CHAPTER II

GENERAL PHYSICAL CHARACTERISTICS OF MAE KLONG BASIN

2.1 Location and Description of Mae Klong Basin

Mae Klong basin is located in the western part of Thailand. It extends from the Thai-Burma border in the west to the Gulf of Thailand as shown in Fig.1 on page 11. It lies between the latitude 13° 15' N and 16° 15' N, the longitude 98° 15' E and 100° E. The Mae Klong basin can be divided into two parts : below and above the Vajiralongkorn Barrage at Tha Muang district, Kanchanaburi province.

The lower part comprises of about 7,020 sq.km. in area. Most of them are flood plains consisting of agricultural area, factories and the population centers of the lower part of Kanchanaburi, the main parts of Ratchaburi and Samut Songkharm provinces. The upper part, which is mainly considered in this study, comprises of about 25,590 sq.km. in area, approximately 80% of which is dense forest and 20% is cultivated area (4% ricefield, 16% farm crops approximately). Types of the forest covering this area are tropical evergreen forest, mixed deciduous forest and deciduous dipterocarp forest. Mixed deciduous forest and deciduous dipterocarp forest can be found in the region of elevation lower than 1,000 meters above M.S.L.

According to Komkris T. (in Forestry of Thailand, 1897) the type of forest can be used to roughly classify the type of the soil.

For example, in the tropical evergreen forest, the soil is clay or sandy clay containing high water content. In mixed deciduous forest, the soil is sandy soil with lower water content and in deciduous dipterocarp forest, the soil is sandy soil or laterite with low water content. From the knowledge of soil types, types of forest and with possibly local survey, the coefficient of meandering of the Mae Klong river can sometime be found.

2.2 The Mae Klong River

The main stem of the Mae Klong river is 143 km. long and has two main tributaries, Khwai Yai and Khwai Noi rivers. It starts at the city of Kanchanaburi where the Khwai Yai and Khwai Noi join together at the latitude 14° 01' N and longitude 99° 32' E. Then the river flows through Tha Muang district Tha Maka district, Ratchaburi, Samut Songkharm and empties into the Gulf of Thailand at the latitude 13° 21' N, longitude 100° E. The bed slope of the river from the city of Kanchanaburi to Tha Maka is about 0.020%, and decreases to about 0.014% from Tha Maka to the Gulf. During June to October, the flow starts to increase and usually reaches its peak value in September (see Fig.3 on page 19). This is the result of the activity of the southwest monsoon. Then the flow begins to decrease during the months of November to February, which is due to the activity of the northeast monsoon having a cool and dry air with light or no rain. The flow usually reaches its minimum value in the dry season of March and April.

2.3 The Khwai Yai River

The Khwai Yai river is one of the main tributaries of the Mae Klong river. Approximately 48% of the flow in the Mae Klong comes from this river. It has the basin area of about 14,630 sq.km. and the length of about 450 km. Originating in Umphang district, Tak province, the river flows downstream through the rugged mountainous area with the slope varying from 2.5% to 0.14%. In this basin, most rocks are limestone and quartzite, covering mostly with the mixed deciduous forest and deciduous dipterocarp forest. About 60 km. upstream from the city of Kanchanaburi, the river flows with the slope of about 0.06% to 0.05% through an open valley of agricultural area cultivating cassava, corn and other farm crops.

2.3.1 The Lam Taphoen River

There are many tributaries of the Khwai Yai river, but one of the most important is the Lam Taphoen river. It rises in the east and out off the rugged mountainous area of the Khwai Yai basin. It has the basin area of about 2,650 sq.km. and the length of 188 km. This river starts from the north of Kanchanaburi and flows with the average slope of 0.19% approximately, through the relatively even and open area covering by shrubs with rice fields and scattering upland crops. The Lam Taphoen river unites with the Khwai Yai river at about 27 km. before the Khwai Yai river reaches the city of Kanchanaburi.

