International Journal of Disaster Risk Reduction 5 (2013) 38–48

Contents lists available at ScienceDirect

International Journal of Disaster Risk Reduction

journal homepage: www.elsevier.com/locate/ijdrr

Indigenous knowledge, coping strategies and resilience to floods in Muzarabani, Zimbabwe

Emmanuel Mavhura [a], Siambabala Bernard Manyena [b,*], Andrew E. Collins [c], Desmond Manatsa [a]

[a] Department of Geography, Bindura University of Science Education, Private Bag 1020, Bindura, Zimbabwe
[b] Disaster and Development Centre, Faculty of Engineering and Environment, Northumbria University, Newcastle upon Tyne NE1 8ST, UK
[c] Disaster and Development Centre, Faculty of Engineering and Environment, Northumbria University, Newcastle upon Tyne NE1 8ST, UK

ARTICLE INFO

Article history:
Received 17 November 2012
Received in revised form
15 July 2013
Accepted 16 July 2013
Available online 8 August 2013

Keywords:
Indigenous knowledge
Floods
Resilience
Coping strategies
Muzarabani
Zimbabwe

ABSTRACT

The connection between indigenous knowledge systems and disaster resilience derives from both theory and practice highlighting potential contributions of indigenous knowledge to building resilient communities. Using data from interviews and focus group discussions, this paper explores people's indigenous survival strategies and variations in people's ability to cope with floods in two flood-prone villages of Muzarabani district, Zimbabwe. The findings reveal that indigenous knowledge systems played a significant role in reducing the impact of floods in Muzarabani district. However, the extent to which indigenous knowledge enhanced resilience to floods was influenced by geophysical locations, exposure to flooding and socio-economic abilities. Communities in an area with low flooding and with a strong socio-economic base such as education and income were more likely to cope with flood impacts compared to those communities in areas with high and sudden flooding and weak socio-economic base. The paper shows how indigenous knowledge systems are an indispensable component of disaster resilience building. This is because indigenous knowledge systems can, (i) be transferred and adapted to other communities; (ii) encourage participation and empowerment of affected communities, (iii) improve intervention adaptation to local contexts, and (iv) are often beyond formal education about environmental hazards.

1. Introduction

The rejection of environmental determinism as an inadequate account of disaster causation shifted attention towards resilience [1]. The resilience notion emphasises the importance of communities to 'build back better' [2], to 'bounce back', if not 'bounce forward' [3] and to recover from disasters with little or no external assistance. Increasingly, indigenous knowledge systems are among the elements implicated in disaster resilience 'thinking', as reflected in sub-texts of the Hyogo Framework for Action of 2005 as part of its call for 'building the resilience of nations and communities to disasters' [4]. Indigenous knowledge has been an inherent component of traditional disaster management systems where over centuries people have adjusted their lives and livelihoods to adapt to changing contexts [5]. The interest in indigenous knowledge systems has been particularly highlighted in flood disasters, due to the likely increase of flood events resulting from anthropogenic climate change through heavy

* Corresponding author. Tel.: +44 796 679 35 92.
E-mail addresses: edmavhura@gmail.com, emavhura@buse.ac.zw (E. Mavhura), bernard.manyena@northumbria.ac.uk, bernmanyena03@gmail.com (S.B. Manyena), andrew.collins@northumbria.ac.uk (A.E. Collins), dmanatsa@gmail.com (D. Manatsa).

2212-4209/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.ijdrr.2013.07.001

precipitation, increased catchment wetness and sea level rise [6]. Yet, there is insufficient empirical evidence suggesting the effectiveness of the indigenous knowledge in enhancing resilience to flood disasters. More importantly, the studies that have been conducted on the connections between indigenous knowledge and flooding are based on Asia, with a relatively insignificant number of such studies from Africa. In bringing indigenous knowledge more into focus the rationale of this paper is that coping and resilience are interrelated concepts in contexts of African development. The effectiveness of people's knowledge as driver of coping and resilience from within their community is however dependent on ecological and social conditions within which they must reside. It is not the intention of this paper to examine and reposition terminologies already widely banded about the academic discourse. Rather the paper contributes a case study through which concepts might gain better meaning, by closer understanding of what under-reported people in conditions of flood exposure and socio-economic volatility do to survive.

