.70	2.15	3.28	2.09	2.38	1.58	2.80	7.46	2.88	1.95	2.00	1.24	1.03	0.86	1.02
14-04-2021	537.09	3.08	9.14	5.31	2.72	2.18	3.35	2.05	2.30	1.62	2.82	7.50	2.94	2.01	2.01	1.24	1.03	0.67	0.73
15-04-2021	537.33	3.08	8.92	5.66	2.78	2.22	3.35	2.02	2.30	1.58	2.88	7.55	2.94	1.97	2.04	1.26	1.02	0.27	0.13
16-04-2021	537.48	3.06	8.90	5.82	3.00	2.45	3.38	2.03	2.29	1.60	2.89	7.62	2.90	1.97	2.06	1.26	1.03	-0.08	-0.19
17-04-2021	537.54	3.11	8.93	5.70	3.25	2.70	3.53	2.08	2.27	1.60	2.85	7.64	2.89	1.97	2.07	1.24	1.02	-0.08	-0.29
18-04-2021	537.56	3.22	9.14	5.54	3.22	2.70	3.68	2.17	2.31	1.55	2.85	7.64	2.88	1.98	2.04	1.24	1.03	-0.31	-0.27
19-04-2021	537.54	3.38	9.28	5.49	3.10	2.62	3.81	2.27	2.43	1.55	2.79	7.60	2.82	2.01	2.05	1.27	1.04	-0.26	-0.23

Table A2: Weekly observed rainfall in mm

2021	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
13-04-2021	0	0	0	0	0	0	0	0	0	0	0	25	6.8	0	7.6	0	0	0	0
14-04-2021	0	0	0	0	0	0	7	0	0	0	0	0	12.2	7.5	0	39.6	16.3	0	0
15-04-2021	0	0	0	2.4	0	0	0	0	73.3	0	0	0	0	0	0	0	0	0	0
16-04-2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-04-2021	0	0.3	5.4	34.7	1.8	35	16.8	0.1	0	0	0.5	0	0	0	0	0	0	0	0
18-04-2021	0	10.2	7.8	1.7	0	0	0	0	0	0	0	0	21.5	0	0	0.6	23.4	0	2
19-04-2021	13	1	8.6	4.2	36.8	16.8	64.7	0	0	0	0	0	0	0	0	0	0	0	0

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