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Assessment of Surface and Shallow Groundwater Resources for Small Scale Farming in Inland Valleys in Dano, Burkina Faso

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Abstract

Dano is a rural area located in the South-East region of Burkina Faso. According to National Department of Statistics of Burkina Faso, approximately 57 % of the population lives with less than 1 Dollar a day. In the Dano catchment, as in many other rural areas in West Africa, many projects intend to reduce poverty through agricultural system improvement in inland valleys. Often they purely base on surface runoff either by constructing small dams or canalizing runoff directly to the fields. Although flooded in the rainy season, fields dry out quickly after the end of the rainy season so that crop growth is not possible without irrigation.

The aim of this research is to investigate surface runoff and shallow groundwater availability in order to support strategies for better utilisation of scarce water resources in small scale farming in Dano catchment. This paper examines the rainfall distribution at high spatial resolution using dataset of 10 rain gauges for a total study area of 65 km^2 in order to capture the spatial distribution of rain in the catchment. Its conversions into streamflow measured at 8 stream gauges were analysed based on hydrographs characterisation. Soil moisture spatial distribution measured at three different depths was analysed in order to understand the transfer of water between soil and shallow groundwater. The shallow groundwater table was determined from the measurements at 80 different locations in the study area. Its extension and continuity were determined by the analyses of electrical resistivity of the aquifer. Finally, water fluxes are modelled using the Water flow balance Simulation Model (WaSiM) and the main hydrological processes which control surface and shallow groundwater availability in inland valleys in the Dano catchment are determined .

Keywords: Hydrological processes analyses, inland valleys, small scale modelling, water balance, water resources availability

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