THESIS

EVALUATION OF GROUND WATER QUALITY AND ITS IMPACT ON CROP PRODUCTION IN SELECTED AREAS OF KOHAT DIVISION

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ABSTRACT

This study was undertaken to evaluate the quality of groundwater and its impact on crops in Lachi valley in NWFP province. Thirty-two representative groundwater samples and thirty-two soil-samples were collected randomly from the area irrigated by the wells at two depths i.e. 0-0.5 m and 0.5-1.0 m. In order to check the effect of wells water on soil, thirty-two soil samples from the rainfed areas near to each representative wells from the two depths were also collected. Individual owners of the wells were also interviewed. The chemical analysis of soil samples showed that well irrigated areas have high salinity value than the rainfed areas. Out of total water samples, 44 percent were found safe (mostly in the western part of the valley), 10 percent were marginal (mostly in the norteast part of the valley) and 46 percent were hazardous (mostly in the south-east part of the valley). Out of the total 32 samples, 16 fall in C_3 S_1 group, 8 in C_4 S_1 group, and 7 in C_4 S_3 group.

The total recharge to the area amount to 0.500 cumecs, out of which 0.055 cumecs comes from Lachi Toi and the remaining from precipitation. The total discharge from the area amounts to 0.796 cumecs out of which 0.74 cumecs were discharging by wells and the remaining by natural springs. The discharge from the study area was two-third times more than recharge to the area that imbalanced the aquifer and the saline water intrusion from saline zone to fresh water zone started. Due to this, 46 percent ground water of the area became saline and continuous application of this water has affected the cropping pattern, cropping intensity and crops yield. Due to the change of water quality in the area, cropping intensity has changed from 95 percent (1985) to 50 percent (in 2001) for kharif season and 84 percent (1985) to 67 percent (in 2001) for rabi season. Also, significant change in the cropping pattern occurred since 1985. The area where once all kind of crops were easily grown is now restricted to only few crops due to the deteriorative water quality and also the yield of most crops has decreased. Average yield of sugarcane has decreased by 100 percent while that of maize and wheat has decreased by 30 and 20 percent, respectively.