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Assessing the Root Cause of Persistent Floods and Strategic Community-based Interventions in Bunyala, Busia County, Kenya

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Abstract:

Due to its persistence, dealing with flooding has become a routine survival mechanism among the people of Bunyala Sub-County in Busia. Generally, very minimal efforts have been directed at empowering communities in Kenya to deal with disasters of any form. As such, members of these communities are hardly capable of averting and or managing the impacts of disasters facing them. This study aimed at examining the root causes of persistent floods and strategic community-based interventions in Bunyala Sub-County. The researcher used a descriptive research design through which the exact condition of Bunyala Sub-County was established in a cross-sectional manner. Data was collected through interviews with key informants, administration of semi-structured questionnaires to household, as well as through discussions in focus groups. The researcher used household as the definite analysis unit. Hence, 384 households were selected as the sample size for the study. Descriptive statistics was the main method of data analysis. Results showed that the root causes of persistent flooding in the area were environmental degradation (53%) and excessive encroachment on the floodplains.

Keywords: Root cause, Persistent floods and strategic community-based interventions.

1. Introduction

In Kenya, severe flooding is experienced on the lower parts of the major rivers which flow into Lake Victoria especially rivers Kuja, Nyando, Nzoia, and outspread near the mouth of river Yala. The Bunyala and Kano plains are the most notorious and flood prone areas in western Kenya (Opere, 2013). In 2003, Bunyala experienced floods and had the following impacts; 21,000 people displaced, while in 2004, Nyando experienced floods and had the several impacts such as loss of properties and 10,000 people were displaced (GoK, 2007). All the six locations in Bunyala sub County namely; Bunyala East, West, South, North and Central and Khajula perpetually affected by flooding. Customarily, the people have settled in the flood plain and this has meant that they are directly affected by the perennial flooding. The April 2003 floods displaced 4000 families or about 24,000 people, covering an area of 60 Km² with people moved to camps or higher areas and relying on food relief (Opere *et al.*, 2006). Therefore, this study aims at examining the root causes of persistent floods and strategic community-based interventions in Bunyala Sub-County.

1.1. Statement of the Problem

Flooding has been a persistent occurrence in Bunyala Sub County. The flooding impact in the area has been immense despite structural and non-structural mitigation approaches that have been taken in addressing the flooding menace in the area. The government's efforts to form task forces for the mapping of flood prone areas and institutionalize Disaster Management Committees are yet to produce any tangible results. This is might be associated with modern technology on flood management that has overlooked opinion and experience of the local residence as well as paying minimal or no attention to the historical information likely to suggest probable factors that trigger flooding. According to Carter (1992), relevant bodies and authorities should acknowledge the invaluable insights and flood-related experience of the locals in order to incorporate such thoughts in their planning. For instance, people of Bunyala Sub County might have developed a number of modification and comeback strategies by which they have been coping with the floods as well as protecting their lives. This knowledge and experience residing within the community is extremely important to any disaster management program. Unfortunately, the local knowledge and experience have not been properly integrated in most of the disaster management initiatives. This study reviewed multiple literatures in order to soundly ascertain the previously established causes of flooding as well as different approaches that diverse communities have taken to survive and recover from the effects of flooding and has not been integrated in the flood management structures in National and County government. In this context, the coping concepts have been adopted as a means of emphasizing the community's inherent potential and willingness to mitigate flooding and its adverse effects. Hence, this is valuable information that can be used by policy makers and disaster management planners to strengthen the existing approaches of community to cope and mitigate floods in the effective flood management.

1.2. Study Objective

- To examine the root causes of persistent floods and strategic community-based interventions in Bunyala Sub-County

1.3. Hypothesis

- H1: Environmental degradation is the root causes of persistent flooding in Bunyala Sub-County

1.4. Causes of Frequent Floods in Kenya

The greatest drawback to Kenyan development and poverty reduction programs is the climate change (GoK, 2007). In the last two decades, some parts in Kenya has been hard hit by serious flood and drought due to climate change resulting to major disturbances such as forest degradation, destroying property, food insecurity and death, and poor land usage which disrupted drainage basins, flood plains, and watershed areas (Opondo, 2013).

