

COMPARATIVE ANALYSIS OF WATER SUPPLY AND CROP DEMAND UNDER PUBLIC AND CIVIL CANAL IRRIGATION SYSTEMS IN PESHAWAR

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ABSTRACT

Pakistan is becoming a water scarce country with declining per capita water availability ($<1000\text{ m}^3$), whereas its demand for domestic, industrial and environment is rapidly increasing resulting in to stress on sustainable water supply to irrigated land contributing $>90\%$ of the agricultural production. The present study was conducted to compare supply and demand under public and civil systems. Water demand was assessed through CROPWAT 8.0. Irrigation supply to the main, secondary and tertiary canals were regularly monitored while at farm level, irrigation water applied to major crops was determined using cutthroat flume.

Water supply remained well below the designed in *Rabi* (winter) due to prolonged break for annual repair and maintenance. In civil system, relative water supply (RWS) as well as relative irrigation supply (RIS) was found greater than public system. During *Rabi*, RWS at primary, secondary, tertiary and farm level under public and civil canal systems was 1.74, 1.05, 0.93, 1.14 and 1.93, 1.56, 1.61, 1.69, respectively. In *Kharif* (summer), RWS at primary, secondary, tertiary and farm level under public and civil canal systems was 1.26, 0.93, 0.86, 0.72 and 1.31, 1.26, 1.13, 1.00, respectively. Statistically, there was a significant difference in RWS of the two systems at secondary and tertiary level, while the difference at primary and farm level was non-significant. Civil system had more generous water supply with an average RWS of more than 1.5. It can be safely concluded that public system relies on rainfall, especially in *Rabi* season and would not be able to meet the crop water demand in a dry year, especially in *Kharif*. To maintain $\text{RWS} > 1.0$ throughout the season, especially critical growth stages, consistent water supply needs to be ensured in public systems by minimizing the annual operation and maintenance period and reducing the conveyance losses.

KEYWORDS: Ris, Rws, Public Canal System, Civil Canal System, *Rabi*, *Kharif*