

waterlogging and salination, side by side with an early attempt to reclaim saline lands. Severely waterlogged areas can be left for later development. Existing or planned tubewell and drainage construction programs should be taken into account in selection of the initial project areas, as should the fact that from a strictly economic point of view, the highest ratio of benefits to costs should be attainable in the northern most sector of the Plain. Because this region has the lowest annual evapotranspiration and the highest rainfall, the amount of tubewell water per acre required for intensive agriculture is significantly smaller than in other areas, and hence the gross sown area can be increased more cheaply. At the same time, large quantities of fresh groundwater are locally available and cost of transporting water can be minimized.

### Potential Increases in Agricultural Output

Early momentum in development in the Former Punjab and Former Bahawalpur should result from the additional irrigation water provided by installation of tubewells in the project areas. This additional water can be used in many ways: to increase the depth of irrigation provided to crops; to enlarge the cropped area, both by increasing the intensity of cultivation and by bringing under the plough lands now fallow or classed as culturable waste; to apply enough water to cultivated land to prevent the accumulation of salts; to leach salts out of deteriorated land; and to irrigate culturable land which is too high for the gravity supply from the canals. One of the major benefits will be to free the farmers from their current dependence on the weather and from the irregularity of canal supplies. The wells will provide not only a more reliable supply of water than ever before, but also water that is better distributed in time.

Computations (given in Chapter 5) for an illustrative million-acre tract in the northern part of the Plain indicate that by adding 1.2 million acre feet of tubewell water to the present canal supply of just over a million acre feet, the gross value of output could be increased from \$32 million (Rs 152 million) to \$59 million (Rs 282 million) or by 86 percent. After allowing for increased costs of tillage, the net increase would be \$26 million (Rs 124 million) or 82 percent. Use of moderate amounts of nitrogen fertilizer plus plant protection measures and presently available better seeds, when combined with the additional tubewell water in the same area, should give an additional gross increase in crop value of \$22 million (Rs 106 million); the net increase after subtracting the cost of fertilizer, plant protection, and seeds, is \$17 million (Rs 80 million) or 56 percent of the present net value. The total gross increase from additional water, fertilizer, plant protection, and existing high yield plant varieties, even when their effect are computed separately without taking interaction into account, is 157 percent of the present gross value.