1.4.1. Climate

Climate is one of the main factors causing disasters due its abundant precipitation that leads to dam breaks, flooding, soil erosion, water pollution, famine and outbreak of water-related diseases (Odada *et al.*, 2006).

1.4.2. Geology and Topography

Geologic characteristic influences the drainage patterns, the soil nature and pattern of land usage. Heavy rainfall, for instance, causes flooding in low-lying areas characterized by clay formations which has low penetration capacities and hence rapid surface run-off (Opere, 2013). The topography determines land-use patterns and intensity of erosion and landslides. For instance, there is a rapid flow of water in areas with steep slopes thereby causing the flood stage of a river to be reached faster. On the other hand, the velocity of water flow is reduced in flat plains or in areas with gentle slopes. This leads to formation of flood plains and meanders hence pile and become more predisposed to flooding for example Kano Plains (Opere, 2013).

1.4.3. Poor Land-Use and Degradation of Catchment Areas

The major causes of catchment degradation are poor land-use activities such as clearance of bushes, deforestation, poor construction of roads and footpaths. Flooding is also associated with inappropriate activities known to facilitate soil erosion through rapid runoff such cultivating steep slopes without applying any soil conservation measures (Odada *et al.*, 2006)

1.4.4. Lack of Regulatory Systems

Due to poor and weak institutional capacities to enforce regulation people have settled in zones designated as wetlands and water channel hence causing flooding (Odada *et al.*, 2006).

1.4.5. Poor Infrastructure

Poor infrastructure such transport and communication network makes the management of disasters such as floods, fire and drought problematic hence to be prepared when it (Odada *et al.*, 2006).

1.5. Conceptual Framework

The study was based on Bogardi, Birkmann and Cardona (BBC) conceptual framework aimed at addressing a number of societies' susceptibilities to natural hazards in the environmental, economic and social sphere (Blaikie *et al.*, 1994). The spheres have been defined as the three main pillars of sustainable development (UNDP, 1999). According to the above definition, even hard-to-examine areas like society's environmental vulnerability can be studied by in the context of BBC-framework (Adger *et al.*, 2003). The framework points out that analysis of an entity's vulnerability entails much more than simple disaster assessment and estimation of the past deficiencies. It emphasizes the need for broader view of vulnerabilities even within the planning process. The interpretation is that there should be a simultaneous focus on the society's vulnerabilities, its ability and capacity to cope as well as the possible tools that can be used during intervention in order minimize the vulnerabilities.

2. Methodology

The study was a cross sectional descriptive design to assess and describe a prevailing observable fact and establishing the relationship between and among variable. This method focuses on social systems and cultural heritage of communities in their naturalistic setting (Bouyer *et al.*, 2001). The design was suitable for the study since extensive data on the persistent of flood menace in Bunyala and coping strategies of community members. The 384 household's respondents represented 15,245 households in six locations selected using Stratified random sampling, 3 purposive selected line Ministry officials, Project Co-ordinators of NGOs in dealing with environment in the area and 7 focus group discussions spread widely in the area. Seven focus group discussions with an average of eight participants per group were conducted and in-depth interviews taking half an hour long were conducted within offices and homes of the respondents. The researcher used tape-recorders to record the conversations while taking brief notes. Discussions with the key informant allowed the researcher to deeper insights into the study as well as triangulation of public concerns and views. Quantitative methods were used to analyse Questionnaire data from all the 384 households for all quantifiable variables which were examined. These data were first coded and entered in Statistical Package for Social Sciences (SPSS) Version 11.5 and Excel spread sheets and then screened for errors. Empirical information gathered in the field was analyzed using cross tabulations, rankings,

frequency counts, correlation, and percentages. The findings were then presented in form of pie charts, graphs, and tables. Majority of data gathered during this study were analysed qualitatively since they included non-quantifiable parameters.

3. Findings

3.1. Response Rate

Three hundred and eighty-four (384) households were interviewed in the entire Bunyala sub County, as stated in data collection section of the methodology chapter. The age of the respondents, who in most cases were also the household heads, was as follows: 26% of the respondents were between 18-35 years old, 41% ranged between 36-55 years old, while 33% were above 55 years of age (Table 1). Most respondents were female (68%, n = 261) which might be associated with the fact that most men go outside to source for food such as fishing. Christianity was the main religion in the study area by 99%.

