Weather and Climate Extremes 17 (2017) 7–16

Contents lists available at ScienceDirect

Weather and Climate Extremes

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

Intervention pathways towards improving the resilience of pastoralists: A study from Borana communities, southern Ethiopia

Argaw Ambelu [a,*], Zewdie Birhanu [b], Abraraw Tesfaye [c], Negalign Berhanu [d,b], Christine Muhumuza [e], Wondwosen Kassahun [f], Teferi Daba [c], Kifle Woldemichael [c,g]

[a] Department of Environmental Health Sciences & Technology, Jimma University, Ethiopia
[b] Department of Health Education and Behavioural Sciences, Jimma University, Ethiopia
[c] Horn of Africa Resilience Innovation Lab, Faculty of Public Health, Jimma University, Jimma, Ethiopia
[d] Department of Health Economics, Policy and Management, Jimma University, Jimma, Ethiopia
[e] Makerere University College of Health Sciences, School of Public Health, Department of Epidemiology and Biostatistics, ReslientAfrica Network, Uganda
[f] Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institute of Health, Washington D.C., USA
[g] Department of Epidemiology and Biostatistics, Jimma University, Jimma, Ethiopia

ARTICLE INFO

Keywords:
Droughts
Ethiopia
Pathway model
Resilience
Livestock
Food security

ABSTRACT

Building resilient communities towards recurrent droughts is increasingly becoming an important element in development endeavours, particularly among communities vulnerable to shocks and stresses. Despite decades of remarkable efforts made by governmental and non-governmental organization, the resilience capacity of pastoralists in Ethiopia remains poor. The aim of this study is to test the statistical relationships among the resilience dimensions that emerged through community consultations, and to identify the intervention pathways for effective resilience building efforts. Data were collected from 1058 randomly sampled households in Arero and Dhas districts of Borana Zone, Southern Ethiopia. The data were collected through interviewer administered structured questionnaire and observational checklist. Principal component analyses were done to develop composite scores of the different resilience dimensions. Structural equation model (SEM) verified the theoretical model. The SEM also revealed that resilience towards impact of recurrent droughts was multi-dimensional and showed statistically significant ($p < 0.05$) relationships. Consequently, household food insecurity manifested as ultimate outcome of poor resilience. Infrastructure and social services ($\beta = -0.24$), livestock dimension ($\beta = -0.21$), human capital ($\beta = -0.12$), psychosocial distress ($\beta = -0.1$) dimensions significantly ($p < 0.05$) affected the status of household food insecurity. Furthermore, livestock and wealth ($\beta = 0.16$), wealth and infrastructure ($\beta = 0.06$), infrastructure and human capital ($\beta = 0.18$), livestock and psychosocial distress ($\beta = -0.09$) dimensions have structural relationships and significantly influence each other. Environment, and peace and security are found to be major underlying resilience factors and significantly associated with pastoralists' resilience which affect other resilience dimensions. The intervention pathway indicated that intervention on the livestock and infrastructure dimensions could help to improve the resilience of these communities.

1. Background

Disaster is a disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources (UNISDR, 2009). It is increasingly becoming global development challenge in many Sub-Saharan African countries. During the past few decades, the burden of natural and human-made disasters has been increased significantly (OXFAM, 2015a). According to global estimate of 2015, more than 193 million people are displaced by different disasters in 100 countries in 2014; on average of 264 million people each year, making one person being displaced every second (Norwegian Refugee Council and Internal Displacement Monitoring Centre, 2015). Global average annual loss from disasters is estimated to reach 414 billion USD by 2030 (UNISDR, 2016).

Disasters weaken development gains in every setting, especially, dragging the poor and most vulnerable part of a communities (UNISDR, 2015). The Millennium Development Goals (MDGs) and Sustainable

* Corresponding author. P.O. Box 378, Jimma, Ethiopia.
E-mail address: aambelu@yahoo.com (A. Ambelu).

http://dx.doi.org/10.1016/j.wace.2017.06.001
Received 17 January 2017; Received in revised form 3 April 2017; Accepted 5 June 2017
Available online 16 June 2017

Development Goals (SDGs) are extremely challenged in many communities and countries by losses from recurrent disasters, shocks and stress (UN, 2015a; UNDP, 2004; UNISDR, 2015; USAID, 2011a). The SDG contained about 25 targets related to disaster risk reduction, clearly indicating the role of disaster risk reduction as a core development strategy and a cross cutting issue in development agenda (UN, 2015a; UNDP, 2004). Consequently, the SDGs and the Sendai Framework for Disaster Risk Reduction 2015–2030 gives substantial attention to disaster risk reduction and builds a resilient community for Sustainable Development (UN, 2015a, 2015b; UNISDR, 2016). Communities affected by some disaster such as drought face slow-onset and persistent stress that result in a significant challenge to livelihood (RAN, 2014; UN, 2015a). Drought is generally a situation where there has not been enough rainfall over extended period of time, usually for a season or more, leading to water shortage that leads to a serious hydrologic imbalance (National Oceanic and Atmospheric Administration (NOAA), 2002). Given the changing global climatic conditions, there is an increasing concern that droughts may be increasing in frequency and severity in the coming years (USAID, 2011b). Drought is one of the most challenging slow onset hazards, affecting the lives of millions with the highest burden being among Sub-Saharan Africa (UNDP, 2004; USAID, 2011a). Evidence has shown that the burden and impact of drought are much heavier for pastoralist communities (FAO, ND).

