

Simulation of Nitrate Leaching under Maize–Wheat Cropping System in a Semiarid Irrigated Area of the Indo-Gangetic Plain, India

Ch. Jyotiprava Dash, Ph.D.¹; A. Sarangi, Ph.D.²; Partha Pratim Adhikary, Ph.D.³; and D. K. Singh, Ph.D.⁴

Abstract: The cost and time involved in frequent field observations pertaining to quantification of nitrate leaching below the crop root zone leads to the use of simulation models, which is a more plausible approach. Nitrate leaching below the root zone of a maize–wheat cropping system under surface irrigation was assessed. The model's predicted results pertaining to water percolation and nitrate leaching were in line with the observed data, with RMSE values close to zero, and index of agreement values close to 1. The seasonal percolation of water below 120 cm soil depth in maize and wheat were 36.5 and 27.5% of applied water, respectively. Similarly, nitrate leaching below 120 cm soil depth was 18.1 and 14.3% of the applied nitrogenous fertilizer in maize and wheat, respectively. Under similar conditions, the nitrate leaching under a maize–wheat cropping system was 6.8 kg NO₃ ha⁻¹ less than in a rice–wheat cropping system. Furthermore, nitrate leaching below the crop root zone under different fertilizer application rates was estimated and best-fit second-order polynomial equations were developed. The equations can be used for estimation of nitrate leaching under different fertilizer input scenarios of maize-grown and wheat-grown areas under similar hydro-agro-climatic regions. DOI: 10.1061/(ASCE)IR.1943-4774.0000965. © 2015 American Society of Civil Engineers.

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