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Performance evaluation of irrigation system using remote sensing and farmers' perception: A case study of Chano Chalba, Chano Mile and Chano Dorga schemes

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In this study, performance of three irrigation schemes (Chano Chalba and Chano Mile modern scheme and Chano Dorga traditional scheme) is evaluated. To assess the performance of irrigation systems ground surveys might require however covering a large area with a short period is difficult and also, unreliability of data is a problem during ground survey. Therefore, remote sensing is essential to evaluate the system in more accurate way. Surface energy balance algorithm (SEBAL) is used to generate useful data such as actual evapotranspiration (ETa), potential evapotranspiration (ETp), water productivity (wp) and land productivity (LP) in this study. Farmers perception on a performance of the schemes such as equity, adequacy, factors that influence the performance of the systems surveyed through the semi-structured interview. The internal indicator equity and adequacy are evaluated. Equity evaluated by spatial ETa distribution across four of the schemes in Hare River. Across schemes, the achieved coefficient of variation (CV) of annual ETa distribution was 0.12. ETa distribution within system shows significant differences, particularly, in rainy months coefficient of variation of ETa on those months scale up to 0.37 in Chano Chabla and 0.38 in Chano Mile due to canal siltation; although most of the farmers thought that water distribution variation is high at dry months. Chano Dorga traditional irrigation scheme performing better regarding equity in this scheme coefficient of variation of ETa distribution is <0.25 throughout the year. Adequacy evaluated by RET and found that the range of RET is acceptable range (0.7-1) throughout the year. Results in comparison shows that Chano Dorga traditional scheme was performing better regarding equity because of good maintenance and participation habit of farmers and regarding productivity Chano Chabla is performing better because of soil fertility which is relatively good as evaluated by farmers.

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