

ASSESSING THE COMMUNITY PREPAREDNESS AND INVOLVEMENT TOWARDS FLOOD RISK MANAGEMENT IN MUBUKU IRRIGATION SCHEME, KASESE DISTRICT, UGANDA

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ABSTRACT

This research clearly assessed the preparedness and involvement levels of Mubuku community members towards flood risk management in the irrigation scheme of Kasese District, Uganda. The recent massive loss of lives and property, including crops and most farm animals in the area triggered the researcher's attention to investigate the community preparedness levels and involvement in flood mitigation with the aim of reducing flood fatalities and massive property destruction. This research described major flood types affecting the community of Mubuku to clearly engage the members in handling with floods based on their suggestions and recommendations for flood control and mitigation measures. Data collection and analysis of both qualitative and quantitative techniques was performed using the Statistical Package for Social Sciences (SPSS). A field questionnaire survey with the sampling of 70 respondents across four villages, i.e., Mubuku, Rukonki, Bwizibweera, and Kigoro, was carried out to gather people's opinions and more information regarding the topics related to driving factors of floods, flood occurrences, including control and mitigation of flood impacts to the people of Mubuku community and their property. The study answered multiple correlation results between flood mitigation, and involvement and preparedness with gender, age, occupation, and level of education. However, the results showed no significant correlation amongst the abovementioned variables. Based on a Likert scale of questionnaire, the findings revealed that community members are willing and strongly interested in attending mitigation meetings; they strongly agree that they possess knowledge about flood mitigation and are doing everything possible using traditional means to control and mitigate flood impacts in Kasese. They further strongly agree that all people, irrespective of gender, occupation or education level, are involved in flood mitigation across the sampled sub-counties. Since most traditional methods in flood mitigation seem to be the only ones used in the district, the area needs much more modern expertise and funding from subcounty departments of natural disaster management and control. Finally, the introduction and knowledge sharing related to new methods for flood mitigation like construction of dykes and levees along the Mubuku River would strongly be needed due to the fact that natural/planted trees cannot be in charge for this particular purpose. **Keywords:** Mubuku Irrigation Scheme, Kasese Uganda, Community Preparedness and Involvement

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INTRODUCTION

Uganda is a landlocked country that is mainly made up of plateaus with a rim of mountains. Located in Equatorial Africa, it borders Kenya to the east, Tanzania and Rwanda to the south, the Democratic Republic of Congo to the west and, Sudan to the north. Uganda is surrounded by mountains. The Rwenzori Mountains, also known as the Mountains of the Moon make up about 80 km (49.7 mi) of the border between Uganda and the Democratic Republic of Congo. This is where Mubuku irrigation scheme is located. In the western part of the country (Langlands, 1975). Rwenzori Mountains (Bweebare, 1994). Following a heavy downpour, the Sebwe River that supplies the Mubuku irrigation scheme sometimes busts its banks and overflow to cause flooding. The river flows from mountain Rwenzori (Waugh, 2007). The high temperatures that are brought as a result of global warming melt the ice on top of the river causing heavy flows that later cause flooding in areas around Mubuku irrigation scheme (Kiss, 1990). The Rwenzori region in the western part of Uganda has experienced for several years a series of destructive floods, landslides, and heavy rains that end up causing the Nyamwamba, Mubuku, Nyamughasana, and Lhubiriha Rivers to burst (Berry, 2006). Aailed statistics show that the region continues to register death of human beings and the destruction of crops with thousands left homeless. In May and November 2020, the region once again experienced flush rains and floods that led to the displacement of hundreds of households and the destruction of property worth billions of Ugandan shillings (Peter Larsson, 2009). Uganda's cultivated area under irrigation to the irrigation potential ration is only 0.5%. The government has recently been supporting farmers with a percentage of investment of machines that are willing to practice irrigation farming, with the major aim of reducing hunger and poverty. The surplus of food can be exported to earn farmers extra income (UBOS, 2013)

The whole research is based on answering the following questions; what are the ways to improve community involvement in flood mitigation in Busongora, Kasese district Uganda? 1) How to identify to reduce the destruction of crops, loss of life, and property in Busongora Kasese Uganda? 2) How to prepare the residents living in Busongora to handle flooding in Mubuku Kasese, Uganda? This is also an independent study report in partial fulfilment for the degree of masters of rural development management Khon Kaen University. Titled, "assessing the community preparedness and involvement towards flood risk management in Mubuku irrigation scheme, Kasese District, Uganda"