2.4 The Khwai Noi River

The Khwai Noi river, another main tributary of the Mae Klong river, has 10,960 sq.km. in basin area approximately which includes the Lam Pachee basin, its most important tributary. The Khwai Noi river is about 320 km. long and rises in the west of the Khwai Yai river. It originates in the northwest mountainous area of Kanchanaburi and flows through the area covering mostly with the tropical evergreen forest and mixed deciduous forest. Most of the rock in this region are limestone. The headwater slope is about 1.0%, decreasing to 0.14% at the Sangkhlaburi district and to 0.05% near the Tong Phaphum district. About 38 km. upstream from the city of Kanchanaburi, the Khwai Noi river meets one of its important tributary, Lam Pachee river. Approximately 52% of the flow in the Mae Klong river comes from this river.

2.4.1 The Lam Pachee River

The Lam Pachee river, the most important tributary of the Khwai Noi river, rises in the south and out off the main basin of the Khwai Noi river. It is about 165 km. in length and 2,580 sq.km. in basin area. Originating in the rugged mountainous area of the southwest part of Ratchaburi, this river flows with the average slope of about 0.50% through the tropical evergreen forest and the mixed deciduous forest. About 70 km. before it unites with the Khwai Noi river, this river flows through the rolling area covering by shrubs, rice fields and scattering farm crops with the average slope of about 0.10%.

