Adaptation Challenges to Flooding in Sri Lanka: Special References to Galle District.

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1. Introduction

Floods are among the most prevalent natural hazards worldwide, presenting significant threats to communities and infrastructure across various regions (K. L. N. Chathurani et al.). The impact of flooding is particularly severe, making it one of the most critical environmental issues in Sri Lanka. (Fernando et al., 2022).In regions like the Yakkalamulla Divisional Secretariat Division (DSD), where floods occur frequently, the need for effective adaptation strategies is paramount to reduce risks and mitigate the associated socio-economic impacts. This study focuses on the factors contributing to flood hazards in these vulnerable areas, with an emphasis on the socio-economic challenges faced by affected communities in implementing adaptation measures. By examining the underlying causes of flood vulnerability and exploring strategies that enhance resilience and sustainable livelihoods, this research aims to provide insights into effective flood management and adaptation practices that can be applied to mitigate future risks. The findings are particularly relevant to areas with similar vulnerabilities, contributing to the broader understanding of flood risk management in the context of climate change adaptation**.**

2. Materials and methods

In Yakkalamulla Divisional Secretariat, the victims face many challenges in adapting to the flood disaster.(Field survey,2024). The inductive approach was the basis for this research.A mix methods approach was applied to the study. Utilizing both primary and secondary data. First objective is to identify factors affecting to the flood hazard in Yakkalamulla DSD and second objective is to identify the socio-economic challenges faced by victims in adapting to flood. To achieve first and second objectives a questionnaire survey was conducted across 10 affected Grama Niladhari Divisions (GNDs), sampling 60 households and taking sample of 5% of the total affected families in each GND using simple random sampling method. "The areas identified as most severely affected by flooding include Udumalagala, Nakiadeniya North, Yakkalamulla East, 181-A Walpola Pahala, 180B Polpagoda West, 181 Walpala Walpala, 181-B Velendawa, 180-A Beranagoda, 181-C Badungala, and 180-D Kaludiyagala" (Recourses profile, Yakkalamulla DSD,2023). A sample of above 10 Grama Niladhari divisions was used for this analysis. Data were analyzed with Microsoft Excel.

The study area is the Yakkalamulla Divisional Secretariat Division, located in the Galle District of Sri Lanka's Southern Province. It comprises 44 Grama Niladhari divisions. "The coordinates of the Divisional Secretariat are approximately 6°06' north latitude and 80°21' east longitude. Yakkalamulla has an annual temperature range of 23.24°C to 30.0°C, with an average annual rainfall of 419.39 mm. The total population is 51,490, resulting in a population density of 458 people per square kilometer" (Recourses profile, Yakkalamulla DSD,2023).

3. Result and Discussion.

The study analyzed the factors contributing to the occurrence of flood disasters in the area, based on the experiences and perceptions of the local population.
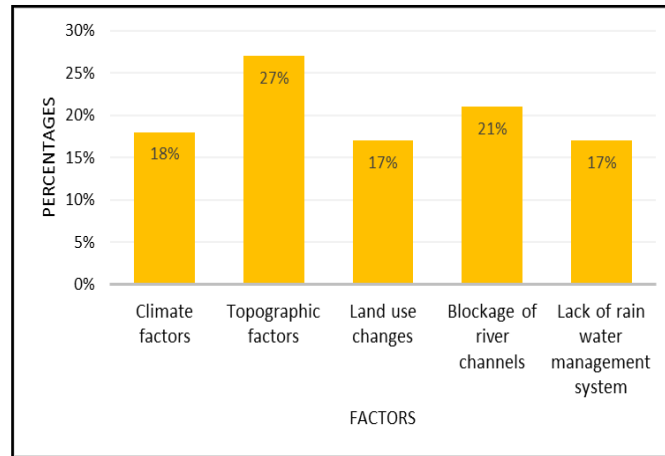

Figure 1: Factors affecting to the flood hazard in the area.
Source; Complied by Author,2024

According to the respondents, topographical features were identified as the most significant factor influencing flooding. Specifically, low-lying areas surrounding the water sources of Pol Watta Ganga and Uduganoya were found to be particularly susceptible to floods. Furthermore, all ten Grama Niladhari divisions with the highest flood frequency in the region are situated within these lowland areas adjacent to the rivers. Land use changes are a significant factor contributing to flooding in the region. Human activities such as deforestation and swamp reclamation have exacerbated flood risks. The absence of an effective rainwater management system has intensified flooding, particularly during the monsoon season. In Yakkalamulla, specifically within the Yakkalamulla East Grama Niladhari division, the primary cause of flooding is the lack of proper infrastructure for rainwater drainage, leading to sudden urban inundation.