LITERATURE REVIEWS

Floods in Kasese have been a major disaster for the past so many years. This is related to the land terrain because the area is entirely mountainous and thus has lots of valleys and hills, the meandering rivers and high rainy intensities in the area, more related studies are explained and detailed below

Causes of flooding, Impacts, and Susceptibility to flooding

Communities living close to the river Sebwe have practices of cutting down trees, and digging close to the river banks, lack of water and soil conservation structures have led to siltation of the river which is one of the disastrous causes of floods in Mubuku. People have taken over river banks and changed the river courses exposing the land to risks of mudslides and floods. The siltation of Sebwe River, population increase which has led to urbanization hence increasing of surface runoff levels of the river, and unsustainable agricultural and human practices have been the causes of floods then and now. The flooding of Mubuku irrigation scheme has left devastating effects on the people, including displacement from homes, destruction of roads, hospitals, gardens, and looming hunger. The floods impact food production greatly as each time it floods vast amounts of garden crop are destroyed (G.B, 2016). This causes food insecurity and hunger sets in. Low lands deposited with soil eroded from hilly areas have become infertile.

Irrigation types

Different irrigation methods or types have different characteristics, and also possess different susceptibility behavior to flooding respective or irrespective of the soil type.

(Strickler, 2016) Defined Irrigation of soil as “the process by which we can use water that is supplied to any land according to their need for various purposes”. We often pour water excessively which often destroys the soil and causes flooding. The interval of water supply needed by a particular plantation can also be controlled by irrigation. It aids farmers to grow an abundance number of crops by preserving the texture of the soil for better growth. It also helps to maintain the topography, as well as it helps to grow the vegetation again back in the loam (Jose Luis Arumi, 2008) in all methods, the manner of irrigation affects soil moisture and salinity. Sprinkling and drip method is good for soil salinity. (S.S, 2003) Other irrigation types include; Surface Irrigation, Localized Irrigation, Lateral Move Irrigation, Sub-Irrigation, and manual irrigation. The type of land can also dictate the irrigation method to use.

Community involvement in participation

Citizen participation is the term formerly referred to as community involvement; this term is used limitedly now because legally citizenship is not important for one to participation in community activities. “The definition of citizen participation as the social process of taking part (voluntarily) in formal or informal activities, programs and/or discussions to bring about a planned change or improvement in community life, services and/or resources easily applies to community participation.” (Norman Walzer, 2022). “Communities may be engaged to use and coordinate their resources of personnel, time, money, goods, and services in a broad range of structures and strategies.” (Paul R. Lachapelle, 2020).

Rural participation in flood mitigation

The main aim of rural participation is to help the public have a meaningful say in the flood mitigation decisive process. It opens up communication opportunities between the public and the concerned agencies. Benefits of rural participation in flood mitigation include; knowledge continuity, identification of public values and concerns, effective dispersion of verified and timely information, and it is also an early warning system.

Community engagement

This engages the community to achieve a sustainable set of goals and implementations in the flood mitigation process. “It is always key to gaining a better understanding of the community and the residents in general (Mora, 2013). What they like and dislike, their major problems, interests, and others. It’s an ongoing dialogue between decision-makers and stakeholders. By enabling and engaging in a community-led conversation, decision-makers get to understand what people like or dislike about their community and the initiatives that could impact it.” (Palmer, 2011).

Factors affecting community preparedness

Preparedness is a set of actions that are research based and are taken as precautionary measures in the face of imminent or potential disasters. Strategic preparedness is a very important quality in mitigating disasters like floods. “It also develops knowledge, beliefs, attitudes, and actions that can increase a person's capacity to adapt, cope with, and recover from the threat of a sudden disaster” (Nance, 2022). Individuals, businesses, schools, media, and all other community-based organs must involve themselves in preparedness efforts. There should be readiness by the community through making plans, being informative and acting to mitigate disaster. Preparedness is influenced by many factors, especially those related to disaster preparedness knowledge and attitudes toward disasters, anxiety, prior disaster experience, and community resilience. Knowledge is the key factor and the key to preparedness (R.P, 2022). “Disaster preparedness knowledge can usually influence attitudes and concerns to be prepared in anticipating disasters. Lack of knowledge of the characteristics of hazards, and the failure to

deal with them can cause helplessness and inability to save life and property when they do occur.” (Fago, 2022). Below is the conceptual framework to the research.

