

G. Summary: water supply for Former Sind. On the basis of present information, the total area that can be irrigated with Δ 's of 3.5 to 4.0 ft/year after tubewell installation and modification of the canal delivery system lies between 8 and 11 million acres. Because of high evapotranspiration and low rainfall, annual depths of irrigation of 3.5 to 4.0 feet would not allow as intensive double cropping as would be possible in the Former Punjab.

II. The Second Level of Development

Additional water supply after the first level of development may be had by providing more storage for regulation and by managing water flow more efficiently to reduce non-beneficial evapotranspiration and other losses. It is not possible at present to delimit precisely the ultimate magnitude of water supply that can be developed on the Indus Plain. The uncertainty derives from two sources.

In the first place the costs of developing surface storage at possible sites in the upper basin are not accurately known. Present estimates show that unit costs are high and that they vary considerably from site to site. Moreover, estimates of costs from different surveys made at the same site vary considerably. Also, there is the difficulty of extrapolating from present construction costs to predict future costs in a developing country.

In the second place the magnitude of the ultimate water supply will depend markedly upon future technological innovations. Among these may be listed: (1) more efficient methods of increasing ground water recharge so as to exploit more completely the reservoir capacity of the enormous aquifer in the northern plain area as a means of seasonal and year-to-year regulation of the irrigation water supply; (2) new methods (including mono-layer chemicals) for reduction of non-beneficial evapotranspiration and for decreasing runoff coefficients of monsoon rainfall; (3) inexpensive methods of reducing and controlling seepage losses from canal distribution systems; (4) economical methods of desalination of brackish waters; and (5) agricultural research on effective methods of utilizing saline waters having salt concentrations as much as 5,000 milligrams per liter.

The following predications for the water budget at the second level of development are presented not as an accurate projection but rather as a discussion of the factors involved in such a projection. Nevertheless, it is evident that even with favorable construction costs of surface reservoirs and with substantial progress in the technology of water management, the total additional water will only amount to a small increase above that achieved at the first level of development.

A. Total average annual flow available from the three western rivers with 2 maf/yr being diverted to Kashmir, 136 maf/yr.