This paper presents findings from a study on the role of indigenous knowledge in reducing the impact of floods in Muzarabani district, Zimbabwe. The paper will make a significant contribution to the conspicuous literature gap on indigenous knowledge systems and flood disasters in Africa. The results are a useful source of information for preparation of a comprehensive disaster management programme. By using indigenous knowledge, it is hoped that the government's institutional capacity will be enhanced in order to effectively encounter future flooding. The paper also highlights the resilience of Muzarabani as a community, particularly during a period when Zimbabwe faced great socio-economic challenges. It indicates the merits of integrating indigenous knowledge systems in flood risk reduction.

2. Indigenous knowledge and disaster resilience

The term 'indigenous knowledge' is presented as having varied meanings including 'local knowledge' [7–9], 'traditional knowledge', 'indigenous technical knowledge', 'peasants knowledge', and 'traditional environmental knowledge' or 'folk knowledge' [10]. Notwithstanding a multiplicity of meanings the term suggests a body of knowledge existing within or acquired by local people over a period of time and passed through generations [11,12]. Indigenous knowledge is thought to be distinguished from scientific knowledge, the latter being associated with Western technology or techniques. However, it is a subjective interpretation in that such differentiations can be challenged since all knowledge can be indigenous, cultural or ethnic. Nonetheless it may be reasonable to consider mainstream knowledge branded as scientific to be structured and global in nature [11]. Shaw et al. [13] state that indigenous knowledge tends to be locally bound, culture and context specific, non-formal and orally transmitted, closely related to survival and subsistence, dynamic and based on innovation, adaptation and experimentation. This suggests indigenous knowledge is an inherent valuable resource, and an integral coping or resilience mechanism built over centuries. Although indigenous knowledge, in many ways, is not always apparent [12], local communities utilise it to construct and reconstruct themselves to prevent, mitigate, prepare, respond and recover from disaster impacts. This can be considered to be a coping mechanism and is the manner in which a group of people or individuals become 'resilient' in the sense used by UNISDR cited earlier in the Section 1 [4]. The resilience terminology is adopted by a global array of governmental and non-governmental organisations that now apply it commonplace. However, bringing indigenous knowledge more into focus and context deepens the understanding of how people manage their own changing circumstances and can bring more pertinent information about the hazard event itself Mercer et al. [11] argue that indigenous knowledge is invaluable in understanding historical hazard events while scientific knowledge has been proven to be of great importance when dealing with rare or unprecedented events. As a result, indigenous and scientific knowledge should be considered as two sides of the same coin, which complement each other.

While we avoid any overly definitive model that would explain the case of Muzarabani, the basic approach of this study can be considered in relation to Dekens' [2] framework for analysing local knowledge in disaster preparedness (Fig. 1). Dekens states that disaster preparedness at the local level is a product of knowledge types, practices and beliefs, which are mainly influenced by societal structures and processes within the local and global hazard contexts. In this model, disaster preparedness at the local level is based on observation, anticipation, adaptation and communication to enhance resilience with the effects on levels of security, sustainability and community resilience building.

3. The study area

Muzarabani is one of the most flood-prone areas in Zimbabwe. The term '*muzarabani*' in the local Shona language means flood plain or an area frequently flooded. It is located in the northern lowveld of Zimbabwe within the Zambezi Basin. The Zambezi River itself flows from the Kalene Hills in Zambia generally in an easterly direction into the Indian Ocean. The river marks the boundary between Zimbabwe and Zambia as well as Zimbabwe and Mozambique. Two types of floods have been affecting the Muzarabani area for decades. The first and most frequent is the seasonal flood, which frequently occurs in January or February, at the peak of the rainfall season. The second and not so frequent one is the cyclone-induced flood. In 2000 and 2003 tropical cyclones brought intense storms that caused flooding in the Zambezi Basin, including Muzarabani [14].

The unique natural setting and human engineered context of Muzarabani makes it more susceptible to flooding. This is because the area is downstream of Kariba Dam in the west, but upstream of the Cabora-Basa Dam in the eastern direction in Mozambique. To the south of Muzarabani is a range of mountains known as Mavhuradonha which separate the Zambezi valley from the highveld of Zimbabwe. All the tributaries of the Zambezi River from the Zimbabwean side