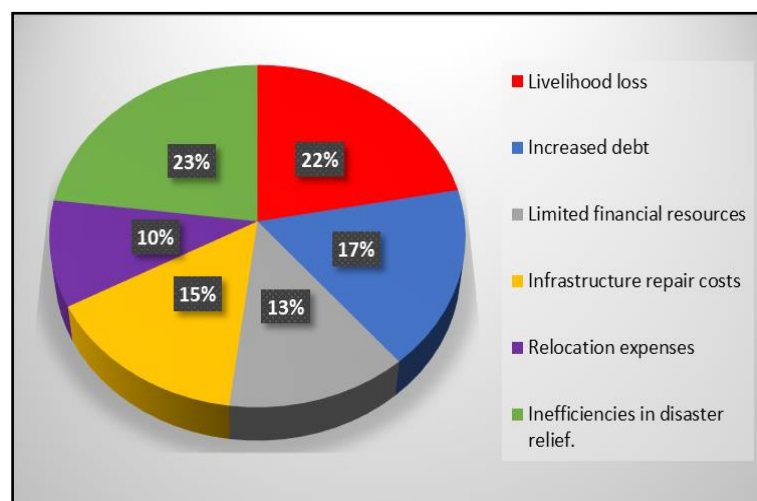Victims face enormous economic challenges in adapting to flood disasters.

Figure 2: Economic challenges faced by victims in flood disaster adaptation
Source; Complied by Author,2024

The primary economic challenge in adapting to flood disasters in the Yakkalamulla Divisional Secretariat is the loss of livelihoods, with 22% of residents identifying agriculture as their main source of income, which is severely impacted by crop damage following floods. The disruption

to livelihoods increases indebtedness as people recover from economic setbacks. Additionally, 23% of respondents noted minimal government support and highlighted the inefficiency of disaster relief efforts. In adapting to the flood disaster, the victims also have to face various social challenges.
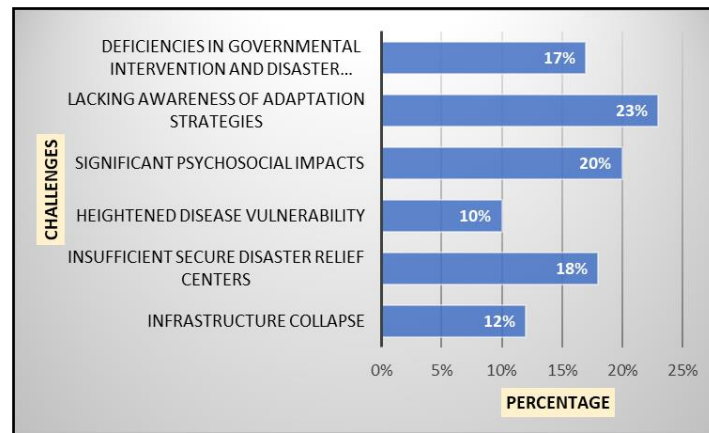

Figure 3: Social challenges faced by victims in flood disaster adaptation
Source; Complied by Author, 2024

A key social challenge in adapting to flood disasters is the low public awareness of adaptation measures. Although new technologies can mitigate flood impacts and manage disaster risk, public awareness remains insufficient. Additionally, 20% of affected individuals report mental health issues as a result of the disaster. Flood-related damages, including the destruction of crops, infrastructure, property, and loss of life, contribute directly to these psychological effects.Eighteen percent of respondents identified the absence of disaster-safe centers as a significant social challenge to flood disaster adaptation. Despite the area's vulnerability to flooding, the lack of such centers complicates disaster response. Providing victims with safe shelters is essential for effective adaptation. Failure to address this issue exacerbates social problems. Implementing appropriate measures can reduce socio-economic challenges and improve flood disaster resilience.

Various measures can be taken to properly manage the disaster by reducing the various socio-economic challenges in adapting to the flood disaster in this area. Measures that can be taken include implementing advanced flood forecasting systems, establishing community-based early warning systems, improving public education on flood adaptation, enhancing infrastructure planning, and comprehensive disaster management strategies. Field surveys reveal a significant gap in public knowledge and preparedness, with many households lacking adequate information and resources for effective flood response. To achieve sustainable adaptation, it is essential to implement targeted measures, strategic plans, programs, and workshops that focus on enhancing public awareness and preparedness. The field survey indicates that the Disaster Management Unit of the Yakkalamulla Divisional Secretariat is ineffective in disaster relief and management. Despite proposing flood mitigation measures, none have been implemented. Government intervention is necessary to enhance flood disaster management and promote adaptation among victims. Strengthening cooperation between local authorities, community groups, and stakeholders is essential for improving adaptation and flood preparedness.

4. Conclusion

To conclude, the prevalence of flood disasters in the Yakkalamulla Divisional Secretariat is heavily impacted by a combination of factors, with topography being particularly influential. Managing the flooding of low-lying areas near the river is essential to prevent widespread

inundation. Integrating the insights from this research into flood mitigation strategies and disaster management plans offers the potential for more sustainable adaptation approaches. Additionally, the study identified several socio-economic barriers that currently impede effective flood adaptation measures. Tackling these challenges is vital for strengthening the resilience of local communities. The recommendations provided in this research present practical steps to mitigate these socio-economic issues, creating a pathway for effective adaptation. By implementing these solutions, the government can ensure a more sustainable adaptation process that not only reduces flood vulnerability but also transforms the region into a safer, disaster-resilient area. Ultimately, these efforts contribute to both disaster risk reduction and long-term sustainable development.

5. References

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