

Weekly Dry Season Situation Report for the Mekong River Basin

Prepared on: 25/02/2020, covering the week from 18 to 24 Feb 2020

Weather Patterns, General Behaviors of the Mekong River and Outlook Situation

General weather patterns:

From 18 to 24 Feb 2020, there was no rainfall in the LMB. Based on the weather outlook bulletins and maps issued by the Thailand Meteorology Department (TMD) were used to verify the weather condition in the LMB. They stated that for the next 3 months from Jan to Mar 2020, the cold appears because the influentially high-pressure air mass areas prevail over Thailand for the whole month. However, at some periods, coldly high-pressure air masses from China will meet hot air masses already prevailing over LMB. They also stated that the cool weather throughout the week is covered at mountainous areas and mountain tops. **Figures 1** presented the weather map for 20 and 24 Feb 2020.

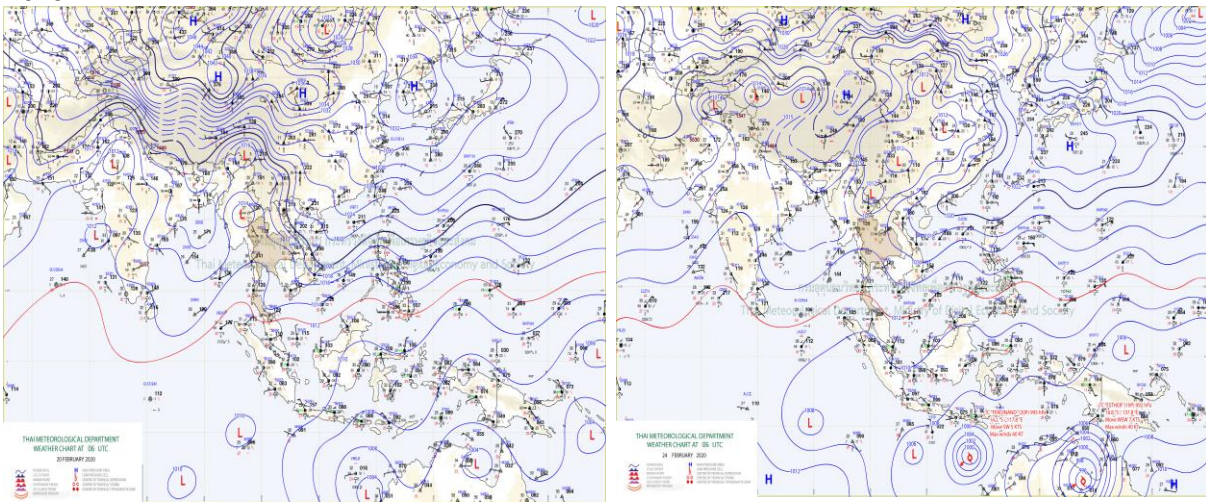


Figure 1: Summary of weather condition over the LMB from 20 and 24 Feb 2020

General behavior of the Mekong River:

This week from 18 to 24 Feb 2020, water levels from Chiang Sean were slightly increased, varied from 0.01 m to 0.03 m since finishing the test of equipment of hydropower station at Jinghong, China at 4 Jan 2020. Water levels at this station were fluctuated above its Long-Term -Average (LTA). However, water level at Luang Prabang and Chiang Khan are likely impacted by hydropower dam at Xayaburi and upstream hydropower dams in which water level at this station were decreased by stay close to its maximum levels, varied from -0.03 m to -0.05 m. Water levels at Chaining (downstream of Xayaburi) were stay below their LTAs. And water levels at stations in the middle part of LMB from Vientiane to Pakse were slightly decreased based on the trend inflows from upstream, but their water levels were still staying below their LTAs even below to their Minimum Levels (at Nong Khai). The station at Vientiane and Nong Khai is considered critical condition). Follow the same trend of water levels from upstream, stations at Stung Treng, Kratie, Chaktomuk on the Bassac, Phnom Penh Port and Neak Luong were very low and stay closely to their minimum levels (these stations were considered critical condition). For the 2 tidal stations at Tan Chau and Chau Doc, water levels increased and reached above their Maximum Levels. The actual water levels at most of the key station are staying below their LTAs and even Min Levels (see its hydrograph in **Annex B**).

