

the water distribution system. Hence the total cost of additional water should be Rs.2.2 crore. The gross annual benefit of Rs. 1300 lakh may be divided by the total cost of the tubewell water to give a gross benefit-cost ratio or $1300/220 = 5.9$. This is a very favorable ratio, even taking into account the fact that no allowance has been made in the calculation for the additional cost of tillage. (4)

With the cropping pattern of Table 5.11, the total net cultivated area in our typical million acre tract would be used in Rabi, but 104 thousand acres would lie fallow in Kharif. This results from the fact that sugarcane and cotton, although listed as Karif crops, require land during both seasons. If it were possible to sow this 104 thousand acres to summer fodder, the value of crops would be raised by Rs. 1.7 crore and the total use of tubewell water would be increased by 182 thousand acre feet, at a cost of Rs.0.35 crore. The average annual depth of irrigation over the entire cultivated acreage would be 34.5 inches. Although such full land use is desirable and should ultimately be feasible, we have not taken it into account in our calculations.

(4) The tillage costs, which are here neglected because available estimates are unduly crude, are certainly minor. They comprise, principally, four elements. (1) Rental value of the additional land cultivated. This can be neglected since it is not a social cost; the land would be simply unused and useless without the additional water. (2) Additional labor of cultivation. As mentioned in Appendix A.5 there is a considerable surplus of farm labor which can be applied to the land without sacrificing valuable output elsewhere. (3) Additional labor of draft animals. Although draft animals also appear to be underutilized at present, the additional 380,000 acres of gross sown area might require as many as 50,000 more work bullocks. Feed for these animals would take up some of the increase in fodder production indicated in Table 5.11, but a calculation similar to that made below for Former Sind (Tables 5.14 to 5.18) shows that even after taking into account the need for more bullock feed, the value of milk and meat production for the fodder and straw grown on the additional acreage would be Rs.190 lakh, nearly Rs.50 lakh above the cash value of total new fodder production. (4) Additional expense for purchase of fertilizer, seed, plant protection, and other agricultural requisites. Under current methods of tillage these costs appear to be nominal except for a few crops such as sugarcane. If we add Rs.65 lakh to annual costs to allow for this (Rs.59 lakh for seed, 4 lakh for fertilizer, and 2 for plant protection) the benefit-cost ratio is reduced further to $1300/285 = 4.6$. It will undoubtedly be necessary to fertilize most of the new land brought under cultivation, but this will also produce additional benefits which are discussed in a subsequent section of this chapter. In short, no reasonable adjustments to the calculation given in the text produce other than very favorable benefit-cost ratios.