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Perceptions of resilience to climate-induced disasters in Mbale municipality in Uganda

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ABSTRACT

Resilience has been raised as a core task within disaster risk reduction frameworks, yet it remains difficult to implement these global ideas in local communities. This study used Community Based Resilience Analysis Approach to investigate the components that are perceived as important in resilience and the extent to which these components have been achieved. It explored the trend of resilience and beneficial interventions for building resilience as perceived by interviewed participants in Mbale Municipality in Eastern Uganda. The study results indicate that access to education, healthcare, employment, peace and security were the most important components of resilience. Respondents perceived to have progressed in accessing credit, building productive farms and sustaining peace and security by July 2017. However, they assessed a lack of diverse income-generating activities, access to insurance, food security, employment and health care. Moreover, the study showed that respondents from marginalised parts of the municipality experienced decreasing resilience while respondents in other divisions had increased resilience. These results provide context-specific components of resilience by the local people. This can inform the formulation of resilience indices and bear relevance for policy-makers and practitioners to understand areas to invest more resources to achieve resilience.

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Resilience; perceived; climate change; shocks; stresses; Mbale

1. Introduction

Understanding the components that can enhance resilience against climate change shocks and stresses so as to guarantee human well-being has become an important objective within the disaster risk reduction frameworks. As climate change is increasingly manifesting through prolonged droughts, heavy precipitation events, storms and floods

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threatening to severely affect developing countries (Jenkins et al., 2012), urban areas of developing countries are likely to suffer most. This is because of high levels of poverty, inadequate socio-economic infrastructure and limited service provision (Boyd & Juhola, 2014). Therefore resilience has been seen as the main goal within disaster risk reduction and Sustainable Livelihood Frameworks (SLF) (Chambers & Conway, 1991; Joerin et al., 2012; Miles, 2015; UNISDR, 2015). However, it has thus far remained difficult to translate these global ideas into actual location specific improvements of resilience. Research by Hollis (2017) shows how important local contexts are for disaster risk reduction and why international organisations fail with their projects if they do not close the gap between local understanding and global frameworks. Furthermore, studies by Jones and Tanner (2015) and Smith and Frankenberger (2018), argue that it is the local communities themselves that have the best understanding of what increases their resilience. Thus, there is a need to understand how local communities perceive resilience, assess what components contribute to their increased resilience and how these components have been achieved. This knowledge is important to inform policy-makers and practitioners on community priority components that can enhance resilience as well as informing the formulation of resilience indices.

In the context of Uganda, previous reports indicate an increase in droughts (Zake & Hauser, 2014), a significant rise in temperature by 0.3°C per decade (Kikoyo & Nobert, 2016), a significant increase in rainfall in October, December and January ($p < 0.05$) and an increase in flash floods in October, November and December (Nsubuga et al., 2014). This has increased climate-related shocks and stresses among urban households particularly those located in low lying areas and slopes of high Mountains (Lwasa, 2010). These reports illuminate the need for empirical assessments in Uganda's urban areas to ascertain the components that enhance resilience to climate-related shocks and stresses. This can guide interventions geared towards resilience building. Whereas some studies on resilience have been conducted in Uganda's urban areas, there was a limited focus on assessing context-specific components that enhance resilience to climate change-related shocks and stresses. For example, a study by Mugume and Butler (2017) focused on the functional resilience of drainage systems under extreme rainfall events in Kampala. Dobson, Nyamweru, and Dodman (2015) focused on a participatory approach of improving savings of low-income earners and the use of environmentally friendly mechanisms. D'Errico and Di Giuseppe (2018) focused on drivers of resilience to food security while a study by Oriangi et al. (2019) focused on sociodemographic factors that determine household resilience. Thus, limited knowledge exists on components perceived to enhance local resilience.

The complexity in the meaning of resilience as a concept has meant that scholars and practitioners see it in several ways for which to achieve societal goals. This is especially with global calls by the United Nations (UN) Sustainable Development Goals of 2015, goal number 11 and the Global Assessment Report on risk reduction (UNISDR, 2015), all striving for immediate action and stronger commitment by member states to prioritise actions that enhance resilience. Resilience is also seen as a positive step that covers the gap of traditional risk and vulnerability approaches and extends the focus to opportunities and capacities of disaster-prone communities to cope with uncertain changes (Aldunce, Beilin, Handmer, & Howden, 2016; UNDP Drylands Development Centre, 2013). Thus, numerous frameworks and indices have tried to define the components that are useful

in enhancing community resilience (FAO, 2012; Joerin, Shaw, Takeuchi, & Krishnamurthy, 2014; The Rockefeller Foundation/Arup, 2016; UNDP Drylands Development Centre, 2013).

The Food and Agricultural Organisation framework (FAO, 2012) indicated that resilience is a function of access to basic social services, productive assets, adaptive capacity, social safety networks and sensitivity. It noted that if a community has better access to health care, education, water, electricity and sanitation, then they are more resilient. Furthermore, FAO framework indicated that ownership of livestock, fertile land and having diversified income-generating activities (DIGA) can increase people's coping and adaptation capacity to new challenges thus, enhancing their resilience. For instance, the community of Dolow in Somalia indicated that it was access to basic social services and ownership of productive assets that were the most important factors contributing to their resilience (FAO-UNICEF-WFP, 2014).

