With each of the pumping patterns shown in Figure 7.23 three rates of irrigation were investigated: 1.67; 2.01; and 2.51 acre feet per acre per year. The relative proportions used in each season were the same as those in the Project Two Feasibility Report.[21]

The computer studies indicated that three types of water table level response occurred depending upon the areal rate of pumping. (1) With low rates the water tables remained high and, except for seasonal and stochastic variations, were largely unaffected by the tubewells; (2) At intermediate rates the groundwater was slowly lowered to permanent levels of 12 to 30 feet depending upon the rate; seasonal variations in level occurred but stochastic perturbations, for example from occasional high intensity rainfall, were considerably reduced; and (3) With high pumping rates, such as envisaged in the Panel Plan, the rate of lowering was rapid and nearly constant. At these rates which exceeded the maximum recharge rate the aquifer was mined and an approximately lower relationship between depth and pumping time was found. Seasonal and stochastic variations tended to disappear when water levels fall below thirty feet. Non-beneficial evapotranspiration losses were considerably reduced.

When the annual irrigation target was less than 1.67 acre feet per acre per year an equilibrium condition was soon reached with a high water table which fluctuated from season to season in a cyclical manner. Results obtained for the twelve runs are described in detail in the Report of the Harvard Water Resources Group. As an example of these, history curves of drawdown are shown in Figure 7.24 at three rates of irrigation for twenty-five wells in a 5 x 5 matrix. In this particular study the canal-plus-water course leakage feedback relation was adjusted so that the leakage rate was reduced by fifty percent. This represents about the maximum reduction that can be obtained in practice at present with emulsion sealants. The effect was to speed the dewatering process in the first two or three years. After this the rate of lowering did not differ greatly from that in runs in which the effect of sealants was not built into the leakage feedback relation. In all runs of this type the rate of lowering of the water table was rapid at first with a gradual reduction occurring as the result of evaporation recovery and capture of recharge from adjoining cells (if any) that were not being pumped. In Figure 7.25 is shown a close-up of the top curve in Figure 7.24 which indicates the details of rise and fall due to seasonal fluctuations in inflow, rain, and irrigation rate.

A comparison of the results of Runs V, VIII, and XI with those of VI, IX, and XIII showed the advantage of pumping from high ground rather than from depressed areas in the initial phase of the dewatering process. At the present time, the high areas contribute ground water flow to the low areas