Abstract:

Adaptation to global climate and environmental change in the context of the water-food nexus will require both understanding the nature of change of freshwater resources (e.g. where does precipitation fall, and how much there is?), and the engineering of regional strategies to manage water harvesting and water use (natural storage in aquifers and in the critical soil zone, and manmade alternatives including land-use/land-cover manipulation such as ramfed agriculture), leading to maximal resilience. In a world of increasing population, achieving and maintaining food security is a fundamental challenge for human development in the 21st century. Food security and sustainable agriculture go hand-in-hand. The basis for sustainable agriculture is hydroecological resilience, which implies the Integrated Management of Land and Water Resources ("a land-use decision is a water decision", Malm Falkenmark 2001). IMLWR requires systematic monitoring of the pathways by which joint space-time organization patterns of landform, precipitation, recharge (groundwater), distribution and storage (runoff) interact, and ultimately impact the so-called "green water" stocks critical for crop production (i.e. soil moisture in the unsaturated zone that is directly available to meet vegetation photo synthetic needs). IMLWR is ideally suited for a remote-sensing based monitoring and analysis framework. Here, an interpretive study is presented using a wide variety of remote sensing data (clouds, rainfall, and vegetation) from multiple satellite platforms to assess the condition of freshwater stocks (rainfall) and hydroecological resilience in NW India, specifically the state of Punjab. Finally, the notion of hydrometeorological audit is proposed as a strategy for anticipating modes of failure in water resource systems, and to inform policy in the context of sustainable land-water management and food production.

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Exposure:
weather or climate related pathway by which climate change affects health
Food Security, Water Security
Food Security: Crop Productivity

Geographic Feature: Mountain

resource focuses on specific type of geography

Geographic Location: Non-United States

resource focuses on specific location

Non-United States: Asia

Health Impact: General Health Impact

specification of health effect or disease related to climate change exposure

Resource Type: Research Article

format or standard characteristic of resource

Cross-cutting Themes: Adaptation, Communication