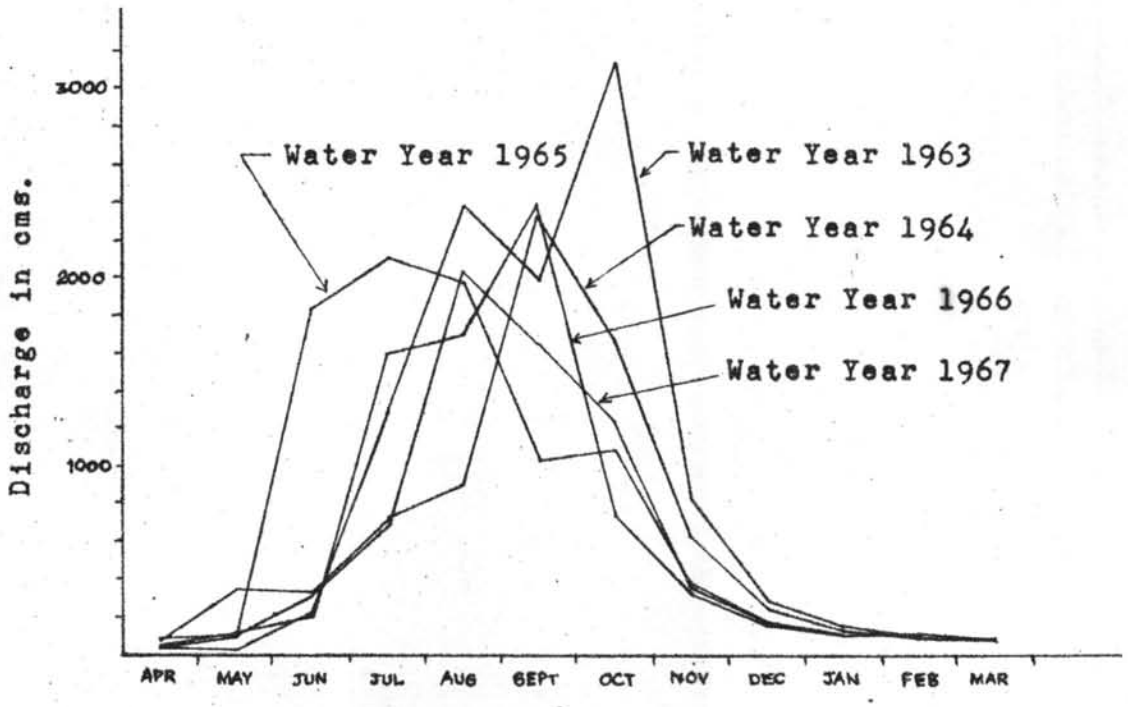

Fig.3 Hydrograph of the Mae Klong river, observed at Tha Muang district

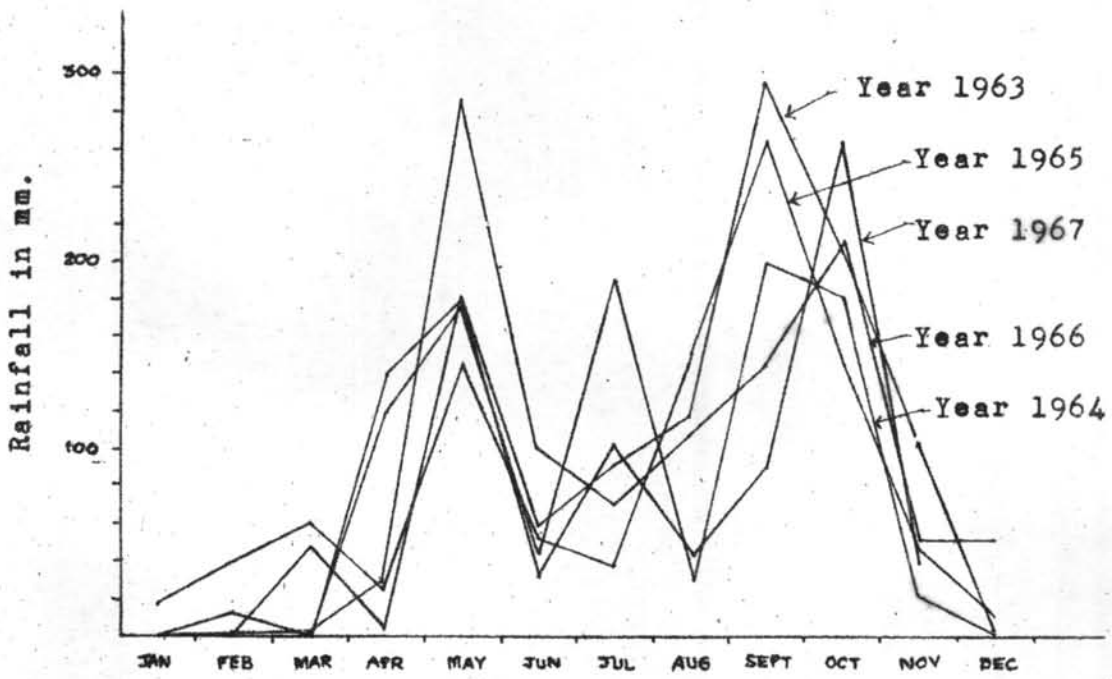

Fig.4 Hydrograph of the rainfall at Kanchanaburi

2.5 Climate

The climate of the Mae Klong basin is characteristically monsoonal. The southwest monsoon, caused by low pressure over central Asia, brings heavy rainfall to the basin. Practically most of the rain falls in the months of June to October (see Fig.4 on page 19) when the southwest monsoon is active, although in the pre-monsoon period there are some thunderstorm activities which cause the heavy rain in April and May. During the wet season, heavy rainfalls and floods usually occur in September which are due to the strengthening of the monsoon current over the basin or due to monsoon depressions during its movement. In addition, the mountain ranges recieve an increase rainfall due to the orographic effect. With the retreat of the southwest monsoon in November, the rain decreases rapidly but floods can sometimes be expected during the post-monsoon period due to the heavy rain resulting from the cyclones which move inland from the South China Sea but usually weaken as they penetrate inland. The northeast monsoon starts in December. The air is cool and dry. Some light showers may occur during the winter months of December to February but this rarely causes flooding. In the dry season during the months of March to May the weather is hot and dry, there are light breezes and occasional light rains.

2.5.1 Rainfall

The mean annual rainfall in the Mae Klong basin is about 1,277 mm. (see Appendix III on page 115). For the Khwai Yai and Khwai Noi basins, the mean annual rainfalls are 1,323 and 1,785 mm. respectively.

2.5.2 Relative Humidity

In the Mae Klong basin, the monthly mean relative humidity varies from 66% to 79% during the rainny season. For other seasons, it usually varies from about 50% to 70% (see Appendix III on page 116).

2.5.3 Temperature

The monthly mean temperature in the Mae Klong basin is lowest in December (24.3° C), slightly increases in January then rapidly increases and reaches its highest in April (32.1° C). From then, the mean temperature gradually decreases to about 25° C - 26° C in November (see Appendix III on page 116).