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Adaptation Nature-Based Solutions: CBA of Woodlands for Flood Risk Management in the Aire Catchment, UK

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Abstract : More than half of the world population lives in cities, in the UK, for example, 82% of the population was urban by 2013. Cities concentrate valuable and numerous infrastructure and sectors of the national economies. Cities are particularly vulnerable to climate change which will lead to higher damage costs in the future. There is thus a need to develop and invest in adaptation measures for cities to reduce the impact of flooding and other extreme weather events. Recent flood episodes present a significant and growing challenge to the UK and the estimated cost of urban flood damage is 270 million a year for England and Wales. This study aims to carry out cost-benefit analysis (CBA) of a nature-based approach for flood risk management in cities, focusing on the city of Leeds and the wider Aire catchment as a case study. Leeds was chosen as a case study due to its being one of the most flood vulnerable cities in the UK. In Leeds, over 4,500 properties are currently vulnerable to flooding and approximately £450 million of direct damage is estimated for a potential major flood from the River Aire. Leeds is also the second largest Metropolitan District in England with a projected population of 770,000 for 2014. So far the city council has mainly focused its flood risk management efforts on hard infrastructure solutions for the city centre. However, the wider Leeds district is at significant flood risk which could benefit from greener adaptation measures. This study presents estimates of a nature-based adaptation approach for flood risk management in Leeds. This land use management estimate is based on generating costings utilising primary and secondary data. This research contributes findings on the costs of different adaptation measures to flood risk management in a UK city, including the trade-offs and challenges of utilising nature-based solutions. Results also explore the potential implementation of the adaptation measures in the case study and the challenges of data collection and analysis for adaptation in flood risk management.

Keywords : green infrastructure, ecosystem services, woodland, adaptation, flood risk
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