

3. Inadequate technical knowledge of methods and times of application. Attainable yield increases depend critically on proper use.

4. Limitations on yield from other causes than insufficient plant nutrients, such as high salt content of the soil, inadequate water, or poor seeds.

This last limitation can be stated inversely. By leaching the soil, increasing water supplies to crops, and using improved plant varieties, the yield per acre from fertilizer can be considerably increased above the values assumed in Table 5.9. Even without these improvements on presently cultivated acreage, relatively high percentage increases can be obtained by the combined use in the same project area of fertilizer plus additional water from tubewells, to increase the cropping intensity, eliminate fallow lands, bring presently unused culturable land under the plow, and modify cropping patterns.

Applied to the economy of a million acre tract, assuming the cropping pattern of Table 5.11, the fertilizer doses recommended by the Planning Commission would contribute Rs. 4.5 crore to the gross value of annual output, at a cost of Rs. 1.8 crore per year. The net gain attainable from the widespread use of chemical fertilizers is therefore nearly Rs. 3 crore per year in a typical project area.

The computations in Table 5.10 show how the application of nitrogen fertilizer in the moderate doses recommended by the Planning Commission can increase the gross value of farm output per year in our illustrative million acre tract to Rs. 34.4 crore. This is 22 percent more than can be obtained by the addition of tubewell water alone and the extension of cultivation made possible by the tubewell water, and 127 percent greater than the annual value produced under current conditions. The cost of the 38 million pounds of nitrogen fertilizer required for this increase is Rs. 1.8 crore, so that the net gain over what is attainable with only current practice with respect to fertilization is about Rs. 4.4 crore, Rs. 36 per gross acre sown.

A well rounded program of agricultural improvement includes many other measures over and above the provision of adequate water supplies and fertilizers. Such additional measures as field protection of crops and the use of improved seed varieties, adapted to local climate and conditions, have been mentioned several times in the description of the complete program.

As discussed in Chapter 2, the Planning Commission has estimated the gains from plant protection and use of better seeds that are already available in