In Ethiopia, pastoralist communities represent 12% of the total population (Mussa, 2014) and they basically reside in the arid and semi-arid lowland areas of the country which are normally vulnerable to rainfall variability (Ministry of Agriculture of Ethiopia, 2013). They contribute 22% of the country's cattle population; share 12–16% of Ethiopia's Gross Domestic Product (GDP) and 30–35% of the agricultural GDP (National Oceanic and Atmospheric Administration (NOAA), 2002). Despite their crucial contributions, they often suffer from frequent attacks of recurrent droughts. Even in recent years, Ethiopia experienced a massive drought and food insecurity crisis as a result of failed rains and droughts, in which pastoralist communities have faced the largest hit (Famine Early Warning System Network, 2015; OXFAM, 2015b).

Despite tremendous efforts, the resilience capacities of Ethiopian pastoralists remain poor (Adrian and Andy, 2012; USAID, 2011b). There are different definitions for resilience, even though the definitions are fundamentally the same. The UNISDR defines resilience as “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” (UNISDR, 2009).

It has been recognized more than ever that building disaster resilient community is critical to achieving the goal of eradicating extreme poverty and promote sustainable development (UN, 2015b; UNDP, 2004; UNISDR, 2015). People and system resilience is best built through understanding of context specific resilience challenges and dimensions, vulnerability factors and adaptive and coping strategies (OXFAM, 2015a; RAN, 2014; UNISDR, 2015). In recent years, there is a growing understanding for context based innovative approach to strengthen community's resilience. For instance, Resilient African Network (RAN) stated that “the resilience of people and systems will be strengthened by leveraging the knowledge, scholarship and creativity to incubate, test, and scale innovations that target capabilities and reduce vulnerabilities identified by a scientific, data-driven, and evidence-based resilience framework” (RAN, 2014). Thus, if resilience capacities have to be strengthened in drought affected pastoralist communities, context specific and evidence based resilience building pathways needs to be identified and promoted (UNISDR, 2015). However, resilience building efforts predominantly focused on response to drought events than building long term adaptive capacities (Pavanello, 2009).

The present study was guided by data driven and context specific resilience framework; developed from the earlier qualitative study with grounded theory approach. The framework was contextually relevant, consisting eight resilience dimensions (Fig. 1). The detailed description of the resilience can be found on the earlier article (Birhanu et al., 2016). In brief, the dimensions included wealth; livestock; infrastructure and social services; environment; social network; governance/peace and security; human capital; and psychosocial conditions. The framework shows the conceptual, inter-relationship among the dimensions and the potential pathways where resilience to recurrent droughts can be strengthened in order to help pastoralist communities to develop long term adaptive capacities. It presents hypothesized relationship which was generated through grounded theory approach. However, resilience measurement mostly ignored this unique iterative and critical step in the process of building or strengthening people's and system's resilience to impacts of shocks including recurrent droughts. Therefore, the present study was aimed at testing the statistical relationship among the resilience dimensions; identify the intervention pathways to resilience building with stronger overall influence on pastoralist communities and system resilience. The study was conducted in Pastoralist communities of Borana Zone, Oromia Region, in southern Ethiopia.

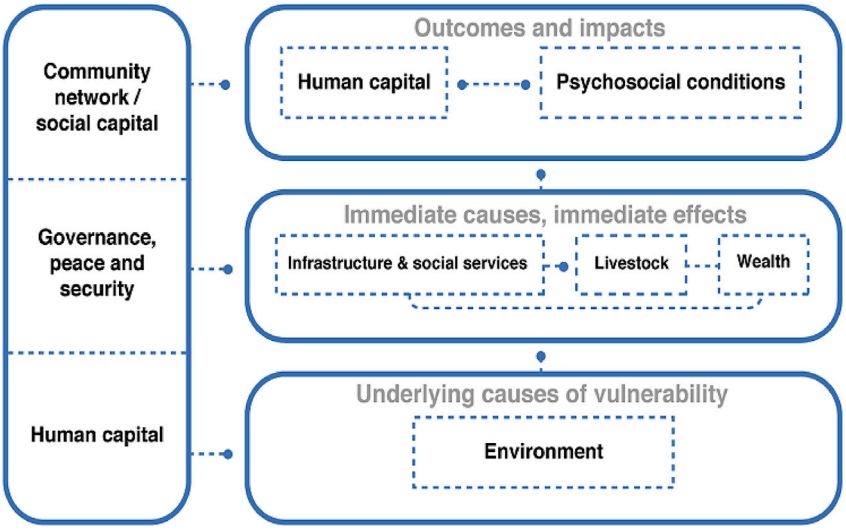

Fig. 1. Resilience dimension framework; as emerged from qualitative study with grounded theory approach; Borana, Southern Ethiopia, 2014 (Birhanu et al., 2017).