**Improving Disaster Resilience in the Rural Communities Report: Budalangi Sub-County**

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**Executive Summary**

Around the world, disasters pose severe risks to humankind. The goal of this report is to address the urgent need to improve disaster resilience in the rural Kenyan community of Budalangi. The Budalangi sub-county area of Kenya is vulnerable to flood disaster threats due to its physical location on the Nzoia River floodplain and its predominantly black cotton soil terrain. Due to runoff and spillovers, the Nzoia River has caused flooding in the past (Onencan et al., 2019). This report addresses vulnerability assessment, early warning systems, community participation, and community-managed disaster risk management systems, among other techniques, to build disaster resilience in the rural community of the Budalangi sub-county.

Budalangi can improve its capacity to endure and recover from disasters while safeguarding the security and welfare of its citizens by putting these precautions into place. This paper presents the results and recommendations of a thorough investigation meant to build a prepared and resilient Budalangi community.

**Introduction**

The ability of individuals, communities, organizations, and states to foresee, prepare for, withstand, and recover from disasters with the least harm to people, property, and the environment is known as disaster resilience. To reduce their risks on an international, regional, national, and local scale, S must be able to organize themselves, learn from the lessons of the past, and prepare for future disasters.

The purpose of this report is to assess the susceptibility of rural communities to flooding and to provide measures for enhancing disaster resilience. These strategies are intended to safeguard the community, which has often suffered from flooding disasters throughout the years.

**Background.**

The Budalangi sub-county in Kenya is vulnerable to flood disaster hazards due to its geographical location at the Nzoia River floodplain and predominantly black cotton soil topography. Because of the Nzoia River's runoff and spillovers, this has exacerbated floods (Wegulo et al., 2019). Human settlements have been disrupted, and crops, shelters, dams, and infrastructure have all been destroyed due to these floods.

The loss of salinization facilities and the displacement of residents into temporary camps have also contributed to the prevalence of disease outbreaks. Climate change is also to blame, as floods in the Budalangi sub-county and surrounding areas continue to cause devastation. Duration and intensity of rainfall affect infiltration and ground seepage rates, particularly by saturating the soils, which increases runoff and contributes to flooding (Lazaro Suau et al., 2022). August often has the most surges, corresponding with the wetter months of the year (July, August, September, April, and March).

Climate change has caused a significant increase in floods everywhere in the world, both in developing and industrialized countries. Particularly in developing countries, where 100-year floods are increasingly occurring annually, the frequency and severity of floods have increased to concerning levels (Monjardin et al., 2019). Floods are the most common hazard and cause the most significant number of deaths today. They have a long-term, intermediate impact on communities, leading to diseases and starvation. Floods cause more economic misfortune than other hazards. The poor population is most vulnerable because their livelihoods limit their access to resources, services, and infrastructure. However, rather than the government only providing post-disaster response and recovery, it should be more proactive in reducing the threat of flooding.

The 2010 World Bank research highlighted how Kenya's major economic sectors, including agriculture, tourism, health, transportation, and housing, have been negatively impacted by the country's ongoing floods caused by excessive rains. The Tana Delta, lowland areas of the Rift Valley, including Narok, and the Lake Victoria Basin's Budalangi and Nyando are among the hardest-hit areas (Dananto et al., 2022). The 2010 World Bank report said the country's most catastrophic floods, believed to have caused $1 billion in economic damages, were the El Nino floods in 1997–1998 (Stefanyshyn, 2022).

Over the years, floods have also occurred in Budalangi Sub County, with catastrophic consequences and losses. In the 2008/2009 floods in the Budalangi area, more than 100 individuals lost their lives, and the breaking up of the southern dyke caused approximately 25,000 people to be displaced by floodwaters(Nabwire, 2019). This event required immediate relief assistance. In addition to destroying cattle and crops, the floods caused significant food shortages, hunger, and other health issues. Furthermore, to begin developing a proactive model, a flood risk assessment must be carried out to determine the essential disaster mitigation measures needed to lessen the hazard.

