The potential for evaporative loss of water to the atmosphere in the canal-irrigated areas of the Former Punjab and Former Bahawalpur is something like 3 to 10 times greater than the average annual rainfall. Even more striking is the comparison of these values of potential evapotranspiration with the effective annual precipitation (Map 1.5). For example, at Lahore the potential evapotranspiration exceeds the effective precipitation by a factor of five; at Multan, by a factor of 20.

Floods and Flood Damage

While circumstances other than meteorological conditions contribute to the incidence of floods of varying degrees of devastation in West Pakistan, it is useful to consider first the pattern of atmospheric disturbances that lead to much higher than normal rainfall. Such an analysis is given in the Annual Report of the West Pakistan Flood Commission, Year 1958–59, West Pakistan Flood Commission Publication No. 1.

All severe floods that damage agriculture over extensive regions in the Indus Plain are the consequence of heavy rainfall from tropical storms and depressions during the monsoon period. Of some 696 tropical storms and depressions formed in the Bay of Bengal during the period 1891 to 1950, only 29 actually approached the Western Himalayas; and only one depression formed over the Arabian Sea reached the mountains. Customarily, depressions from the Bay of Bengal traverse the central parts of India; there is a convergence of the Bay of Bengal and Arabian Sea branches of the monsoon in the upper atmosphere over the northern Indus Plain, and the consequence is some rainfall over the Plain but not in excessive amounts nor of long duration. On a few occasions, however, the rainfall does intensify when a depression moves eastward over the extreme north of West Pakistan at the same time that a depression recurves over Central India. The Ravi and Chenab floods in July 1959 were of this type.

Devastating floods on a wider scale occur when there is very heavy rainfall in the upper catchment areas of the Indus and its tributaries. In these instances the Bay of Bengal depressions recurve over the Rajasthan area of India (just to the southeast of the Former Bahawalpur State) and force the two branches of the monsoon to converge in the Western Himalayas. Rainfall is exceptionally heavy in the upper catchment areas and may persist for three to five days. River volumes become correspondingly great and the rivers overflow onto the meander and cover flood plains beyond the usually flooded active flood plains.