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Abstract

Keywords

1. Introduction

2. Materials and methods

2.1. Study area

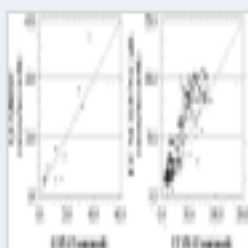
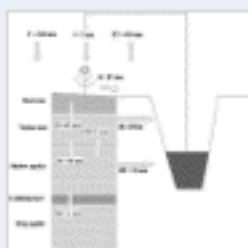
2.2. SWAT

2.3. MD model for analysis of ecosystem service supply



3. Results

3.1. Hydrological modelling



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Abstract

Tibet can be considered as the water tower of Asia and the protection of its water resources crucial. We show that a minimum data approach to model the supply of ecosystem services can potentially be applied to water conservation in Tibet. The approach integrates the spatial heterogeneity of the biophysical environment and the economic behaviour of farmers. A spatially distributed hydrological model is used to simulate the effect of irrigation on evapotranspiration reduction and stream flow enhancement in a Tibetan agricultural catchment. The results feed into an economic model that estimates the supply curve of conserved water from the distribution of net returns between irrigated and rain-fed barley cultivation. The analysis shows that it is theoretically possible to increase discharge out of the catchment in the critical months April–June by 11% on average. Accumulated over larger areas this could provide a significant increase in total upper Brahmaputra discharge. The methodology appears to be a transparent and cost effective tool to quantify the effect of financial incentives in the conservation of water resources. Policy relevant information can be generated without the need to conduct expensive field surveys and to set up more elaborate econometric simulation models. Given the anticipated effects of climate change the potential of payments for ecosystem services to conserve water may become increasingly more important in sustaining stream flow early in the growing season.

Keywords

Water conservation; Hydrological model; Ecosystem services; Minimum data

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