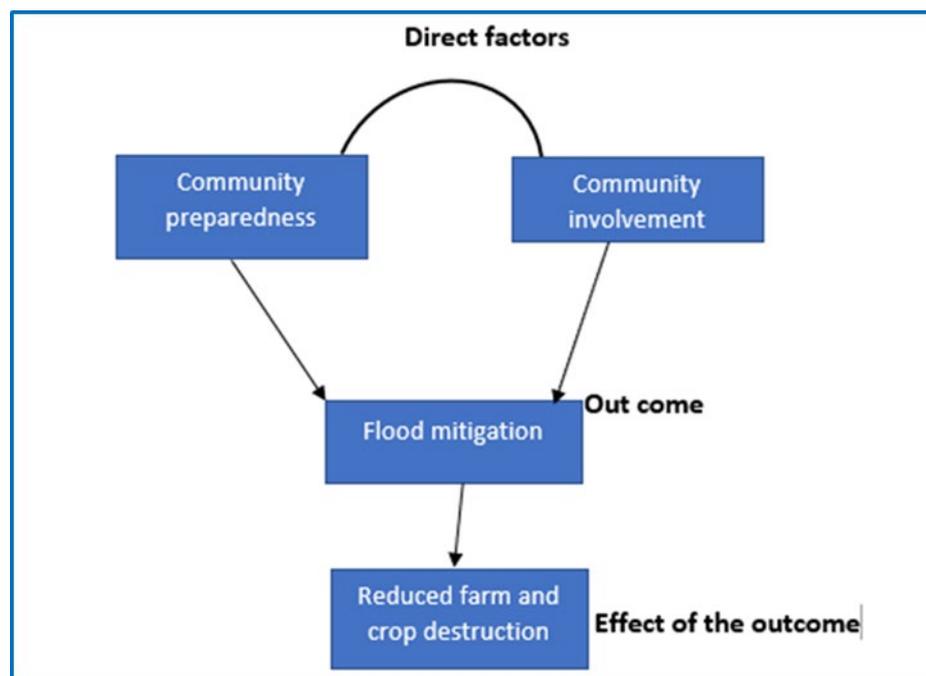


Figure 1 Conceptual framework

RESEARCH METHODOLOGY

Process evaluation methods for community participation

Participant Surveys, written questionnaires for members and community leaders assess the qualitative data upon execution of the implementation. Other include event call logs, key informant interviews, and focus group discussions.

Research design and approach

The study uses mixed method of research, both qualitative and quantitative methods. Qualitative method of data collection involves observation, and comparison of previous data to the data collected. This method is subjective and all it entails to collect data including purposive sampling in the field to youth farmers who avail most ground information relating to the participation levels (Roy, 2020). Seventy (70) sample size being used, calculations made at confidence interval of 95%. Questionnaire covers topics around the major topic of study and the preferred objectives of the research paper. Having; general personal information, Likert scale ratings section, Objectives section, opinionated section and qualitative parts where a person share thoughts on the previous experience in regard to the topic. To have data collected, questionnaires were sent and distributed to people in the four villages of Mubuku, Rukonki, Bwizibwera and Kigoro being local community, they were guided by the research assistant and village chiefs. Data analysis was done by the use of SPSS software tool, for quantitative data, to give descriptive data that entail percentages, frequencies, Standard deviation and variance. In addition, correlation and regression for Pearson and Spearman to give relationship of variables in relation to flood mitigation. Data was displayed in tables and graphical patterns, the results explained focused on the study objectives and were as below.

RESEARCH RESULTS

Table 1 Level of agreement on different flood factors and statements in Kasese

Statistics		Flood mitigation meetings are always held in my area	Floods have affected my locality in the recent years	The time of schedule of mitigation floods is convenient for me	The venue of flood meetings for flood mitigation is known and accessible	Government and other agencies help in flood mitigation	Most community members are aware of floods and mitigation measures
N	Valid	70	70	70	68	70	69
	Missing	0	0	0	2	0	1
	Mean	2.4143	1.5286	3.1000	2.2941	2.5000	2.7536
	Median	2.0000	1.0000	3.0000	2.0000	2.0000	2.0000
	Mode	2.00	1.00	4.00	2.00	2.00	2.00
	Std. Deviation	1.10981	.67505	1.11836	1.03749	1.10007	1.18080
	Range	4.00	3.00	4.00	4.00	4.00	4.00

The above table results show the Likert readings for flood mitigation meeting being held in the area had agree being represented by 2, resulting to mean value of 2.4 mode of 2 Agree and medium values. The above values had 1-representing strongly 2-agree, 3- neutral, 4- disagree, 5-strongly disagree. The first column had most respondents agree that flood mitigation meetings are held in their area. The second had 1.5 as mean representing strongly agree value to the fact that floods have affected people in the area S.D being 0.67 below 1.0 showing a small difference or deviation from the mean of 1.5. This results greatly indicate how much people consent positively with the fact that flood affect them.