About half of the respondents (47.1%, n= 181) reported that they were in monogamous unions. An average number were widowed (31.3%, n = 120), while the least number reported to be in polygamous marriages (13.3%, n = 51). The remaining (8.3 %, n = 32) respondents were either single or separated/divorced. A summary of the results on respondents' ages is given in Table 1.

The result of the study shows that most of the respondents were married (60.4%, n=232) and living with their spouses. All the respondents were from flood prone areas. it is assumed that household headed with females, widows and children are more vulnerable than their counterparts with both spouses since its believed that they are financial stable and psychological hence easy to recover from impacts of flooding in a better mental and emotional state than their single counterparts (SERA Project, 2000; Yamano & Jayne 2002). However, this disagrees with the research conducted by Rayhan and Grote, (undated) which reported no significant effect of gender of household head of flooded households on vulnerability to flood risks in Bangladesh.

Variables	Categories	Frequency Count	Percent (%)	Valid Percent (%)
Age	18-35 years	138	35.9	35.9
	36-55 years	173	45.1	45.1
	Over 55 years	73	19.0	19.0
Total		384	100	100
Gender	Male	123	32.0	32.0
	Female	261	68.0	68.0
Total		384	100	100
Marital Status	Single	27	7.0	7.0
	Monogamous	181	47.1	47.1
	Polygamous	51	13.3	13.3
	Widowed	120	31.3	31.3
	Separated/divorced	5	1.3	1.3
Total		384	100	100

Table 1: Summary of respondent Age, Gender & Marital status

3.2. Root Causes of Persistent Flooding

There were varying underlying causes of flooding for most respondents in Bunyala Sub County. Environmental degradation (53%), breaching and over topping of dyke (18%), Excessive siltation of the river bed (16%), poverty (10%), lack of awareness & information, location of settlement on flood plain each contributed (1%) were identified as the root causes of flooding (Figure 1). "The flooding in Bunyala Sub County occurs when the river rises above the level of its banks and not because of extreme rains experienced in the area, but as a result water of being generated upstream by intense rains from Cherenganyi hills and Mt. Elgon regions that are hundreds of miles away from the area". "This subsequently affects vast watersheds resulting in the swelling of the river far above its usual level due to erosion caused by the reduction of vegetation in higher parts of the watershed (in favour of agriculture and pasture or due to deforestation), which has altered the structure of riverbanks and riverbeds with sand deposits"(Key informant-WKCDD/FMP). Deforestation results in increased run-off and often a decrease in channel capacity due to increased sedimentation rates. Myers and White, (1993) have reiterated that when heavy or continuous rainfall exceeds the absorptive capacity of soil and the flow capacity of rivers, streams, and coastal areas, flooding will occur. This causes a watercourse to overflow its banks onto adjacent lands. Floodplains are, in general situated adjacent to rivers and streams. Floodplains are therefore "flood-prone" and are hazardous to development activities if the vulnerability of those activities exceeds an acceptable level of sustainable water resource use within the catchment (Rayhan and Grote,undated).

