

- iii) use shallow multiple strainers to pump 2 to 4 cusecs from each unit of pumping set.
- iv) not pump saline groundwater as multiple strainers will be installed to pump the top 70 to 100 feet of the aquifer,
- v) replace the stagnant groundwater richly charged with carbonates and bicarbonates as a result of action of root zone by fresh rain water, rich in oxygen and most beneficial to crops,
- vi) start fluctuating the groundwater which will rise during summer and will fall by several feet during the remaining eight months, thus creating a system of natural drainage as exists along the flood plains,
- vii) not pump saline groundwater, which would introduce the problem of aquifer deterioration, nor have a problem of disposal of highly saline water.
- viii) water highly charged with carbonates and bicarbonates will be replaced by rain infiltration, and the problem of conversion of normal soil into alkaline impermeable soils by use of bicarbonate charged water will be remedied.

The financial aspect of these suggestions can further be examined but it is certain that when we have more summer supplies available, we should utilize them by ever-lasting canals, requiring little maintenance as against short lived tubewells with costly maintenance. Integration of the presently constructed storage at Mangla can be so incorporated as to reduce pumping. When we need winter supplies we may install cheap, shallow multiple tubewells. The efforts of the farmers can even be integrated to pump during winter both for drainage and for extra supplies.

These are the suggestions which can be applied in the Punjab and Bahawalpur or where significant pumpable good quality aquifer exists such as along the strip of the Indus in Sind or in Khairpur West or in Larkana-Shikarpur Districts. This suggestion is not workable for Ghulam Mohammad Barrage in general and the lower region of the Sukkur Barrage System adjoining the Ghulam Mohammad Barrage region having high watertable of a very highly saline nature. Here, we have to create good quality aquifer before tubewells can be installed. Tile and open drains are the solution and there is no doubt about the success of this type of drainage in that area.

In the end, it is admitted that Pakistan is much obliged to the American scientists which constituted the Panel for their great service to this country.