Furthermore, the City Resilience Index (The Rockefeller Foundation/Arup, 2016), indicated that resilience is a function of (a) health and well-being consisting of minimal human vulnerability, diversity of livelihood opportunities, employment and safety of human health. (b) Economy and society consisting of collective identity and community support, comprehensive security and rule of law and sustainable economy. (c) Infrastructure and ecosystem consisting of reduced exposure, effective provision of critical services and reliable mobility and communication and (d) leadership and strategy consisting of effective leadership and management, empowered stakeholders and integrated development planning.

Further still, the Climate Disaster Resilience Index by Joerin et al. (2014) indicated that resilience depends on the physical, socio-economic, institutional and natural components. They explain that availability, access and alternative capacity of electricity, water, roads, housing, health and education can enhance resilience. Furthermore, the index explains that a strong social capital, household assets, DIGA, employment opportunities, access to credit, savings and good governance will help to create a resilient community.

Additionally, the Community Based Resilience Analysis (CoBRA) (UNDP Drylands Development Centre, 2013) reported that resilience is a function of the physical, human, financial, natural and social components. The physical component includes basic infrastructure such as roads, railways, telecommunication, markets, sanitation, shelter and water. The human component includes education, food security and health care. The financial component includes access to credit, productive farms, employment, DIGA and livestock, while peace and security constitute the social component. The CoBRA approach explains that more access to these components will enhance community resilience. A study conducted in the drylands of Kenya and Uganda indicated that education, water, peace and security were the most important components that enhanced community resilience (UNDP, 2014).

Inter alia, the components of resilience proposed by these different frameworks/indices relate to physical, natural, social, economic and institutional dimensions. These components directly relate to the five capitals of the SLF (Chambers & Conway, 1991). The physical component refers to the basic infrastructure such as roads, shelter, water, electricity and housing that facilitates the well-functioning of the community and enhances people's ability to respond and recover easily when faced with shocks and stresses (Joerin et al., 2014; UNDP, 2014). The natural component is where other resource base activities depend on i.e. land, forests and wetlands (UNDP Dry lands Development

Centre, 2013). The social component which includes sectors like education promotes human development and enables people to easily understand early warnings while inclusive health sector can support citizens to recover during shocks and stresses (The Rockefeller Foundation/Arup, 2016). In addition, the social networks among residents show how people are connected in supporting each other to manage challenges (Joerin et al., 2014). The economic component shows the ability of people to get income which is important in accessing the basic needs of life and enhances the ability to thrive during shocks and stresses. It also shows the ability to save which provides the spare capacity to withstand shocks and stresses (Joerin et al., 2014). The institutional component constituting good governance, population awareness and crisis management looks at the local and national government functioning to manage shocks and stresses and enables protection of important ecosystems that enable urban areas to thrive during climate change shocks and stresses (The Rockefeller Foundation/Arup, 2016).

This study investigated the priority components that enhance the resilience of the local people, assessed the extent to which these components have been achieved, trends of resilience and beneficial interventions in building local resilience in Mbale municipality in Eastern Uganda. It borrows insights and the methodology used by the CoBRA approach in setting up the strategy used in the group interviews and key informant interviews as well as questions asked (UNDP Drylands Development Centre, 2013). The CoBRA approach is premised on the fact that resilience can best be understood from a local based perspective. Its goal is to attain an understanding of what the local population perceive as important in enhancing their resilience (UNDP Drylands Development Centre, 2013). It uses the Sustainable Livelihood Framework (SLF) capitals (i.e. financial, human, natural, physical and social) to classify the resilience components identified by the local population. This is because the SLF expresses the five major factors that affect individual livelihoods (Chambers & Conway, 1991; UNDP, 2014). The CoBRA approach was chosen based on its premise that the local population is better placed to evaluate the most important components in resilience building (Hollis, 2017; Jones & Tanner, 2015). Thus, enabled the study to come up with a number of relevant context-specific resilience variables. Such information can be helpful for future quantitative approaches. This study therefore, deviates from the traditional top–bottom approaches of objective indicators that assume that experts have a better understanding of factors that drive peoples resilience using pre-defined frameworks (Jones & Tanner, 2015; Jones, Samman, & Pink, 2018; Smith & Frankenberg, 2018). While objective approaches have numerous strengths (Suárez, Gómez-Baggethun, Benayas, & Tilbury, 2016), subjective resilience assessments such as the CoBRA, can be useful in informing objective approaches on what defines local resilience. UNDP Drylands Development Centre (2013) defines resilience as ‘an inherent as well as acquired condition achieved by managing risks over time at individual, household, community and societal levels in ways that minimise costs, build capacity to manage and sustain development momentum and maximise transformative potential’.

The aim of this study was to assess how the local population in Mbale municipality perceives resilience. The study contributes to existing research by coming up with context-specific components considered as important in driving resilience, thus informing the formulation of resilience indicators that can be used to monitor improvements in resilience over time. Findings on the priority resilience components are also important in guiding policy and interventions seeking to understand priority sectors for resources allocation

given the scarce resources. This paper is structured as follows: this section presents the introduction. Section 2 describes the materials and methods. In Section 3, the results and discussion are presented and in Section 4, the conclusion is given.

