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Farmers' and academia's views"

Water use with cloud computing: prospective for food and water security in smallholder irrigation schemes

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Abstract

Growing water scarcity for agriculture calls for the adoption of prudent agricultural water management practices that can boost food production by producing more crops for each drop of water used. Understanding how irrigated lands use water over time is essential for planning and managing water allocation, water rights, and agricultural production. Our study aims to characterise and compare the spatiotemporal dynamics of agricultural water use. The study areas are two different rudimentary irrigation schemes in a west African semi-arid area (Burkina Faso) context. The lakes around each study area, which are the main water resource for irrigation, are shrinking. This is due to both competition amongst users and climate change. Open remote sensing data on the cloud-based platform Google Earth Engine with its large Landsat dataset over the last 35 years have been used for the analysis. The indicator "Water used per surface" is derived via actual evapotranspiration from a surface energy balance model. A per pixel trend analysis shows changing water use at field level. The research demonstrates the utility and advantages of using cloud computing. It offers, automated workflow that enables relevant, more rapid, and cost-effective updated information for water management in data scarce and informal environment. Up-to-date and basin-wide evapotranspiration information is a crucial input in hydrological models capable of simulating the future impact of water management decisions made today. The results also discuss the implication for the future generations on securing food production without having to increase croplands andgreater water use. Subsequent studies should investigate the understanding of crop water productivity to improve food security and better water management strategies with the increasingly limited water resources.

Keywords: Evapotranspiration, google earth engine, thermal remote sensing, time series, water use efficiency, West Africa

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