

## Assessment of Natural Flood Management Potential of Sheffield Lakeland to Flood Risks Using GIS: A Case Study of Selected Farms on the Upper Don Catchment

**Authors :** Samuel Olajide Babawale, Jonathan Bridge

**Abstract :** Natural Flood Management (NFM) is promoted as part of sustainable flood management (SFM) in response to climate change adaptation. Stakeholder engagement is central to this approach, and current trends are progressively moving towards a collaborative learning approach where stakeholder participation is perceived as one of the indicators of sustainable development. Within this methodology, participation embraces a diversity of knowledge and values underpinned by a philosophy of empowerment, equity, trust, and learning. To identify barriers to NFM uptake, there is a need for a new understanding of how stakeholder participation could be enhanced to benefit individual and community resilience within SFM. This is crucial in light of climate change threats and scientific reliability concerns. In contributing to this new understanding, this research evaluated the proposed interventions on six (6) UK NFM in a catchment known as the Sheffield Lakeland Partnership Area with reference to the Environment Agency Working with Natural Processes (WWNP) Potentials/Opportunities. Three of the opportunities, namely Run-off Attenuation Potential of 1%, Run-off Attenuation Potential of 3.3% and Riparian Woodland Potential, were modeled. In all the models, the interventions, though they have been proposed or already in place, are not in agreement with the data presented by EA WWNP. Findings show some institutional weaknesses, which are seen to inhibit the development of adequate flood management solutions locally with damaging implications for vulnerable communities. The gap in communication from practitioners poses a challenge to the implementation of real flood mitigating measures that align with the lead agency's nationally accepted measures which are identified as not feasible by the farm management officers within this context. Findings highlight a dominant top-bottom approach to management with very minimal indication of local interactions. Current WWNP opportunities have been termed as not realistic by the people directly involved in the daily management of the farms, with less emphasis on prevention and mitigation. The targeted approach suggested by the EA WWNP is set against adaptive flood management and community development. The study explores dimensions of participation using the self-reliance and self-help approach to develop a methodology that facilitates reflections of currently institutionalized practices and the need to reshape spaces of interactions to enable empowered and meaningful participation. Stakeholder engagement and resilience planning underpin this research. The findings of the study suggest different agencies have different perspectives on "community participation". It also shows communities in the case study area appear to be least influential, denied a real chance of discussing their situations and influencing the decisions. This is against the background that the communities are in the most productive regions, contributing massively to national food supplies. The results are discussed concerning practical implications for addressing interagency partnerships and conducting grassroots collaborations that empower local communities and seek solutions to sustainable development challenges. This study takes a critical look into the challenges and progress made locally in sustainable flood risk management and adaptation to climate change by the United Kingdom towards achieving the global 2030 agenda for sustainable development.

**Keywords :** natural flood management, sustainable flood management, sustainable development, working with natural processes, environment agency, run-off attenuation potential, climate change

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