Weekly Flood Situation Report for the Mekong River Basin
Prepared on: 16/07/2012, covering the week from the 09th July to the 15th July 2012

Weather Patterns, General Behaviour of the Mekong River and Flood Situation

General weather patterns
During the week of the 09th July to 15th July 2012, five weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 09th July and 15th July bulletins are presented in the figures below:

South-West (SW) Monsoon
Moderate SW monsoon prevailed over Amanda Sea and the Gulf of Thailand and was stationary in the whole last week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)
No Inter Tropical Convergence Zone (ITCZ) was observed during the week.

Tropical depressions (TD), tropical storms (TS) or typhoons (TY)
No Tropical Storm, Typhoon or Tropical Depression has significant affected to the LMB in last week.

Other weather phenomena that affect the discharge
No other weather phenomena affecting the discharge were observed.

Over weather situation
A normal weather situation lasted during last in the LMB. As a result of SW monsoon activity, scattered thunder shower with heavy rain occurred in the North, Northeast and the Western coast of Thailand, the North of Lao PDR and Vietnam, in the South, the Southeast, and the Central of Cambodia. Figure 3 illustrates rainfall amount distribution over the LMB, covering 10 – 16 July, in which heavy rain was observed in some tributaries in the upper part from Luang Prabang to Paksane, in the middle part of LMB from Khong Chiam to Pakse and Tonlesap area in the downstream.
General behaviour of the Mekong River

There was some variation of water levels along the Mekong river during reporting period. Water levels at most stations in the upper and middle reaches recording levels that are below the long-term average while water levels at lower reach’s stations were somewhat around or above the long-term average during this time of the year.

Regarding to 2 stations in downstream at Tan Chau and Chau Doc, water levels at those 2 stations were somewhat below the long term average with slightly rising trend in last week.

For stations from Chiang Saen to Vientiane/ Nong Khai

During the monitoring period, water levels at Chiang Saen showed a rising and falling trend following changes of water level at upstream station Jinhong in China (Figure 4) while water level at Luang Prabang was more-or-less stable. Water levels at Chiang Khan, Vientiane/ Nakhon Phanom were increasing in the beginning of the week and then more-or-less stable till the end of week. These stations were recording levels that are below the long-term average for this time of the year and lower than that of 1992, the lowest of water levels at those stations during current 20 year historical record (Annex C).
Figure 4: The influence of water level changes at Jinhong station on the water level at Chiang Saen

For stations from Paksane to Pakse

Water levels were more-or-less stable with slightly decreasing in last week except Paksane where water level rose quickly in the first half of the week, then fell down in the end of the week. These stations were recording levels that are somewhat below the long-term average for this time of the year.

For stations from Stung Treng to Kompong Cham

Water levels showed a decreasing trend during the week. These stations were recording levels that are somewhat above the long-term average for this time of the year.

For stations from Phnom Penh to Koh Khel/Neak Luong

Water levels at these stations were slightly falling in the reporting period and somewhat around the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels showed a slightly increasing trend during last week. Both stations were recording levels that are somewhat below the long-term average for this time of the year and significantly affected by tidal.

Note: for areas between forecast stations, please refer to the nearest forecast station.
Flood Situation

- Flood stage or alarm stage:

No alarm stage (where the forecast is expected to reach flood level within three days) was reported anywhere on the mainstream of the Mekong River during the past week. Water levels are still significantly below flood levels (as defined by the national agency) at all forecast stations.

- Damage or victims:

No damage or loss of life due to river flooding was recorded anywhere along the Mekong River during the past week.

For more details see the following annex:

- tables and graphs for water level and rainfall for the last week in Annex A
- a graph for accuracy in Annex B
- a table of forecast achievement in Annex B
- tables and graphs for performance in Annex B
- the water level graphs showing the observed water level for the season in Annex C
### Annex A: Graphs and Tables