2. Materials and methods

2.1. Description of the study area

The study was conducted in June 2017 in Mbale Municipality in Eastern Uganda (Figure 1). Mbale municipality comprises three divisions; Wanale, Industrial and Northern divisions. These three divisions are constituted by 14 wards with a total population of 92,857 (UBOS, 2016). The municipality was selected based on its location in the mountainous disaster-prone area characterised with recurring flash floods, prolonged droughts and a very

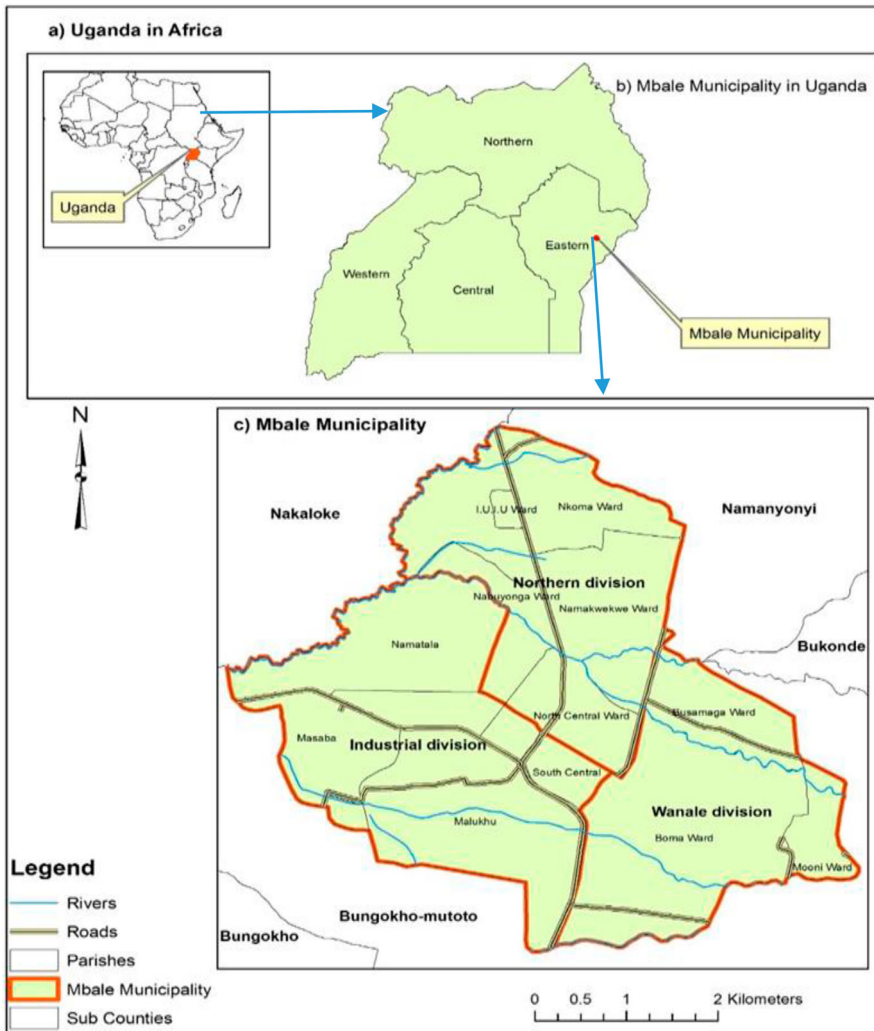


Figure 1. The study area location in Eastern Uganda based on UBOS shape files of 2014.

high rate of urban population growth and density which impose pressure on land and social service provision (UBOS, 2016). The area experiences a humid tropical climate with bimodal rainfall from March to June and from September to November, while the dry seasons extend from December to February and in July (UNDP, 2013). The average total annual rainfall was 1500 mm while the average annual temperature was 23°C for the period 1960–2009 (Mbale District Local Government Statistical Abstract, 2012). Climate change is expected to increase the frequency and intensity of extreme events such as prolonged droughts, flash floods and heatwaves in the Municipality (UNDP, 2013).

2.2. Research design

The study used some elements of grounded theory and fixed qualitative research designs (Clarke, 2003). Using these research designs, the study obtained perceptions on the priority components that enhance resilience, achievements of priority resilience components, the trends of resilience, characteristics of resilient households and interventions in local resilience building.

2.3. Data collection methods

2.3.1. Group interviews

Data on the components that enhance local resilience, achievement of priority components, the trend of resilience and interventions in local resilience building was collected using 9 structured group interviews based on theoretical saturation (Braun & Clerke, 2006). Three (3) separate group interviews were conducted in each of the 3 division of the municipality (i.e. with men aged above 30 years, women aged above 30 years and the youth aged between 18 and 30 years¹) since mixing participants would cause the young and the women not to express themselves freely (Bob, 2011). Each group interview consisted of a minimum of 7 and a maximum of 12 participants. This reduced the time and financial costs. The local government representatives at the village level and the research assistants from the locality mobilised suitable participants from the community for the group interviews. The participants were selected purposively based on those who were information-rich and consent was sought from participants before beginning the interview. A consistent and easily understood definition of resilience was developed since it is a highly technical concept with no direct interpretation. Thus, resilience was defined as the ability of people or households to withstand hardships related to climate change. Each group interview lasted approximately 2–3 h and the languages used were English and Luganda.