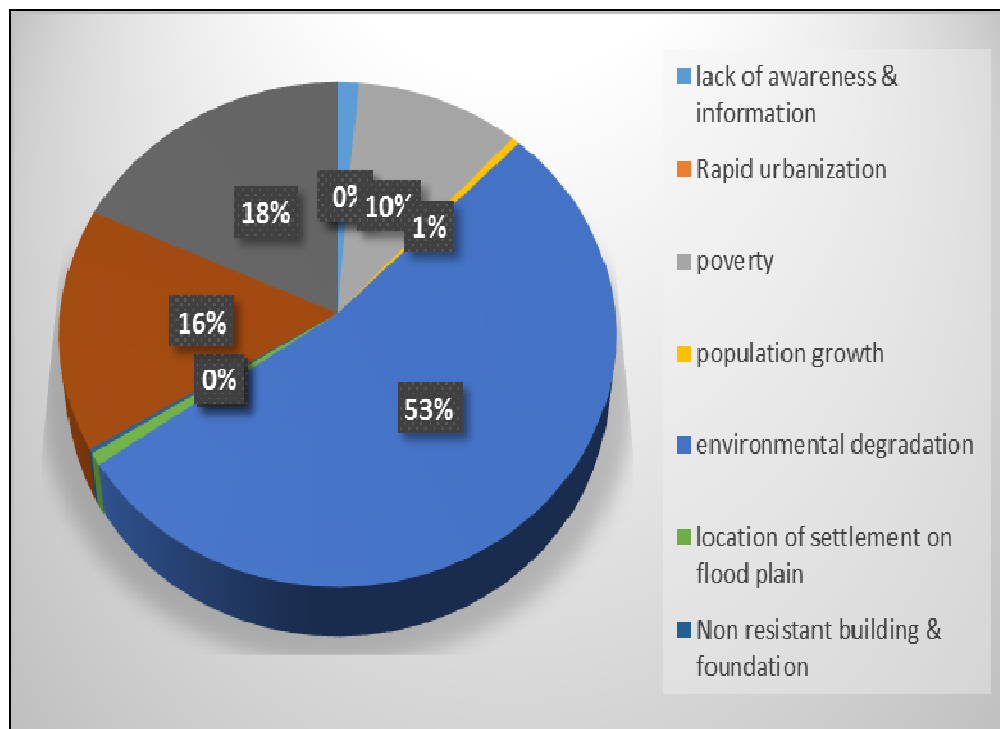


Figure 1: Causes of flooding

According to Table 2 the results of findings reveal a mean of 0.68 (Very satisfactory) that floods is majorly caused by the area being a low land, while the second cause is that there is excessive encroachment of the flood plain areas such as wetland with a mean of 0.72 while other causes are, poor drainage system in the area, poor infrastructure (dyke) that block the water channel and the poor settlement policy with the mean respondents of 0.90, 1.20, and 1.65 respectively. These results concur with Bloch *et al.*(2012) who found out that floods are usually caused by the overflowing of large rivers, by flash floods from their tributaries, runoff following intense local rain, and sea level rise, as well as ground water floods and artificial systems failures. According to Nott (2006), the causes of floods can be broadly divided into physical, such as climatologically forces, and human influences such as vegetation clearing and urban development.

Reasons for the persistent flooding	Mean	Interpretation	Rank
Poor drainage system	1.20	Satisfactory	4
Poor dyke	0.90	Very satisfactory	3
The area is in the low land	0.68	Very satisfactory	1
Excessive encroachment of the flood plain	0.72	Very satisfactory	2
Poor settlement	1.62	Fairly satisfactory	5

Table 2: Reasons for the persistent flooding in Bunyala Sub County

The findings concur with the study carried out in the same study area byMango(2003), who found out that Floods in Bunyala Sub County occurred as a result of overtopping of River Nzoia and increased water levels in Yala swamps, the latter affecting the southernmost parts of the sub-county. Being located on the flood plains of River Nzoia, high river discharge triggered by heavy rainfall in the upper catchment areas (Elgon Downs, Kitale, Eldoret and Bungoma regions) of the river caused flooding. According to Pinter et al., (2010) land-use change, climate shifts, and engineering activities and structures along the rivers are main causes of increase in frequency, duration and magnitude of the floods. This is similar to the study area as increased river discharge has been caused by conversion of forested areas into agricultural land, poor engineering works of the dykes which have contributed to frequent breakages of the dykes at the meandering points and increased rainfall intensity in the upper catchment areas of Rivers Nzoia and Yala (Mango, 2003).

4. Conclusion

According to the findings of this study, the root causes of persistent flooding included catchment deforestation, excessive encroachment on the floodplain, breaching and over topping of dyke, and excessive siltation of the river bed. There seems to be more generation of runoff than in the past due to land use changes. A greater percentage of rainfall water that is meant to penetrate through soil or to be intercepted by the vegetation is instantly available to on the earth surface to run-off into rivers and streams, thus causing the flooding hazard.

4.1. Recommendations

To permanently solve the problem of flooding in Bunyala, this study recommends the following measures:

- i. The need to implement an integrated catchment management framework for the entire River Nzoia basin.
- ii. Government to work with all key stakeholders in implementing such an integrated flood management plan.

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