

which serve as sumps and dissipate the water to the atmosphere by evaporation and transpiration. The sumps can be regarded as inefficient wells which may be used to speed dewatering. Consequently, if the pumps are located in the high ground the rate of lowering in these regions will be rapid.⁽²²⁾ Eventually, however, if the pumping rate is sufficiently high, the pressure gradients of the water table will be reversed and ground water will flow laterally from the low to the high regions and the advantage of the former sumps, as evaporating basins, gradually disappears.

The overall results for the twelve runs with the 5 x 5 matrix corroborate the results obtained with the electric analogue computer in showing that with the average pumping rates recommended by our plan the dewatering will be rapid and effective. This was found to be true for all configurations of pumps. The gross rate of pumping (including back-seepage from water courses) for the non-saline areas of the Former Punjab as calculated in the water budget was 1.77 acre feet per acre per year. The drawdown at this rate may be read from Figure 7.26, which shows average drawdowns after forty years of pumping for all runs, as 135 feet. This result corresponds to a lowering of $135 (30)/40 = 101$ feet in 30 years, and accords closely with the result obtained from the analogue computer in this range. For regions where lateral infiltration is small we recommend lowering the ground water table to a depth of 100 feet in 30 years.

Effect of Pumping in Tubewell Fields of Different Sizes

The multiwell model was used to investigate the rate of lowering of the water table at fixed rates of pumping in project areas of different size. As stated in a previous section, small project areas have a relatively large perimeter, and the effect of lateral infiltration of ground water from adjoining areas not being pumped, will be high. If the lateral infiltration is large, the dewatering and desalination process will be retarded or inhibited completely. Waterlogging and salinity will continue to impair agricultural production.

To investigate the effect of pumping in regions of different size, the multiwell model was deployed in a 25 x 1 matrix; pumping was provided in six cells and nineteen had no pumps. The project areas were taken to be rectangular with a ratio of the long side to the short side sufficiently large such

(22) There are two distinct but complementary advantages gained in setting the first tubewells in a project on relatively high ground: (i) the advantage, mentioned here, relating to the rapid lowering of the water table; and (ii) the superior quality of the water in these areas as discussed in the section "Problems in Regions Having Excessive Salinity in Soil and Ground Water."