2.3.2. Key informant interviews (KII)

In order to triangulate the results of group interviews, 8 structured KII's were conducted with households perceived by participants of the group interviews to have achieved partially or fully resilience characteristics in the community. The information captured during KII's included: demographic characteristics, components contributing to their resilience and interventions that would best build community resilience. The representative sample was based on the saturation level which was reached at the 8th interview (Braun & Clerke, 2006). Each KII took approximately 1 h. The language used was English

since all the households perceived to have achieved partially or fully resilience characteristics in the community were educated.

2.4. Data analysis

Data from group interviews and KIIs was analysed using summative thematic content analysis (Braun & Clarke, 2006) to derive the major climate change shocks and stresses, the priority components that enhance local resilience, level of achievement of priority components, factors that have contributed to household resilience among resilient households, the trend of resilience and interventions that would best build community resilience. This involved sorting and generating initial codes from the data and both open and vivo coding was used. This was followed by categorisation of texts into emerging patterns grouped into relevant resilience themes (Braun & Clarke, 2006). This is an inductive process where field data guides the process of categorisation.

2.5. Sample characteristics of participants in the KIIs

The average age of the participants in the KIIs was 51 years with a range of 34–60 years old. Most of the participants completed university while the rest completed tertiary, secondary and primary level of education. The majority of the participants were in formal employment while few participants were involved in business. The average household size was 5 members with a range of 2–8 members.

3. Results and discussion

3.1. The main climate change shocks and stresses perceived by participants in Mbale municipality

The main climate change shocks and stresses perceived by participants of group interviews in all the three divisions of Mbale municipality were heavy rainfall events, droughts and unpredictable rains. Heavy rainfall events are often accompanied by flash floods particularly in the low lying areas near streams in all the three divisions. Flash floods make some roads impassable, destroy crops and soak the floors of houses or even make others uninhabitable. Also during heavy rainfall events, latrines get filled up contributing into the spread of water-borne diseases. Participant 1 in a group interview with men in Wanale division stated that ‘when the rains come, it is too much causing destruction of crops, latrines get filled up particularly in areas where the water table is high, making the situation worse in terms of spread of diseases’. Furthermore, participants in group interviews reported that droughts have often caused water and food scarcity for households. Droughts have also affected agricultural related businesses since farm supplies reduce thus, causing high food prices. Participants also noted that the most recent drought that affected the area stretched from August 2016 to April 2017. Participant 7 during group interviews with men in Industrial division stated that ‘Prolonged droughts have become a destructive element causing scarcity of water, low crop yields, hunger and making people fail to recover easily’. In addition, it was reported that the rains have become unpredictable thus affecting planting seasons and other rain-fed activities.

One of the participants stated that: ‘We used to grow crops in the beginning of March but the rains now come so late and when they come, they are accompanied with strong storms which blow away roofs of houses’ (Participant 3 in group interviews with women in Wanale division). When the rains delay, it means that many farmers go without planting which causes harvest loss, hunger and an increase in food prices because traders have to buy food from other regions. This finding is consistent with a report by Egeru (2016) who found that there was an increase in heavy rainfall events and flash floods in Karamoja region in North Eastern Uganda. The finding also corroborates with the report by Zake and Hauser (2014) which indicated that there was an increase in droughts and heavy precipitation events in Mpigi district in Central Uganda.

3.1.1. Components perceived to enhance resilience to climate change shocks and stresses

Findings revealed that the priority components that were perceived by respondents to enhance resilience (Table 1) include being educated, access to better health care, being employed, hard work and peace and security. These are likely to be the core components that development partners need to focus on. It is likely that participants of group interviews had observed community members with such characteristics being more resilient. Statements on education and health care emphasised better quality education and health care services and statements on employment emphasised better-paying jobs for people. Furthermore, the resilience components were classified according to the five capitals of SLF (Table 1). The human, financial and physical capitals came out more prominently and the least prominent was the natural and the social capital. The priority component in human capital was education followed by health. This shows the importance of education in human development. People who are educated can easily get employment which improves people’s capacity to earn income and access basic needs of life. Education also improves people’s capacity to save which provides the spare capacity that can be used

Table 1. Components perceived by the local people in Mbale municipality to enhance resilience categorised according to the SLF.

SLF	Resilience characteristics
Human	Education
	Health care
	Hard work
	Food security
	Good governance
Financial	Employment
	Commercial agriculture
	Access to credit
	Having a business
Physical	Alternative source of income
	Good housing
	Good roads
	Access to water throughout the year
	Access to reliable power
Natural	Market
	Natural Resource Management (NRM)
Social	Ownership of many plots of land
	Peace and security
	Unity

during shocks and stresses (Joerin et al., 2014). Therefore, many people were likely to perceive that they would be more resilient if they are educated. Education as an important factor in enhancing resilience was also reported by UNDP (2014) in the drylands of Northern Kenya and Northeastern Uganda. Furthermore, health care is important in supporting citizens to recover during shocks and stresses particularly in this context where most of the population lacks health insurance. Several reports have noted the importance of health care in enhancing resilience (Joerin et al., 2014; The Rockefeller Foundation/Arup, 2016; Woolf, Twigg, Parikh, Karaoglou, & Cheab, 2016). In addition, the less importance accrued to the natural factors could be because of the humanised nature of the urban environment where the physical factors are less recognised and also probably people perceive this as issues that one cannot change. Moreover, the components of resilience to climate change shocks and stresses are related to one another as illustrated in Figure 2.