For stations from Chiang Saen and Luang Prabang

Water levels from 18 to 24 Feb 2020 at Chiang Saen station were slightly increased, after the finishing test of equipment for hydropower dam at Jinghong station in China. The increased water levels were resulted from the increased inflows from that station. Water levels at this station varied from -0.01 m to -0.03 m. However, at Luang Prabang station, water levels were slightly decreased but still stay close to its historical maximum levels. Water levels at this station also decreased in between -0.03 m to -0.05 m, due to the reservoir operation of upstream and downstream at Xayaburi. It was observed that the Luang Prabang stations is likely nominated by hydro power dam operation upstream (tributaries) and downstream (Xayaburi) in which water levels always fluctuated above their LTAs, during the impounding reservoir at Xayaburi from end of October 2018 to May 2019.

For stations from Chiang Khan, Vientiane-Nong Khai and Paksane

Water levels from 18 to 24 Feb 2020 at Chiang Khan station were likely also nominated by upstream hydropower dam of Xayaburi, which was noted that water levels decreased, varied from -0.02 to -0.04 m. The current observed water levels at Vientiane and Nong Khai stations are in critical conditions, in which they stay below their historical LTAs and even close to their minimum levels.

For stations from Nakhon Phanom to Pakse

Water levels from 18 to 24 Feb 2020 at Nakhon Phanom to Pakse stations were also slightly decreased, followed the same trends from upstream and varied from -0.02 to -0.04 m. The current water levels at these stations are also considered critical condition in which they stay below their LTAs.

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

Water levels from 18 to 24 Feb 2020 at Stung Treng, Kratie and Kompong Cham were decreased, varied from -0.02 m to -0.15 m. The current water levels at Kompong Cham, Chaktomuk, Koh Khel, Phnom Penh Port and Prekdam on the Tonle Sap are in critical situations. However, water level at Neak Luong was above its LTA.

Tan Chau and Chau Doc

Water levels from 18 to 24 Feb 2020 at the 2 tidal stations at Tan Chau and Chau Doc were increased and reached above their LTAs. This could be influent by the tidal effect from the sea. This week, water levels at these two stations were reached above their long-term-minimum levels.

According to the Japan Meteorological Agency (JMA), Sea surface temperature (SST) variability in the tropics Neutral, which has no major impact.

Discussion and Conclusion

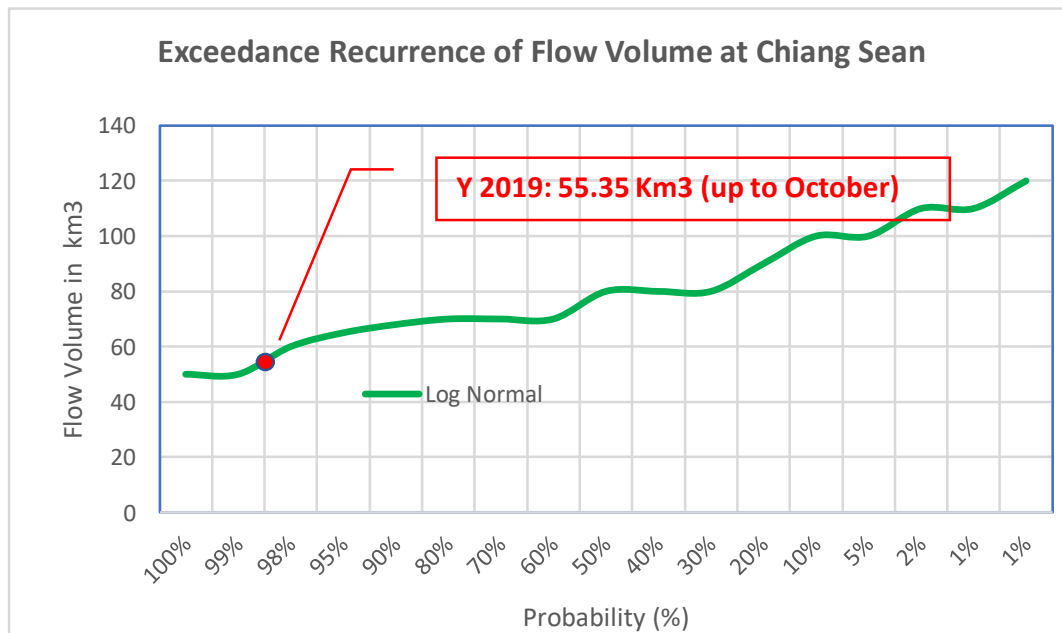
From 18 to 24 Feb 2020, the trend of water levels at Chiang Saen were slightly increased after finishing test of equipment of hydropower dam at Jinghong at 4 Jan 2020. Water level at Chiang Saen is relied from inflow at Jinghong Hydropower Station on Lancang and its catchment rainfall. The impact could obviously see the gradually increasing water level to downstream to Vientiane/Nong Khai. Based on a hydrological phenomenon, the inflow contribution of water from the upstream of Lancang-Mekong in China to the Mekong mainstream is about 16% in total during the Dry season from Nov to May, while 24% in the Wet season (Adamson. 2010). The whole inflow of water into the lower Mekong basin is influenced more by inflow from tributaries and the direct rainfall catchment.