However much they agreed that mitigation meetings are always held in their area, the time showed not to be convenient for them to attend meetings as the result neutral for attendance time which was represented by 3 and thus the mean, S.D. of 1.1 with mode being the 4 (disagree) value which meant the time schedule wasn't in their favor. This may result too few people attending the meetings and reducing the awareness levels of floods and mitigation measures.

Descriptive data for marital status

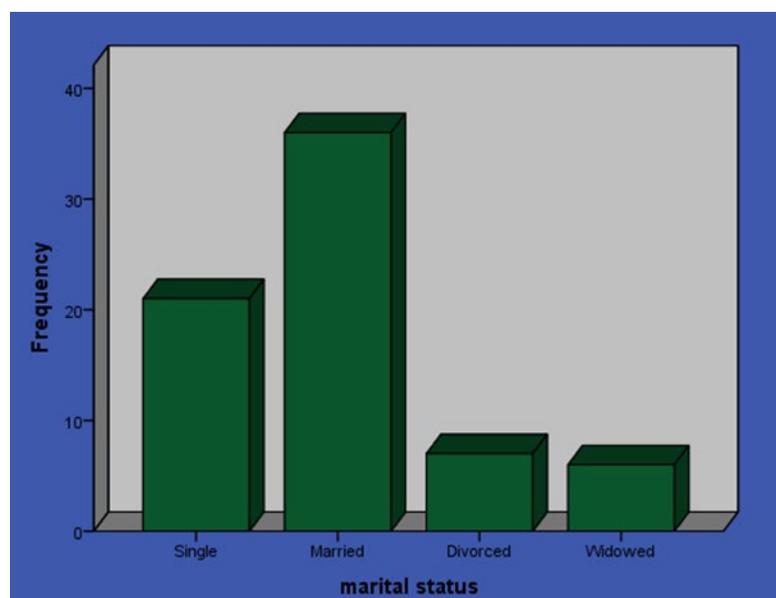


Figure 2 Graph of Marital status

The graph above shows the detailed collected and analyzed data regarding the marital status of the four sampled villages in Kasese District. 51.4% were married as in Uganda marriage is considered important and whoever is married is addressed with maximum respect in contrast to those who are unmarried. In addition, most sampled people were in their youthful age which is considered the most fertile age for both men and women and most people at this age get married. Also 10% divorce rate being low this is attributed to the reasons that whoever fails in marriage is a failure and being married is part of the cultural beliefs thus people mostly women are taught from their young age to sustain marriage at all costs by respecting their husbands. The single percentage is high as most people who are still in primary and secondary school attaining their studies are always young and below the marriage age which is 18 years.

Gender and flood mitigation

H₀ There is no significant correlation between gender and flood mitigation contribution.

H₁ There is a significant correlation between gender and flood mitigation contribution

Table 2 Gender and Flood mitigation

Correlations			
		Gender	Which gender contributes more in flood mitigation
Gender	Pearson Correlation	1	.075
	Sig. (2-tailed)		.535
	N	70	70
Which gender contributes more in flood mitigation	Pearson Correlation	.075	1
	Sig. (2-tailed)	.535	
	N	70	70

The P value being 0.075 is > 0.05 significant level we then agree with the H₀ hypothesis, even though the correlation is positive there is no significant relationship between gender and flood mitigation contribution as the sig. (2-tailed) is above 0.05 at sample size 70 and positively correlated variables.

Conclusion H₁ there is no significant correlation between gender and Flood mitigation contribution.

This therefore explains that both men and women contribute to flood mitigation in Kasese in their capacities. Women help men in a few activities like preparing food for workers as they engage in hard core weeks of digging trenches, help in making terraces in their gardens as they are engaged in farm activities too to cultivate food at subsistence level. In addition, being that floods affect all when they occur, it is not a gender specific problem when it comes to mitigating floods all people play their roles in their capacity to mitigate floods

Community activities and involvement in flood mitigation

Sensitizing tree planting activities; these were reported mainly in Mubuku and such activities were said to be headed by their leader Kateregga James and the council team in charge of flood control plus the irrigation scheme. These trees are mainly planted at the river bank of Mubuku and the neighboring wetlands that re- referred to as river free zone which areas were reportedly prohibited for settlement, economic activities and other human enhanced developments.