3.1.2. Analysis of the components that enhance resilience according to gender and age

The components perceived to enhance resilience were further analysed based on gender and age groups (Table 2). Whereas similarities existed on the resilience components considered to be the most important among the men, women and youth, there were some important differences. The men listed employment and education as priority components.

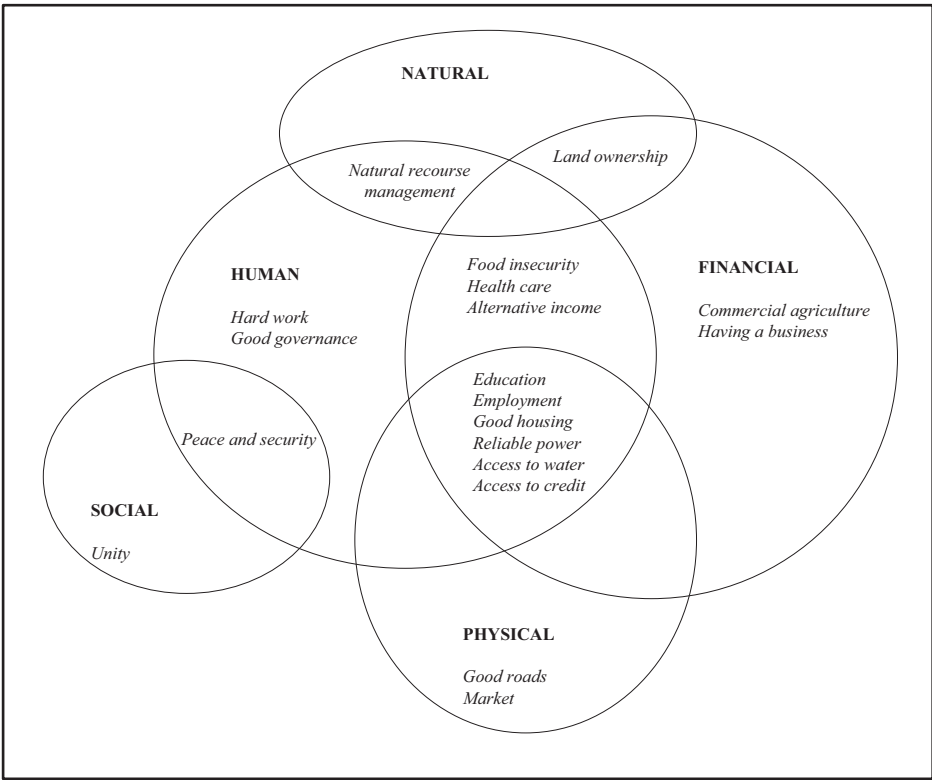


Figure 2. The relationship between the components perceived by the local people in Mbale municipality to enhance resilience categorised according to the SLF.

Table 2. The top three components reported by respondents that enhance resilience to climate change disasters according to gender and age group in the three divisions of Mbale Municipality.

Gender/age group	Divisions		
Men	Industrial	Wanale	Northern
	Employment	Employment	Better health care**
	Education**	Diversified income sources	Employment**
Women	Proper planning**	Education	Access to credit**
	Employment	Employment	Employment**
	Access to credit	Better health care	Food security**
	Education**	Access to credit	Better health care**
	Hard working**		
Youth	Proper planning**		
	Employment	Employment**	Employment
	Proper Planning**	Food security**	Better health care**
	Better health care**	Better health care**	Access to credit**
	Food security**		

**These are the characteristics equally mentioned.

Women listed employment, access to credit and better health care as the most important while the youth listed employment, better health care and food security as the most important. Employment was listed as a priority component by all the three groups. Whereas education appeared to be one of the most listed by men and women, the youth did not perceive it as a priority component could be because the majority of the Ugandan youth that graduate from Universities are not able to get jobs, hence may have watered down the importance of education in enhancing resilience among the youth. This implies that the government needs to work on creating more jobs that can take up the youths that graduate from Universities. For example, one of the members in the group interviews lamented that 'We have sold all our land in order to educate our children, but when they finish studies, they cannot be able to get jobs to earn a living' (Participant number 4 in the group interview with men in Industrial division). Important to note is that components that are perceived to enhance resilience seem to be structured in terms of gender and age groups. This finding corroborates with the fifth assessment report of IPCC (2014) that highlighted the significance of age and gender in shaping the resilience of urban communities. Access to credit and health care came up as an important component among women and not men possibly because several credit programmes by government and development agencies target women and avail them with start-up business capital to help them become more financially independent. For the case of health care, in the Ugandan context, it is mostly women who are left with the duty of child health care as the men concentrate in income-generating activities to provide for the family's economic needs.