The low inflows from upstream and less rainfall in catchments, resulting water levels from Paksane to Pakse are drastically dropped below their minimum levels. For example, at Vientiane/Nong Khai. From Stung Treng and Kratie stations, water levels were above their LTAs, followed the same trend from upstream. However, downstream from Kompong Cham on the Mekong river, Phnom Penh Port to Prekdam on the Tonle Sap and Bassac and Koh Khel on the Bassac river,

the water levels were stay below their LTAs and even close to their Minimum Levels. These stations were also considered as critical condition.

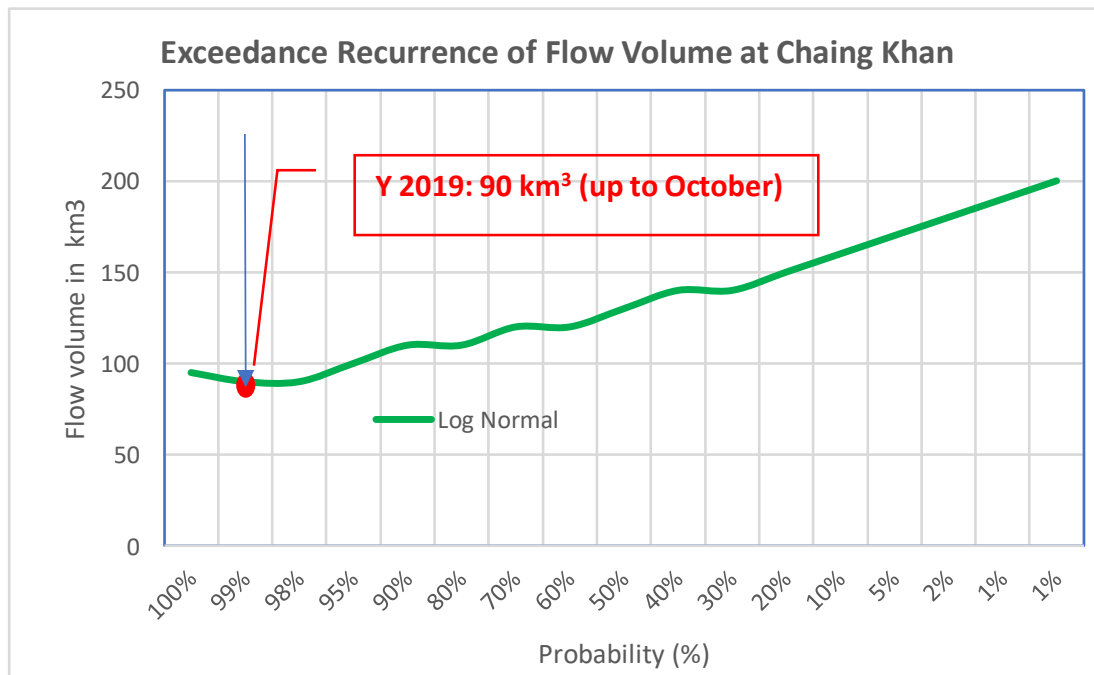
Based on the Exceedance Recurrence of the Minimum Flow Volumes at Chiang Sean, Chaing Khan and Kratie referred to historical data availability and the flows volume up to October 2019, it showed the current situation at these stations are considered as critical low flows in between **50 to 100 year of return period of low flow condition**. Figure 2 showed the Exceedance Recurrence Flow Volume with the table of probability condition of highlighted the low flows condition at Chiang Sean, Chiang Khan and Kratie.