Table 3 correlation values between flood response and flood recovery

Correlations		Respond to floods	Recover from floods
Respond to floods	Pearson Correlation	1	.226
	Sig. (2-tailed)		.060
	N	70	70
Recover from floods	Pearson Correlation	.226	1
	Sig. (2-tailed)	.060	
	N	70	70

H₀ There is no significant correlation between flood responses and recover

H₁ There is a significant correlation between flood response and recovery

There is appositive correlation between flood response and recovery at 70 sample size number. However, the correlation is statistically insignificant as the P-Value is 0.226 which is above or greater than 0.05. And at significant level of 0.06 which means there is 6% chance of obtaining the result as far as the treatment has no real effect. This then draws to a non-rejected null hypothesis. 0.06 means there is moderately no high correlation between flood response and recovery.

Conclusion, H₁ There is a no significant correlation between flood response and recovery

This correlation is attached to different factors or reasons. Community members properly respond to floods but they use faded traditional means this means that the recovery rate after floods by community members is obviously not fastened even though they try in their capacity to respond. This could also be attributed to the degree of response they respond at low rates compared to the need and the intensity of floods that occur in the area.

Correlation results for age and knowledge about nature of floods

H₀ There is no significant correlation between age and knowledge on nature of flood occurrence of flood occurrence

H₁ There is a significant correlation between age and knowledge on nature of flood occurrence of flood occurrence

Table 4 Correlation results for age and flood occurrence knowledge

Correlations		age	flood occurrence is natural or human intervention or both
Age	Pearson Correlation	1	-.260*
	Sig. (2-tailed)		.032
	N	68	68
D occurrence is natural or human intervention or both	Pearson Correlation	-.260*	1
	Sig. (2-tailed)	.032	
	N	68	70

*. Correlation is significant at the 0.05 level (2-tailed).

Correlation for two turned out negative showing the P value as -0.26. This shows the relationship is generally weak and sig value being 0.32 is less than 0.05 we then reject the null hypothesis.

Conclusion H₁ There is a significant correlation between age and knowledge on nature of flood occurrence of flood occurrence

The above results based on reasons as older people who did not attain school education and cannot better analyze flood in details in different perspectives more so scientifically. This is so because for such a long time they believed the gods of the waters are not happy with people's activities and they react by causing floods. Floods have affected this area for such a long time and the ancient mentality is still stuck with so many people's minds because all the alternatives brought in from somewhere else are not helping in complete prevention. In addition, the old tell the young and youth about the indigenous knowledge they have accumulated for generations about floods, who also believe in their god tradition and have that perception toward floods. Yes, floods can be natural but still human enhancement led to deadly outcomes however being natural doesn't mean floods are as a result of gods of rain being sad. And the correlation of this mentality with age showed significance with the two variables. People who do not attain education to a proper understanding level and only rely on the indigenous knowledge about floods think floods are only natural, not human enhances and it is caused by gods of rain.

DISCUSSION & CONCLUSION

Reasonable conclusion after studying the objective with an aim of suggesting ways to improve community preparedness and involvement in flood mitigation to reduce crop destruction and loss of human life. Study results show that people irrespective of gender, education level, occupation are actively involved in mitigating, controlling and preventing floods. However, they are only focused on traditional ways which can no longer cop up with the increased impact of climate change of melting ice snow at mountain Rwenzori top and heavy rains within the area. Results further show that floods are still a major fatal factor affecting the general population of Kasese however much they have put lots effort to mitigate them. This could be because of relying on category of mitigation and that is only traditional control methods, even though all people are involved, involvement, and levels are very low in relation to the population and the need. Flood mitigation strategies and programs within Kasese as a district is a big issue and massive loss of lives and destruction of property due to floods is evident in the area. Related studies about floods show that floods have continued to be a major disaster and different studies attribute it to so many factors however, this research paper focused on community preparedness and involvement factor and focused on Busongora-Kasese

Based on the study results, the following suggestions were made by the researcher in relation to the discussed topic;

Providing special flood education making it compulsory at all levels that is from primary, secondary, and University regarding not only floods but also other natural calamities affecting the area. Integrating modern methods of flood mitigation with the traditional techniques to have effective results in flood control, and mitigation results. Proper land use planning in most sensitive areas of the district so prevention would be a good way to prevent people in staying in more prone areas to floods. I greatly recommend the government and other non-government agencies to get involved in sensitizing and funding projects related to flood mitigation and control. Putting up different committees at village levels reporting their achievements in flood mitigation, response and control to the main body at the district Disaster management office.

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