#### Table A1: observed water levels

| 2012 | Jinghong | Chiang Saen | Luang Prabang | Chiang Khan | Phon Pisai | Pha Taeh | Nakorn Phanom | Mekong | Sangkhlaburi | Kanchanaburi | Kanchanaburi | Pha Taeh | Kanchanaburi | Kanchanaburi | Pha Taeh | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom |
|------|----------|-------------|---------------|-------------|------------|----------|--------------|--------|--------------|-------------|-------------|----------|--------------|--------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 09/07 | 535.69   | 3.20        | 7.04          | 6.75        | 2.98       | 3.50     | 6.20         | 6.78   | 5.62         | 7.89        | 6.58        | 6.80     | 15.83       | 10.28       | 5.81     | 4.58    | 5.20    | 4.04    | 4.68    | 1.50    | 1.06    |
| 10/07 | 535.98   | 3.45        | 6.67          | 7.32        | 3.48       | 4.01     | 6.51         | 6.63   | 5.84         | 7.75        | 6.30        | 6.47     | 15.65       | 10.24       | 5.93     | 4.74    | 5.27    | 4.08    | 4.77    | 1.54    | 1.10    |
| 11/07 | 535.24   | 3.33        | 6.49          | 7.50        | 4.06       | 4.65     | 6.80         | 6.50   | 6.85         | 7.70        | 6.22        | 6.23     | 15.15       | 9.93        | 5.82     | 4.66    | 5.20    | 4.02    | 4.71    | 1.54    | 1.12    |
| 12/07 | 534.72   | 3.51        | 6.61          | 7.28        | 4.22       | 4.95     | 7.10         | 6.37   | 6.54         | 7.54        | 6.16        | 6.28     | 14.77       | 9.60        | 5.67     | 4.56    | 5.08    | 3.90    | 4.59    | 1.49    | 1.14    |
| 13/07 | 534.73   | 3.33        | 6.58          | 7.10        | 4.03       | 4.87     | 7.46         | 6.50   | 6.50         | 7.30        | 5.96        | 6.31     | 15.01       | 9.58        | 5.59     | 4.50    | 4.97    | 3.83    | 4.53    | 1.49    | 1.19    |
| 14/07 | 534.73   | 3.02        | 6.66          | 7.20        | 3.85       | 4.68     | 7.65         | 6.50   | 6.52         | 7.12        | 5.77        | 6.15     | 14.82       | 9.60        | 5.62     | 4.57    | 5.01    | 3.82    | 4.56    | 1.57    | 1.28    |
| 15/07 | 534.73   | 2.64        | 6.67          | 7.12        | 3.96       | 4.68     | 7.70         | 6.61   | 7.65         | 7.12        | 5.66        | 5.94     | 14.43       | 9.46        | 5.53     | 4.52    | 4.94    | 3.76    | 4.53    | 1.62    | 1.37    |
| 16/07 | 534.73   | 2.80        | 6.52          | 7.18        | 3.98       | 4.75     | 7.40         | 6.65   | 6.55         | 7.10        | 5.59        | 5.76     | 14.04       | 9.07        | 5.39     | 4.49    | 4.84    | 3.64    | 4.41    | 1.61    | 1.42    |

**Flood level**

11.80  18.00  17.40  12.50  12.20  14.50  12.70  14.00  12.60  13.00  16.20  12.00  12.00  12.00  12.00  12.00  11.50  11.00  7.90  8.00  10.00  4.20  3.50

#### Table A2: observed rainfall

| 2012 | Jinghong | Chiang Saen | Luang Prabang | Chiang Khan | Phon Pisai | Pha Taeh | Nakorn Phanom | Mekong | Sangkhlaburi | Kanchanaburi | Kanchanaburi | Pha Taeh | Kanchanaburi | Kanchanaburi | Pha Taeh | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom | Phalom |
|------|----------|-------------|---------------|-------------|------------|----------|--------------|--------|--------------|-------------|-------------|----------|--------------|--------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 09/07 | 2.00     | 5.00        | nr            | 1.20        | 33.60      | 16.90    | 26.50         | 0.60   | 1.90         | 5.50        | nr          | 4.00     | 1.00         | 28.00       | 1.40     | nr      | nr      | nr      | nr      | nr      | 2.00    |
| 10/07 | 1.0      | 9.9         | nr            | nr          | nr         | 4.3      | 8.8           | 9.2    | nr           | 6.0         | nr          | nr       | 50.4         | 18.0        | 9.4      | nr      | 0.0     | nr      | 0.0     |
| 11/07 | nr       | 0.7         | nr            | nr          | nr         | 39.1     | nr            | nr     | nr           | 64.0        | nr          | nr       | nr           | 2.9         | 5.3      | 1.0     | nr      | 3.3     | 17.6    | 6.5      | 1.8     | nr      | 6.6     |
| 12/07 | nr       | 0.5         | nr            | nr          | nr         | nr       | 2.0           | 88.9   | nr           | nr          | 0.9         | 3.1      | nr           | 8.5         | 2.8      | 32.7    | 3.4     | 8.5     | 85.4    | 9.2     | 38.5    |
| 13/07 | 0.0      | 30.2        | nr            | nr          | nr         | nr       | 6.4           | nr     | nr           | 1.0         | nr          | nr       | nr           | 34.5        | nr       | 56.6    | 51.8    | 16.7    | 2.8     | 5.9     | 29.7    | 29.0    |
| 14/07 | 1.0      | nr          | nr            | nr          | nr         | nr       | nr            | 24.3   | 35.7         | 2.5         | 1.3         | nr       | nr           | 9.3         | 9.5      | nr      | 1.0     | 6.2     | 15.4    | 1.6     | nr      | 17.0    |
| 15/07 | 15.0     | 14.8        | nr            | nr          | 6.1        | nr       | 20.1          | 8.8    | 26.9         | nr          | nr          | nr       | nr           | 0.3         | nr       | 7.6     | 38.8    | nr      | 11.0    | 0.4     |
| 16/07 | 4.0      | 4.50        | nr            | nr          | nr         | nr       | nr            | nr     | nr           | nr          | nr          | nr       | nr           | 1.0         | nr       | nr      | nr      | nr      | nr      | 3.30    |         |         |         |         |         |         |
Figure A1: Water level and rainfall for Jinghong, Chiang Saen, and Luang Prabang
Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane
Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet
Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie
Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel.
Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc
Annex B: Accuracy and performance

