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Crop planning and productivity assessment in a semi-arid vertisol using MIKE–SHE model

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ABSTRACT

Crop planning and productivity assessment of the PDKV-1 watershed were carried out in this paper using a physically based, distributed catchment modelling system 'MIKE SHE' with the qualitative and quantitative land evaluation of watershed. The objective of the study was to (i) calibrate and validate MIKE SHE model for watershed; (ii) simulate hydrological water balance of watershed using qualitative land evaluation; (iii) compute a productivity index of soils using Storie index rating; (iv) evaluate the yield of crops based on the modified FAO model using water balance and determine its relation with those measured by Storie index. The crop planning was made using land capability and suitability classification. The MIKE SHE model was calibrated to simulate the hydrological water balance based on crop planning. The crop yields were evaluated using MIKE SHE model and modified FAO relationship. The model showed that it could be applied for simulating water balance with planned crop rotation. The yields calculated by the modified FAO relationship of green gram, cotton, sorghum and soybean were 20.9, 47.5, 38.0 and 40.2% of maximum yield of 1.1, 1.2, 5.0 and 2.5 t ha^{-1}, respectively. The crop yields coincided with the Storie index with a coefficient of determination of 89.8% and indicated the utility of Storie index for crop planning.