that infiltration from the latter could be considered negligible at the mid-point of the former. The 25 cells were located in a direction perpendicular to the long side at its mid-point. The six cells with pumps extended from the longitudinal axis of the rectangle to the edge; the nineteen cells without pumps were continued beyond the project area into the adjacent region which was assumed to be irrigated but without vertical drainage.

Three runs were made with the following cell sizes: 2,000, 6,000, and 18,000 feet. These corresponded to widths of project areas of (2) (6) (2,000)/5,280 = 4.54 miles; 2(6) (6,000)/5,280 = 13.6 miles; and 2(6) (18,000)/5,280 = 40.9 miles.

The parameter values for pumping rates, canal inflow, rain, and the ground water feedback relations were set to accord with those derived in the water budget. The results are shown in Figure 7.27. The transmissibility of the aquifer was taken to be 200,000 gpd/ft; the storage coefficient was 0.25.

The results show in a striking way the marked effect of lateral infiltration in retarding the dewatering of small tubewell fields. The physical explanation is that in small areas the frictional resistance to lateral infiltration is small so that when the water table is depressed, a large region outside is also depressed. When this happens the evaporation is reduced and the entire recharge from the outside area is captured, and with continued pumping large lateral ground water inflows occur.

The drawdown of the smallest area in Figure 7.27 is about one-fifth that of the largest. While the amount of water per unit of area available for agriculture and for leaching in the smallest is the same as the largest, the agricultural productivity of the former would be seriously reduced since severe waterlogging would continue during the first decade after the start of pumping. On the other hand, the drawdown rate throughout the largest area, which corresponds to a project area of a million acres, is such that the effect of waterlogging would be virtually eliminated after one or two years of pumping. The water table curve for the largest area after twenty years of pumping, shows drawdowns ranging from 25 to 67 feet with a large part of the central zone more than 50 feet below the surface. Project areas, larger than 41 miles on a side would exhibit similar drawdown characteristics. In the project area of intermediate size (14 miles) the dewatering process is slower in the first few years, and in regions of high permeability or in areas near a major source of recharge, such as a river, serious impairment of agricultural productivity might persist for five or ten years, particularly in low-lying regions. Therefore, these hydrological considerations indicate an ideal project size of at least a million acres.