3.2. Perceptions on the achievement of the components that enhance resilience

Findings showed that the most achieved resilience components reported by participants of group interviews were not uniform in all the three divisions but rather tended to vary as follows: Access to credit, hard work and productive farms were the most achieved components by the respondents in Industrial division. Hard work, natural resource management (NRM) and peace and security were the most achieved by respondents in Northern division while access to credit, productive farms and good roads were the most achieved by respondents in Wanale division. In contrast, DIGA's, good roads and food security were the least

achieved components of resilience by participants of group interviews in the Industrial division. Insurance, employment and health care by participants in Wanale division. And better housing, good governance and employment by participants in Northern division. Participants in the Industrial division, for example, were faced with the problem of food security and incomes. This is the biggest slum of the municipality with most of its inhabitants being immigrants from the semi-arid region of northeastern Uganda. This largely immigrant population is characterised by low socio-economic status as compared to populations of other divisions of the municipality. The non-uniformity in the attainment of resilience components by interviewed participants in the different divisions is likely to be due to differences in participants' ownership of productive assets, level of vulnerability to climate-related disturbances and human development aspects. This implies variation in the level of achievement of resilience components in time and space even within a small geographic confinement. This finding is in agreement with the finding of Cutter and Derakhshan (2020) who found out that resilience varied over time and space. In summary, access to credit, hard work, productive farms, NRM and peace and security were the most achieved components of resilience while, DIGA's, food security, employment and health care were the least achieved components of resilience by the interview participants. The extent of achievement of resilience components represents context-specific perceptions of the members in the group interviews. These may indicate where the local population of the different divisions is prospering and where they still struggle and points to where government and other actors should target in order to enhance resilience in this locality. Furthermore, there seemed to be 'second-order disaster' caused by climate change shocks and stresses e.g. when a climate disaster occurs, it begins by affecting production in farms and work on these farms, by implication it creates food insecurity. This is the 'first-order disaster. Food insecurity situations will in turn lead to a reduction in peace and security. This is a second-order disaster'. One of the participants indicated that 'After a long dry season has occurred, there is often an increase in theft as many people are unable to meet their food needs and the only way to meet their needs is going to steal'.

3.3. What a resilient household looks like according to the local understanding of participants of group interviews in Mbale municipality

Participants in the group interviews were asked to state the characteristics of households that have attained all or most of the components that enhance resilience. Overall, participants of group interviews reported that: having household members employed, good shelter, owning plots of land in the urban and rural areas, access to better health care and having all household members educated were the characteristics of the resilient household. Results from KII's with households perceived to be resilient by group interview members confirmed that most of their household members had either completed primary and secondary education or tertiary and university level. At least one person was in formal employment and others engaged in other income-generating activities. All these characteristics are related to households having reliable or good sources of income that enables them to withstand climate change shocks and stresses. This finding closely corresponds with the report by UNDP (2014), that indicated that, having a member of a household employed as the topmost characteristic of resilient households in the arid areas of Northern Kenya and North Eastern Uganda.

3.4. The trend in household resilience

Participants in the group interviews were asked whether the resilience of households in the community has increased, reduced, or stable in the last five years. Overall, very few participants in the Industrial division perceived household resilience to have increased. In the Northern division, participants indicated that household resilience had neither reduced nor increased, while the majority of the participants in Wanale division indicated that household resilience had increased over the last five years. The main reason given by participants in Wanale division for increased resilience included: increased involvement in business, owning houses for rent and practicing small scale commercial agriculture which has boosted incomes and household prosperity. One of the participants stated that ‘We now practice commercial farming particularly growing of vegetables such as cabbages, beans, tomatoes, onions and many others and the money we get helps us to face climate change challenges’ (Participant number 5 in Wanale division). Increased resilience by interviewed participants in Wanale division may not imply that it is already a ‘job well done’, as an ‘increase’ in resilience does not imply that resilience is overall satisfactory. In contrast, the main reasons given by participants in the Industrial division for decreased resilience were: high interest rates charged on loans, increasing cost of living, increasing unemployment and unpredictable weather. One of the participants stated that ‘high interest rates on loans is making people poorer leading to reducing resilience’ (participant 1 in the group interview with women in Wanale division).

3.5. Interventions that have been helpful in enhancing household resilience in the last five years

When participants of group interviews were asked to list interventions that have been beneficial in enhancing their level of resilience and to state the reason why? Many sectoral, governmental and non-governmental interventions were listed. The most listed in all the three divisions included interventions on: education, health care, credit, roads, security and agriculture. Furthermore, participants were asked to list three current and three previous interventions that have been the most beneficial in enhancing their resilience. Most of the listed current and previous interventions were similar (Table 3) and the most prioritised interventions included education, health care and credit. KII’s with households perceived to be resilient confirmed the interventions listed by members of group interviews as helpful in resilience building in the last five years. Furthermore, when members of group interviews and participants of KII’s were asked to suggest interventions that would build wider community resilience in the future, results indicated a need for an improvement of the interventions already listed. Education still came out most prominently could be because people give value to it as a symbol of hope to be ‘better off’ in the future. This finding corroborates with a report by The Rockefeller Foundation/Arup (2016).

4. Conclusion

Respondents in Mbale municipality consistently indicated quality education and health care, better-paying jobs to all people, hard work and peace and security as the most priority components that can enhance their resilience to climate change disasters. These

Table 3. Interventions commonly listed as most important in enhancing household resilience to climate change disasters by respondents in Mbale municipality and the reasons why?

