

HAZARDS OF EROSION AND ITS EFFECTS ON THE WATER RESOURCES OF PAKISTAN

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The economy of Pakistan is fundamentally based on agriculture and its surface water storage reservoirs play an important role in providing irrigation water to the largest canal-irrigated system of the world. To establish the adverse effects of soil erosion and sedimentation or silting in reservoirs resulting in reduction in storage capacity, a study was carried out in the catchment areas of the Tarbela, Mangla, and Khanpur dams. Due to the high rate of precipitation in some parts of the catchment area, geological setting, and erodibility of clay in the predominant alternate hard and soft formational lithology, the silting rate has gained considerable proportions. A total of 13% reduction in surface-water storage capacity has occurred since the construction of these dams, threatening the supply of water for irrigation in future. In Tarbela, a total of 8.28% reduction has occurred since 1974, while the Mangla reservoir has reduced its capacity by only 4.6% since 1967 due to the high quality management of the watershed soon after its construction.

It is found that in addition to high precipitation, differential erosion in alternate hard and soft formations prevailing in the area, deforestation and unstable slopes, particularly in high seismic zones of the catchment area, are the main causes of silting.

In order to demarcate different zones susceptible to high erosion, data on geology (geological maps on different scales), precipitation, seismicity, slope instability, and geomorphic variations were used. Stabilisation of soils, construction of checkdams, and proper management of watershed are recommended.