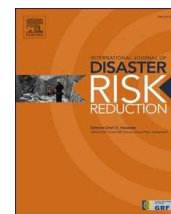


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Flood risk and damage analysis in urban areas of Zimbabwe. A case of 2020/21 rain season floods in the city of Gweru

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ABSTRACT

Urban flooding has become a topical issue in the 21st century as flood frequency and severity in urban areas have increased due to the changing climate. The study assessed the flood risk of areas in the city of Gweru and the damage from the 2020/21 rainfall season flooding. A mixed methods research design anchored by both qualitative and quantitative data probing techniques was employed in this study. Geographic information system, questionnaire, interviews and observations were adopted for data collection. Microsoft excel 2013 and ArcMap 10.5 software were used for data analysis. The majority of residential areas are located in flood-prone areas. Disregard of city by-laws, corruption and poor planning were major drivers of establishment of residential stands in flood-risk areas. Property damage and crop destruction among others were major socio-economic impacts of the 2020/21 rainfall season flooding incident. The study concludes that areas historically reserved as urban carbon-sinks prior to the current climate change geographical period have now been developed into residential areas because of the lull in flooding events in recent years. The study recommends that urban development authorities should cognize frequent auditing of development activities and due-respect of urban by-laws in order to avoid development in flood-risk areas.

1. Introduction

Reports of urban flooding events, which have caused significant damages and fatalities over the world have increased in recent years [1–15]. Flooding in urban areas manifest as flash floods, coastal floods, or river floods but there is also a specific flood type that is called urban flooding [16]. Urban flooding is the accumulation of flood-waters that result when the inflow of storm water exceeds the capacity of a drainage system to infiltrate water into the soil or to carry it away [16]. Urban development increases chances of flooding by transforming natural landscapes which disturbs normal drainage [17,18].

Floods have resulted in some of the greatest economic and social impacts on the population of the United States. Catastrophic floods in urban areas, for example, one caused by Hurricane Katrina in New Orleans in 2005, Superstorm Sandy in New York in 2012, and Hurricane Harvey in Houston in 2017, are greatly remembered for causing serious socio-economic problems [19–22]. These floods caused loss of life, damaged property worth billions of dollars and adversely affected millions of people in most urban cities. Even small frequent floods, such as those that occur during short-term downpours can have high cumulative socio-economic repercussions [23]. In 2003, a disastrous flood occurred in the Argentinian city of Santa Fe which directly killed 23 people and another 100 people died due to indirect consequences of the disaster in the following months and years which left many people homeless and tormented [24].

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