Intervention and the reason why?
Education: Free education helps vulnerable children to access education and this opens them up for jobs where they can earn.
Health care: Free medication in government hospitals enables the poor to access treatment and be healthy.
Roads: Provide access to market agricultural products
Credit: Promotes business and savings which acts as spare capacity during difficulties.
Security: Provides safety for life and other business without much danger.
Water: Important for domestic and other uses.
Savings: Improve people’s preparedness on unforeseen hardships.
Housing: Housing for street children by NGOs has improved their resilience.
Industrialisation: Employs people.
Market: Better market has been constructed for business operations.
Food programmes: Free food is given to vulnerable families during food scarcity.
Electricity: Has enabled people to engage in small scale industries to support their livelihoods.
Skilling: Widens people’s ability to generate income.
Information services: Create awareness.

priority components are important in understanding local contextual factors that drive resilience to climate change disasters at the same time informing the formulation of resilience indices that can be used to monitor improvements in resilience over time. In addition to the priority components, DIGA, access to credit and food security also came up consistently among the different age groups as important components. However, some variations came up in the priority components that enhance resilience structured according to gender and age groups. These are an indication that when targeting strategies to enhance resilience to climate change disasters, attention needs to be paid on the different gender and age groups because not everything that works for men, may work for women and youth.

The most achieved components of resilience by respondents include access to credit, productive farms, hard work and peace and security. While DIGA, insurance, food security, employment and health care were regarded as the least achieved resilience components. The most and least achieved resilience components to climate change disasters are important for guiding government and practitioners seeking to understand which sectors to prioritise in order to enhance resilience. Furthermore, interview participants generally indicated decreasing resilience during climate change shocks and stresses which indicates their high level of vulnerability and low level of development.

Group interview participants indicated that a resilient household is one where members of the household are employed in better-paying jobs, able to access better health care, having members who are educated, household owning plots of land in town and in the rural and those having better housing. All these characteristics relate

to having reliable sources of income that enable households to withstand climate change shocks and stresses. KI participants confirmed having at least a member in formal employment and most of their members being educated. The results imply that it is the long term projects that the interview participants feel are helpful in building their resilience.

Most of the participants in the Industrial division perceived their resilience to have reduced while most participants in Wanale divisions indicated that their resilience has increased. This seems to imply that development projects have worked so well in the Wanale division as compared to Industrial division whose interview participants perceived to have experienced reducing resilience. This is important in guiding Mbale municipal planning and practitioners to consider redirecting more support to Industrial division to improve local resilience.

Finally, interview participants in Mbale municipality perceived that education, health care, credit, roads, peace and security and agricultural interventions were the most important in supporting the achievement of resilience to climate change disasters. These need to be the focus of urban planners and other stakeholders in this municipality.

Note

1. In this study, youth were defined as young men and women aged between 18–30 years (Gemma, Lwanga, & Mbowa, 2013).

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References

- Aldunce, P., Beilin, R., Handmer, J., & Howden, M. (2016). Stakeholder participation in building resilience to disasters in a changing climate. *Environmental Hazards*, 15(1), 58–73. doi:10.1080/17477891.2015.1134427
- Bob, H. (2011). *Reducing risk of disaster in our communities* (H. Gaw, Ed., 2nd ed.). Teddington: Tearfund.
- Boyd, E., & Juhola, S. (2014). Adaptive climate change governance for urban resilience. *Urban Studies Journal Limited*, 2014, 1–31. doi:10.1177/0042098014527483
- Braun, V., & Clarke, V. (2006). Thematic analysis. *Qualitative Research in Psychology*, 3(2), 77–101. doi:10.1191/1478088706qp063oa
- Chambers, R., & Conway, G. (1991). *Sustainable rural livelihoods: Practical concepts for the 21st century* (Agriculture and Rural Problems; Food Security; Environment No. 296). Retrieved from <https://www.ids.ac.uk/files/Dp296.pdf>
- Clarke, A. E. (2003). Situational analysis: Grounded theory mapping after the postmodern turn. *Symbolic Interaction*, 26(2003), 553–576.
- Cutter, S. L., & Derakhshan, S. (2020). Temporal and spatial change in disaster resilience in US counties, 2010–2015. *Environmental Hazards*, 19(1), 10–29. doi:10.1080/17477891.2018.1511405