A. Chaing Sean Station



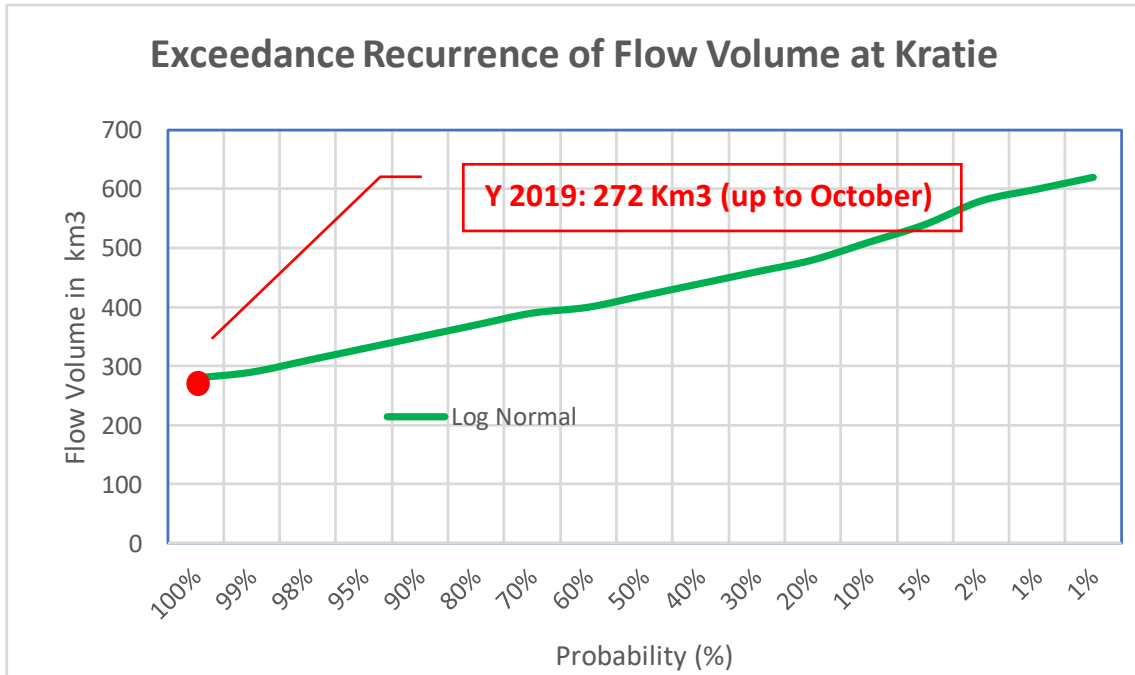
Probability	Recurrence Year	Log Normal [km ³]	Y2019 [km3]	Conditions
100%	200	50		Critical Low Flow
99%	100	50		
98%	50	60	55.35	Low Flow
95%	20	65		
90%	10	68		Normal Flow
80%	5	70		
70%	3	70		
60%	2	70		
50%	2	80		
40%	3	80		
30%	3	80		
20%	5	90		
10%	10	100		High Flow
5%	20	100		
2%	50	110		
1%	100	110		
1%	200	120		

B. Chiang Khan Station



Probability	Recurrence Year	Log Normal [km ³]	Y2019 [km ³]	Conditions
100%	200	50		Critical Low Flow
99%	100	50		
98%	50	60	55.35	Low Flow
95%	20	65		
90%	10	68		
80%	5	70		Normal Flow
70%	3	70		
60%	2	70		
50%	2	80		
40%	3	80		
30%	3	80		
20%	5	90		
10%	10	100		High Flow
5%	20	100		
2%	50	110		
1%	100	110		
1%	200	120		