**Study Area**

Budalangi is a sub-county in western Kenya, a country in the eastern part of Africa. It is located in Kenya's Busia County and borders the following areas: Lake Victoria to the west; Funyula, Butula, Matayos, and Namable sub-counties to the south; Siaya and Homabay counties to the north; and Vihiga and Kakamega counties to the east. The sub-county mainly experiences floods as its major disaster, adversely affecting local communities. The flat geography traverses the River Nzoia, which frequently overflows its banks onto the vast flood plain. Because of this, the surrounding fields are incredibly fruitful, drawing people to live and farm close to the dykes and putting them at risk of flooding.

 **Challenges and Effects of Floods in Budalangi Sub-County**

Flooding is caused in part by Budalangi's geographical location on the Nzoia River floodplain, as well as increased runoff from damaged catchments. These results suggest that the policy initiatives implemented by various parties to address the issue have had a negligible effect in the Budalangi region. Some of the challenges faced by the local communities include

**Displacement of Households**

According to Nabwire 2019, people are displaced because of the devastating floods that frequently occur during heavy rainfall upstream of the River Nzoia in the lower portions of the Nzoia basin (Budalangi). The 2012 floods flooded a fair amount of land on both sides of the Dykes. Families were compelled to move to safer areas.

**Damage to Arable Lands**

Because the River Nzoia has many meanderings and shallow river channels, high water volumes from upstream of the basin cause water to overflow on the riverbanks, contributing to some surface runoff. As a result, farms inside the outer dams are swept away. Consequently, this increases food prices and creates an endless cycle of starvation and poverty.

**Damage to Bridges and Roads**

According to Nabwire 2019, the Ndekwe Bridge, which linked the Budalangi Sub-County sub-locations of Mabinju and Rukala, was washed away by floods in 2007, leaving the people without mobility. Rukala, Magombe, and Igigo are just a few of the local roads that were devastated. Pathways by the Dykes were also washed away, making communication in these areas difficult.

**Disruption of Learning Programs**

In Budalangi, frequent flooding has negatively affected the curricula of numerous local schools. Makunda Secondary School was severely damaged by floods in 2008, right before candidates took their national examinations (Nabwire, 2019). The school had to take candidates to the neighboring St. Anne Bunyala Girls to write their final examinations.

**Effects on People and Animals**

During floods, many humans and animals perish, while others are injured or left homeless. Along with other illnesses, floods can cause diarrhea, typhoid, and malaria (Suhr & Steinert, 2022). Additionally, floods have numerous deleterious effects on animals and people. Animals and people are frequently washed up by floods, mainly when the water is quite polluted. They are primarily killed by falling debris rather than drowning. If the water is deep, the consequences of flooding include crop destruction, habitat destruction, the spread of diseases, and loss of life.

**Effects on Environment**

The environment is equally impacted when chemicals and other hazardous substances end up in the waterbodies and eventually contaminate the bodies that flood. Floods can also cause soil erosion on fertile land, which lowers crop output and raises the possibility of a food crisis (Gupta, 2019). The effects on the environment are so severe for the human inhabitants.

**Effects on the Economy**

Roads, bridges, farms, homes, and automobiles are all destroyed by floods, especially flash floods. A large number of people become homeless. In addition, there is a cost associated with resettling the displaced, and it takes longer for businesses to resume normal operations. The impoverished become further poorer as a result.

**Vulnerability Assessment**

Improving resilience requires an understanding of the risks and vulnerabilities unique to Budalangi. The latter can only be attained through a thorough vulnerability assessment. Several vulnerability assessment findings from recent research on Budalangi include

**Wear And Tear of Dykes**

Parts of the built dyke along the banks of the Nzoia River have sustained damage from floods, most notably the flood of 2008. Because certain weak spots on the dike are susceptible to breaching should water levels increase above the main river channel, the state of the dykes in both the southern and central regions indicated the need for rehabilitation (Nabwire, 2019). For example, the frequency of floods caused by broken dams was low before 2008, but it has gradually increased. This might be explained by the fact that the dyke has never needed reinforcement or repairs because many of its components are weak.

