

family and bullock labor is a dubious item. On the one hand it will undoubtedly require more work on the part of both humans and bullocks to cultivate larger crops and expanded acreage, but on the other hand there is considerable evidence that both bullocks and farmers are at present under-utilized in Pakistani agriculture⁽⁹⁾ so that substantial increases in crops can be obtained without increasing the numbers of men or animals employed on the farms. Other items in the farm cost accounts, particularly interest and depreciation on tools and the like, will probably increase far less than in proportion to the increases in acreage and yields. In short, the farm account data available do not distinguish fully between the constant costs of farm operation and those that vary in response to changes in yields and extent of cultivation.

The optimal cropping pattern depends upon the water requirement per acre, the yield, and the gross and net value per acre for each of the crops produced. In the present analysis, these data are not regarded as immutably fixed, but are determined within the computation to assure that the marginal value of water is the same on all crops to which it is applied. The sole exception to this statement is rice, which must be grown under standing water. Therefore it was prescribed that land under rice must be provided with sufficient water to meet the full evapotranspiration potential. Except for rice, the water requirement, yield, and value data were determined by the trial-and-revision procedure just described, using water response curves with parameters estimated by taking averages of the data in Table A.5.1. Table A.5.3 shows these data for the optimal depths of irrigation, which correspond to a marginal value of water of Rs. 5.54 per acre-inch in Kharif and nil in Rabi. The optimal cropping pattern deduced from these data is shown in Table A.5.4. According to this computation, the gross area cropped should be 1,389 thousand acres, corresponding to a cropping intensity of 1.64. The corresponding gross value of output is Rs. 26 crore per year, and the net value is Rs. 23 crore per year. It is instructive to compare these results with those of Table 5.6, which reflects the same physical and economic data and the same agricultural practices. According to Table 5.6 the gross value produced is

(9) See A. G. Asghar, B. A. Azhar and S. Haider, A study Into The Economics of Land and Water Use in Land Reclamation (Lahore: Pakistan Association for the Advancement of Science, 1960), p. 17, or Rana Nasib Khan, Survey of Small Holdings in the Punjab (Lahore: Board of Economic Inquiry, 1955), p. 28.