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Developing a Framework to Measure Watershed Sustainability by Using Hydrological/Water Quality Model

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ABSTRACT

A framework is built, wherein hydrological/water quality model is used to measure watershed sustainability. For this framework, watershed sustainability has been defined and quantified by defining social, environmental and biodiversity indicators. By providing weightage to these indicators, a "River Basin Sustainability Index" is built. The watershed sustainability is then calculated based on the concepts of reliability, resilience and vulnerability. The framework is then applied to a case study, where, based on watershed management principles, four land use scenarios are created in GIS. The Soil and Water Assessment Tool (SWAT) is used as a hydrology/water quality model. Based on the results the land uses are ranked for sustainability and policy implications have been discussed. This results show that landuse (both type and location) impact watershed sustainability. The existing land use is weak in environmental sustainability. Also, riparian zones play a critical role in watershed sustainability, although beyond certain width their contribution is not significant.

KEYWORDS

Sustainability, Development, Framework, Watershed, Resilience, Reliability, Vulnerability, Hydrological Models Application, Landuse

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