**Overreliance on agriculture.**

According to Wegulo et al. (2019), research In the Budalangi area, agriculture was shown to be the primary source of revenue. Families with farming as their primary source of income were particularly susceptible since, in the event of flooding, their farms would be significantly affected. Their crops would be swept away, their animals would be swept away, and their grazing land would be submerged. These households did not have any other sources of income. However, it is noteworthy that they supplemented their primary source of income during flooding by engaging in non-farm activities.

**Lower-Income Households.**

In addition, heads of lower-income households were particularly vulnerable because they could not pay the costs of reconstruction and repair. From the studies, they were discovered to be impoverished and without the means to move to safe grounds. In addition to that, their houses were built shoddily, thereby exposing them to more vulnerabilities.

**Heads of Households (Gender)**

Households headed by women were most likely vulnerable because of the limitations placed on their ability to pursue higher education, obtain information, get involved in politics, and a host of other opportunities (Nabwire, 2019). Additionally, women in households are disproportionately employed in low-paying or unpaid jobs, which furthers the cycle of vulnerability. Consequentially, this implies that they are significantly impacted by the floods compared to other households with male heads.

**Age**

Age is another aspect that increases the vulnerability to disasters among Budalangi residents. Older people were more susceptible since they were more likely to be physically challenged, have less mobility, and have poorer health (Nabwire, 2019). Due to their lack of wealth and strong ties to their ancestral home, they depended on others to survive.

**Types of Shelter**

The type of shelter and its quality are important factors determining how vulnerable a household will be to flooding; the quality of the building materials and the overall amenities contribute to the housing quality. Studies show that housing quality is correlated with personal wealth, meaning that impoverished people often live in substandard housing that is particularly vulnerable to disasters (Raker & Woods, 2023). The findings also reveal that, in addition to demographic factors, other factors that increase states of vulnerability to flooding in the Budalangi area include the amount of land covered by agriculture.

**Strategies for coping and addressing the challenges**

**Early warning systems**

Research shows that Budalangi Sub-County has community-based early warning systems. Volunteers, assisted by the government, the Kenya Red Cross Society, and other agencies, have created committees to reduce disaster risk, assessed vulnerability and capacity, created hazard maps, and marked clear routes for evacuation to designated centers, such as higher-ground schools where people seek shelter during floods. News of the impending flooding is disseminated through local and national media, such as Budalangi's RANET Bulala radio station, and county administrators, staff members, and other organizations provide additional information (Mukuna). The Kenya Red Cross has provided community members with sirens and megaphones that designated community members use to warn the community of impending floods.

**Education and Training**

The following strategies are essential to preparing Budalangi residents for disasters: evacuation plans, which involve creating clear and effective evacuation plans that include routes, shelters, and communication strategies. Disaster preparedness programs teach residents how to make emergency kits, make family disaster plans, and comprehend evacuation procedures. In addition, first aid and CPR training involves teaching residents the fundamentals of first aid and CPR so they can effectively respond to medical emergencies. Finally, disaster simulations involve regular drills to ensure that residents and first responders are well-prepared for real-life emergencies (Perera et al., 2020). The drills are held quarterly to educate community members on emergency response.

**Construction and repair of dykes**

To prevent flooding, the government constructed dykes along the Nzoia River that are six meters high. Residents receive radio station alerts warning them to evacuate to higher ground when the water level reaches 5.6 and 5.8 meters (Sharma et al., 2021). The county administration must fix these dykes, even though wear and tear has caused damage, to lessen their susceptibility to flooding.