Accuracy

“Accuracy” describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model system and the hydrology of the Mekong River Basin. The information is presented as a graph below, showing the average flood forecasting accuracy along the Mekong mainstream.

The graph of average difference between forecast and actual water levels for the past week is illustrated in the Figure B1.

In general, accuracies at most stations for all forecast lead time are fairly good except at Vientiane and Nong Khai where their accuracies for 4-day and 5-day forecast lead time were less than expected. And this perhaps caused by high variability of rainfall forecast from NWP and internal model functionality in forecasting especially at those stations; for which the parameter adjustment in the model is not possible.

Figure B1: Average flood forecast accuracy along the Mekong mainstream
Forecast Achievement

The forecast achievement indicates the % of days that the forecast at a particular station for a lead-time is successful against a respective benchmark (Table B2).

Table B1: Achievement of daily forecast against benchmarks unit in %

<table>
<thead>
<tr>
<th></th>
<th>Chiang Saen</th>
<th>Luang Prabang</th>
<th>Chiang Khan</th>
<th>Vientiane</th>
<th>Nongkhai</th>
<th>Pakse</th>
<th>Nakhon Phanom</th>
<th>Thakhek</th>
<th>Mukdahan</th>
<th>Savannakhet</th>
<th>Khong Chiam</th>
<th>Pakse</th>
<th>Si Phan Don</th>
<th>Stoeng Treng</th>
<th>Stung Treng</th>
<th>Phnom Penh (Bassac)</th>
<th>Phnom Penh Port</th>
<th>Koh Khe</th>
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Table B2: Benchmarks of success (Indicator of accuracy in mean absolute error) Unit in cm

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<tr>
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<th>Chiang Khan</th>
<th>Vientiane</th>
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Note: An indication of the accuracy given in the Table B2 is based on the performance of the forecast made in 2008 from the new flood forecasting system and the configuration for the 2009 flood season and is published on the website of MRC (http://ffw.mrcmekong.org/accuracy.htm).

A new set of performance indicators that is established by combining international standards and the specific circumstances in the Mekong River Basin, is applied officially for the flood season of 2011 onward.
Performance

Performance is assessed by evaluating a number of performance indicators, see table and graphs below:

Table B3: Overview of performance indicators for the past 5 days including the current report date

<table>
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<th>Missing data (number)</th>
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</table>

Week is the week for which this report is made; Month is actually the last 30 days (or less if the flood season has just begun); Season is the current flood season up to the date of this report.

Figure B2: Data delivery times for the past 8 days including the current report date
Data Delivery - Missing Data

Figure B3: Missing data for the past 8 days including the current report date

Flood Forecast - Completion Time

Figure B4: Flood forecast completion time

Flood Forecast - Stations without Forecast

Figure B5: Flood forecast stations without forecast

Flood Forecast - Second Forecast Needed

Figure B6: Second forecast needed
Annex C: Season Water Level Graphs

This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

Water level at 7am of Mekong at Chiang Saen

Water level at 7am of Mekong at Luang Prabang

Water level at 7am of Mekong at Chiang Khan
Monday, 16th July 2012

Water level at 7am of Mekong at Chiang Khan

Water level at 7am of Mekong at Vientiane

Water level at 7am of Mekong at Nong Khai
Water level at 7am of Mekong at Paksane

Water level at 7am of Mekong at Nakhon Phanom

Water level at 7am of Mekong at Thakhek
Water level at 7am of Mekong at Savannakhet

Water level at 7am of Mekong at Mukdahan

Water level at 7am of Mekong at Khong Chiam
Water level at 7am of Mekong at Paksé

Water level at 7am of Mekong at Stung Treng

Water level at 7am of Mekong at Kratie
Water level at 7am of Bassac at Koh Khel

Water level at 7am of Mekong at Neak Luong

Water level at 7am of Tonle Sap at Prek Kdam
Water level at 7am of Mekong at Tan Chau

Water level at 7am of Bassac at Chau Doc