

A framework for assessing the risks and impacts of rural access roads to a changing climate

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**ABSTRACT:**

African communities are worst affected by climate-related natural disasters, in part due to high socio-economic vulnerability, natural resource dependency and low adaptive capacity. Climate resilient road infrastructure in rural areas is critical for improving quality of life. For this reason, a geospatial risk and vulnerability assessment method was developed as a tool for determining where access roads, and the communities they serve, are most at risk to the effects of a changing climate. This is intended to help guide, through prioritisation, the identification of high-risk areas where appropriate climate adaptation measures would be most effective in reducing the impacts of climate variability and change. The research methodology relies on using GIS processes and spatial data to calculate a composite climate risk index, the combined output of a hazard exposure index as well as a road criticality index. The analysis methodology was applied to Mozambique, where large parts of the country were found to be at very high risk to change in terms of rural accessibility given the country's high and recurrent exposure to extreme floods. Downscaled climate simulations for a 2050 future under a low mitigation scenario indicated that pronounced increases in rainfall and cyclone activity are plausible in northern Mozambique, whilst the southern region may become hotter and drier. Prioritisation is thus crucial for more effective and efficient asset management. The methodology was found to be an efficient and effective way of identifying high-risk regions in terms of community access and the physical impact of climate on road infrastructure.