C. Kratie Station



Probability	Recurrence Year	Log Normal [km ³]	Y2019 [km ³]	Conditions
100%	200	280		Critical Low Flow
99%	100	290	272	
98%	50	310		Low Flow
95%	20	330		
90%	10	350		
80%	5	370		Normal Flow
70%	3	390		
60%	2	400		
50%	2	420		
40%	3	440		
30%	3	460		
20%	5	480		
10%	10	510		High Flow
5%	20	540		
2%	50	580		
1%	100	600		
1%	200	620		

Flow data period: 1925-2019

Figure 2: Exceedance Recurrence Flow Volumes and Probability of Low Flow condition at Chiang Saen, Chiang Khan and Kratie

Based on the low flow analyses of the Mekong from Chiang Saen to Kratie, the upcoming **Dry Season** can be possible of facing some problem, related to the shortage of drinking water and agricultural production, fishery production, ecological systems, biodiversity, bank erosion, salinity intrusion in the Mekong Delta and waterway transport because not enough water for fish spawning and also aquatic lives ect. The reduced water flow could also affect to the expanding unsaturated soil which cause bank erosion and salinity intrusion from the sea.

The Trend of water level and its Outlook

From 25 Feb to 02 Mar 2020, water levels along the lower Mekong River from Thailand's Chiang Saen will continue to slightly increase varies. The increased water level will vary from 0.01 m to 0.04 m. From Lao PDR's Vientiane and Thailand's Nong Khai, water levels will slightly increase which followed the same trend from upstream vary from 0.02 m to 0.04 m. From Thailand's Nakhon Phanom to Lao PDR's at Pakse, water levels will be slightly decreased, varying from -0.02 m to -0.03 m. From Cambodia's at Stung Treng to Neak Loung on the Mekong River, water will slightly decrease, varies from -0.03 m to -0.06 m.

For Viet Nam's Tan Chau on the Mekong River and Chau Doc on the Bassac River, water levels will decrease due to the effect tidal from the sea.

For details information on water levels and rainfall at each key station, **Annex A** and **Annex B** are presented as follows:

- Tables presents observed water levels and rainfall from last week (**Annex A**)
- The water levels hydrographs showing the observed water levels for the dry season (**Annex B**)

Annex A: Graphs and Tables

Table A1: observed water levels

Unit: m

2020	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Kheh	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
18-02-2020	-	1.83	8.13	3.10	0.64	0.73	2.50	0.76	1.34	0.78	2.39	6.51	2.34	2.16	2.16	1.66	1.05	0.43	0.52
19-02-2020	-	1.81	8.19	3.14	0.55	0.68	2.44	0.75	1.30	0.70	2.36	6.53	2.48	2.19	2.32	1.82	1.22	0.75	0.84
20-02-2020	-	1.83	8.24	3.12	0.55	0.66	2.39	0.76	1.32	0.70	2.36	6.60	2.56	2.12	2.19	1.96	1.12	0.92	1.02
21-02-2020	-	1.83	8.17	3.12	0.58	0.69	2.35	0.72	1.32	0.70	2.35	6.53	2.58	2.09	2.15	2.00	1.07	1.12	1.27
22-02-2020	-	1.82	8.13	3.15	0.60	0.70	2.32	0.70	1.30	0.70	2.37	6.52	2.57	2.02	2.03	2.00	1.08	1.26	1.41
23-02-2020	-	1.82	8.07	3.16	0.60	0.70	2.31	0.68	1.28	0.70	2.31	6.55	2.56	1.97	2.05	1.95	1.03	1.24	1.41
24-02-2020	-	1.83	8.03	3.16	0.60	0.72	2.30	0.65	1.27	0.70	2.29	6.45	2.58	1.79	2.06	1.78	1.04	1.23	1.40

Table A2: observed rainfall

Unit: mm

2020	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Kheh	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
18-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-02-2020	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: No data available from China during the Dry Season

Annex B: Season Water Level Hydrographs

This Annex showed water level hydrographs of each key station. These hydrographs distributed weekly water level for River Monitoring purpose.

HYDROGRAPH AT 7 AM OF MEKONG TONLE SAP AND BASSAC AT MAINSTREAM STATIONS IN DRY SEASON UP TO 24 FEB 2020

