shown for well depths of 50 feet and 250 feet, for two pumping rates (0.88 and 1.67 acre feet per acre per year), for the case of no drainage (y-z = 0) and the case of 10 percent drainage (y-z = 0.10y). The graphs show two horizontal lines indicating two salt concentrations (1100 and 2500 milligrams per liter) in the applied irrigation water that approximately delimit the zone in which salt concentrations begin to inhibit and finally to impair seriously the production of salt-sensitive crops. Five of the runs showed concentrations in and above this zone within an economic time-horizon of 25 years. The runs simulating the condition of no drainage indicate that high concentrations will be built up after twenty-five years and that this condition could not long be tolerated.

The principal conclusions gained from the salt flow model are:

1. The spacing of wells has no effect on the salt build-up characteristics of irrigation water provided the same amounts of water per unit area are applied and other factors held constant and provided the wells have the same depth.

2. Two effects were found in simulation studies with wells of different depths:

   (a) the rate of salt build-up increases in inverse proportion to the depth, and

   (b) the salinity of irrigation water due to salt initially on the surface of the ground increases in inverse proportion to depth.

3. The rate of salt build-up increases very nearly in direct proportion to the pumping rate, other factors being held constant.

4. Surface drainage of about 10 percent of the tubewell pumping over a 50-year period is needed to preclude eventual excessive salt accumulation in the root zones of the crops. More than 15 percent is unnecessary and less than 5 percent is ineffective. In many cases the pumps-to-drain flow can be delayed for 10 or even 20 years without excessive salt build-up provided that the total drainage in 50 years is equal to about 10 percent of the total pumpage.[19]

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(19)In the water budget the amount of tubewell pumpage was estimated to be approximately 59 maf/yr including mining and recycling. Accordingly, the ultimate rate of export would be 5 maf/yr to inhibit excessive build-up. However, in the initial period of development the export rate would not have to exceed 1 maf/yr. There are three possible methods of disposing of saline tubewell effluent: (1) return by surface drain channels to the river system; (2) export to salt lagoons in desert areas; and (3) export to the Arabian Sea in a long drainage channel.