- D'Errico, M., & Di Giuseppe, S. (2018). Resilience mobility in Uganda: A dynamic analysis. *World Development*, 104, 78–96. doi:10.1016/j.worlddev.2017.11.020
- Dobson, S., Nyamweru, H., & Dodman, D. (2015). Local and participatory approaches to building resilience in informal settlements in Uganda. *Environment and Urbanization*, 27(2), 605–620. doi:10.1177/0956247815598520
- Egeru, A. (2016). Climate risk management information, sources and responses in a pastoral region in East Africa. *Climate Risk Management*, 11, 1–14. doi:10.1016/j.crm.2015.12.001
- FAO. (2012). *Resilience index: Measurement and analysis model*. Dolow: Fiat.
- FAO-UNICEF-WFP. (2014). *Household Resilience in Dolow, Somalia*.
- Gemma, A., Lwanga, M. M., & Mbowa, S. (2013). *Youth engagement in agriculture: Challenges and prospects*. Kampala: Makerere University.
- Hollis, S. (2017). Localized development gaps in global governance: The case of disaster risk reduction in Oceania. *Global Governance*, 23(1), 121–139. doi:10.5555/1075-2846.23.1.121
- IPCC. (2014). Glossary. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, & M. Chatterjee (Eds.), *Climate change 2014: Impacts, adaptation and vulnerability. Contribution of working group II to the fifth assessment report of the intergovernmental panel on climate change* (pp. 1757–1776). New York, NY: Climate Change.
- Jenkins, D. H., Harris, H., Abu, A., Tair, H. T., Okotel, R., & Kinuthia, J. (2012). Community-based resilience building: Normative meets narrative in Mbale. *Environmental Hazards*, 12(2013), 47–59. doi:10.1080/17477891.2012.738641
- Joerin, J., Shaw, R., Takeuchi, Y., & Krishnamurthy, R. (2014). The adoption of a climate disaster resilience index in Chennai, India. *Disasters*, 38(3), 540–561. doi:10.1111/disa.12058
- Joerin, J., Shaw, R., Takeuchi, Y., Krishnamurthy, R., Okotel, R., Kinuthia, J., ... Marqa, Q. (2012). Action-oriented resilience assessment of communities in Chennai, India. *Environmental Hazards*, 11(3), 226–241. doi:10.1080/17477891.2012.689248
- Jones, L., Samman, E., & Pink, V. (2018). Subjective measures of household resilience to climate variability and change: Insights from a nationally representative survey of Tanzania. *Ecology and Society*, 23(1), 88–99. doi:10.5751/ES-09840-230109
- Jones, L., & Tanner, T. (2015). *Measuring 'subjective resilience' using people's perceptions to quantify household resilience*. London: Overseas Development Institute.
- Kikoyo, D. A., & Nobert, J. (2016). Assessment of impact of climate change and adaptation strategies on maize production in Uganda. *Physics and Chemistry of the Earth*, 93, 37–45. doi:10.1016/j.pce.2015.09.005
- Lwasa, S. (2010). Adapting urban areas in Africa to climate change: The case of Kampala. *Current Opinion in Environmental Sustainability*, 2(3), 166–171. doi:10.1016/j.cosust.2010.06.009
- Mbale District Local Government Statistical Abstract. (2012). Kampala.
- Miles, S. B. (2015). Foundations of community disaster resilience: Well-being, identity, services and capitals. *Environmental Hazards*, 14(2), 103–121. doi:10.1080/17477891.2014.999018
- Mugume, S. N., & Butler, D. (2017). Evaluation of functional resilience in urban drainage and flood management systems using a global analysis approach. *Urban Water Journal*, 14(7), 727–736. doi:10.1080/1573062X.2016.1253754
- Nsubuga, F. W. N., Botai, O. J., Olwoch, J. M., Rautenbach, C. J. d. W., Bevis, Y., & Adetunji, A. O. (2014). The nature of rainfall in the main drainage sub-basins of Uganda. *Hydrological Sciences Journal*, 59(2), 278–299. doi:10.1080/02626667.2013.804188
- Oriangi, G., Albrecht, F., Di Baldassarre, G., Bamutaze, Y., Mukwaya, P. I., Ardö, J., & Pilesjo, P. (2019). Household resilience to climate change hazards in Uganda. *International Journal of Climate Change Strategies and Management*, 12(3), 59–73. doi:10.1108/IJCCSM-10-2018-0069
- Smith, L. C., & Frankenberger, T. R. (2018). Does resilience capacity reduce the negative impact of shocks on household food security? Evidence from the 2014 floods in northern Bangladesh. *World Development*, 102, 358–376. doi:10.1016/j.worlddev.2017.07.003
- Suárez, M., Gómez-Baggethun, E., Benayas, J., & Tilbury, D. (2016). Towards an urban resilience index: A case study in 50 Spanish cities. *Sustainability*, 8(8), 774. doi:10.3390/su8080774
- The Rockefeller Foundation/Arup. (2016). *Measuring city resilience* (Vol. 4). New York, NY: Arup International Development.

- UBOS. (2016). *Census 2014 final results*. Kampala.
- UNDP. (2013). *Climate profile and climate change vulnerability assessment for Mbale Region of Uganda*. Kampala.
- UNDP. (2014). *Understanding community resilience: Findings from community-based resilience analysis (CoBRA) assessments*. Nairobi: UNON Publishing Service Section.
- UNDP Drylands Development Centre. (2013). *Community based resilience assessment (CoBRA) Conceptual framework and methodology*. Nairobi: UNON Publishing Service Section.
- UNISDR. (2015). *Making development sustainable: The future of disaster risk management. Global assessment report on disaster risk reduction. International strategy for disaster reduction (ISDR)*. Tokyo: The United Nations Office for Disaster Risk Reduction. [doi:9789211320282](https://doi.org/10.9789211320282)
- Woolf, S., Twigg, J., Parikh, P., Karaoglou, A., & Cheab, T. (2016). Towards measurable resilience: A novel framework tool for the assessment of resilience levels in slums. *International Journal of Disaster Risk Reduction*, 19, 280–302. [doi:10.1016/j.ijdrr.2016.08.003](https://doi.org/10.1016/j.ijdrr.2016.08.003)
- Zake, J., & Hauser, M. (2014). Farmers' perceptions of implementation of climate variability disaster preparedness strategies in Central Uganda. *Environmental Hazards*, 13(3), 248–266. [doi:10.1080/17477891.2014.910491](https://doi.org/10.1080/17477891.2014.910491)