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Performance Evaluation of the Irrigation System in Lower Kabul River Basin, Afghanistan

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Abstract

The agriculture sector is the backbone of Afghanistan's economy and makes up around 22% of its GDP. Wheat is the main staple food of the country and accounts for over half of the population's caloric intake. Because of the complex terrain of the country, crops are cultivated on only about 12% of the total area out of which 70 % is solely occupied by wheat crop. Being a cereal deficit country, Afghanistan depends on food imports from neighboring countries to meet the growing population's food demand; the reason behind insufficient food production is the poor land and water productivity of the conventional farming system across the country. As a physical water scarce country, the insufficient rainfall does not meet the local crop water demand. The growing water scarcity problems in the region have not only limited the availability of water for existing agriculture but have also partly restricted the expansion of irrigated land. Prior to any irrigation water management and development initiative to be taken, it is vital to evaluate the existing situation of the on-farm irrigation system of the Kabul River Basin (KRB). Through this study we assessed the irrigation performance by using irrigation application efficiency as the key indicator under the conventional irrigation system in the lower reaches of the KRB. For this purpose, Attawor irrigation scheme, located at the downstream KRB, was selected where winter wheat was grown. Throughout the wheat growth period, a total of 6 irrigation events were applied and measured. Soil moisture content (%) before and after each irrigation event was measured in order to analyze the amount of irrigation water applied against the demand (i.e. irrigation application efficiency). Results of the on-farm experiments showed that the average irrigation application efficiency at field-level was 46 % while the overall range was 34-74 % depending on the canal water availability at different crop growth stages. The existing irrigation application in the study area shows that there is potential for water saving within the irrigation networks provided some technological interventions, infrastructural development and social awareness.

Keywords: Afghanistan water, food security, irrigation system evaluation, Kabul river basin, water scarcity

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