**Provision of Health and Social Services**

According to Nabwire 2019, residents of Budalangi may suffer severe physical and psychological effects from disasters. It is essential to ensure that social and health services are sufficiently equipped to handle these effects. Among the strategies are capability improvement, improving medical facilities' resilience, and the ability to manage increasing patient loads during disasters. The provision of access to mental health services to manage stress, trauma, and other psychological repercussions of disasters is also known as mental health support. Likewise, the creation of social support networks for support inside the community to help the elderly, people with disabilities, and those with limited incomes, among other vulnerable groups; and lastly, keeping emergency supplies on hand to help populations in the early aftermath of natural disasters, such as food and shelter,

**Community Engagement**

The effectiveness of the disaster resilience planning process depends on including the Budalangi community members. Participation from community members is essential in determining policies, making decisions, and coordinating preparedness initiatives. Among the tactics for community involvement are public education and awareness, which promotes readiness and knowledge of disaster risks through workshops, informational campaigns, and educational initiatives.

Another tactic is meetings and workshops for the community, which focus on arranging frequent gatherings and seminars where locals may express their worries, exchange ideas, and participate in resilience planning. Additionally, volunteer associations, through forming volunteer networks such as search and rescue, medical response, and communication teams, offer assistance during and after disasters. Finally, creating robust social networks and connections throughout the community to boost resilience and assist those in need is often called "building social capital."

**Community-managed Managed Disaster Risk Reduction system**

Budalangi residents have implemented interventions that have allowed them to control floods through their ongoing engagement in various activities (Dangol & Carrasco, 2019). The study found that the communities in Budalangi became more aware of risks, threats, and vulnerabilities in meetings by creating a hazard map for the community, mapping important players in disaster risk reduction, and organizing lobby campaigns for riverbank reforestation. They also participated in exchange programs where they shared experiences managing flood disasters, established a relationship with the national government wherein the government undertook efforts to rehabilitate dykes, and engaged in flood mitigation activities such as reforestation, improved farming techniques, and diversified income, creating barriers.

**Conclusions**

In conclusion, Budalangi is more likely to experience floods due to its location in the Nzoia basin and the geography of the local soil. Human activity and climate change make this even worse. This paper discusses the challenges and effects of floods in the Budalangi Area sub-county, including household displacement, damage to arable land, damage to bridges and roads, disruption of educational programs, deaths of people and animals, and degradation of the environment.

Addressing the vulnerability assessment of the region also revealed several risks that require attention and mitigation. The risks found in the vulnerability assessment of earlier research include Dykes' deterioration, the over-dependence of many households on agriculture, poverty, households without adult males, aging, and substandard shelters. To prevent the disastrous consequences of floods in the Budalangi area, addressing and mitigating them is necessary.

The report also covered some coping mechanisms used in disaster-prone areas, such as early warning systems, education and training, stakeholder coordination and collaboration, dyke construction and repair, health and social service delivery, and community engagement. Lastly, the report covered community-managed disaster risk management systems. Using coping techniques and minimizing vulnerabilities are crucial ingredients for improving disaster resilience in rural communities and Budalangi in particular.

**Recommendations**

This report is based on the findings from various studies and offers recommendations to policymakers and planners. National and county governments, humanitarian agencies, and developmental organizations implement disaster management programs. The recommendations include improving community awareness and involvement in the design and implementation of community-based early warning systems, promoting the adoption of disaster risk reduction interventions as opposed to the provision of relief and recovery services, and ensuring that at-risk community members are all aware of and have accurate information about impending flood risks.

Furthermore, it ensures that all disaster management programs must be coordinated, equipped with the necessary tools, and taught in schools along with disaster risk reduction. Likewise, to help the affected households meet their basic needs, flood risk mitigation activities are required. These include community preparedness and early recovery interventions.

To reduce flood damages brought on by recurrent floods, which increase the vulnerability of already stretched households that must rebuild their lives, stakeholders initiating flood response activities must implement them before flooding occurs in Budalangi. The management of floods should involve the county administration. At the local, state, and federal levels, this can be accomplished by consistently enhancing institutional and human resource capability. Finally, the proposal to be carried out by the national government to build dams in Nandi Hills as a permanent solution for controlling flooding in the Budalangi area

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