IX

CONCLUSION

The following inferences may be based on the results of this work.

1) The condition of the top soil was more important than any other factor in deciding the infiltration capacity of the soil in this locality.

2) The infiltration capacity of the soil varied with season. During summer it was higher than that during winter.

3) The deep ploughed land had the highest infiltration capacity, even higher than that of the sod land immediately following the tillage operation, but after about a month, it lagged behind the sod land in its infiltration capacity.

4) Ploughing alone or ploughing plus harrowing resulted in similar changes in the infiltration capacity of the soil.

5) Ploughed land had markedly higher infiltration rate than that of the harrowed soil.

6) Irrespective of the method of tillage, the infiltration capacities of all the plots with various tillage practices tended to approach that of the bare uncultivated plot after about two months.

7) Sod land continued to maintain a steady high infiltration rate.

8) The favourable influence of tillage in increasing the infiltration capacity of the soil was nullified by a fairly heavy rainfall.

9) Grass sod and to some extent straw mulch offered the greatest resistance to the destructive influence of rainfall on the infiltration capacity of the soil.

10) Cover crops like groundnut and cowpea provided some protection to the soil surface against rainfall impact. Groundnut was slightly better in this respect than cowpea.

11) A curvilinear relationship was found to exist between the moisture content of the soil and its initial infiltration rate. Between 6 and 20 percent soil moisture contents, there was a linear relationship with a high degree of correlation.

12) The loss of moisture from the soil due to evaporation was very moderate at 8 to 12 inches, more at 4 to 8 inches and most at 0 to 4 inches.

13) Evaporation removed the maximum amount of moisture up to a depth of 12 inches in the deep ploughed soil, among the plots with various tillage practices. Hence deep ploughing which increased the infiltration capacity of the soil immediately following tillage, had also caused increased loss of moisture due to evaporation.

14) Evaporation of moisture from the soil was not reduced by cultivation.

15) Straw mulch was very effective in reducing evaporation loss of moisture from the soil.

16) The depletion of moisture from wet soil greatly exceeded that from a dry soil in ~~both~~ the plots with and without vegetation.

17) The loss of moisture from the soil due to transpiration greatly exceeded that due to evaporation.

18) Moisture loss from the groundnut plot exceeded those from the cowpea plot and sod land. The removal of moisture from the soil by the cowpea crop exceeded that by the grass sod.

The results obtained in the present investigations are typical of a large portion of the Kelaghai river upper catchment area in which the Indian Institute of Technology is located and also in the Midnapore, Bankura and Birbhum districts of West Bengal and in adjacent states. Here much of the upland is cut over, heavily grazed scrub forest or is completely denuded idle land. Cultivation is confined principally to paddy in low areas. In the light of the present studies the following recommendations may be made for this region.

1. The denuded idle upland subject to heavy erosion can be rested under grass protected from heavy grazing or under

well managed forest. The grass cover offered the best means for increasing the infiltration capacity of the soil thereby reducing surface runoff.

2. In the cultivated areas where soil moisture deficiency is a serious limiting factor in crop production especially in the period after the monsoon rainfall, breaking the hardened surface layer of the soil by ploughing and the use of paddy straw mulch at the rate of 2 tons per acre, provided good protection against the destructive influence of rainfall especially during the monsoon period. The straw mulch preserved and maintained the infiltration capacity of the soil and also prevented the excessive loss of moisture from the soil due to evaporation.

3. Cover crops like groundnut and cowpea planted during the monsoon rainfall period eventhough were less effective than straw mulch in protecting the soil surface from rainfall impact, can be used with advantage in preserving the infiltration capacity of the soil.