

SOCIOECONOMIC DETERMINANTS OF WOMEN'S COPING MECHANISMS AND RESILIENCE TO FLOODS IN 508 - *KITTAMPAHUWA* GN DIVISION IN KOLONNAWA, SRI LANKA

Warnakulasuriya S*, Samaranayake RU, Chethana J, Samarasinghe TD, Ransara
AMGS, Nethranjalee HAD, Kavindi DHP, Vindyani BKSS, Isurika KBS,
Abeyesundera KATN and Wickramasinghe V

*Faculty of Indigenous Social Sciences and Management Studies, Gampaha Wickramarachchi University of
Indigenous Medicine, Sri Lanka*

Abstract: Floods are recurring disasters in Sri Lanka that disproportionately affect women due to socioeconomic conditions, cultural practices, and household responsibilities. This study examines the socioeconomic determinants of women's coping mechanisms and resilience to floods in the 508-Kittampahuwa GN Division in Kolonnawa. It focuses on women's vulnerability to floods, coping strategies, caregiving responsibilities, and behavioural factors that contribute to resilience. A qualitative case study design was adopted, guided by interpretivism epistemology and constructivist ontology. Data were collected through 12 in-depth interviews using purposive and snowball sampling and analysed thematically. The findings indicate that poverty, limited access to resources, cultural practices, caregiving responsibilities, education and awareness, and the availability of flood early warning systems influence women's coping mechanisms and resilience. Women with limited resources face greater difficulties in accessing emergency support, recovering from household damage, and managing flood-related economic challenges. Cultural practices and caregiving responsibilities further intensify these challenges during flood events. The findings also indicate that women's preparedness relies largely on previous flood experiences, owing to limited access to formal education and awareness programmes. The non-functional flood early warning system further constrains timely preparedness and response. Overall, the study highlights the interconnected nature of socioeconomic and cultural factors in shaping women's vulnerability, coping mechanisms, and resilience to floods in *Kittampahuwa*.

Keywords: flood vulnerability, women coping mechanisms, resilience, socioeconomic determinants, Kolonnawa

Introduction

Background of the Study

Flooding is a common disaster in Sri Lanka and has serious consequences for the lives and livelihoods of people impacted by it. Kolonnawa, 508 - *Kittampahuwa* GN division is located within the Colombo District of Sri Lanka and the area is particularly vulnerable to flooding during monsoon seasons and

heavy rainfall. It has been frequently affected by floods mainly due to improper land use, improper construction of the area, and low-lying terrain. floods have not only become a recurring issue and are causing significant disruptions to people's daily lives in the *Kittampahuwa* but also exacerbate existing socioeconomic disparities like lack of education and access to limited resources disproportionately affecting women.

Kolonnawa has a long history of flood-related challenges, with the 508 - *Kittampahuwa* GN division being one of the most affected regions and 2016 is said to be the year that this area was most affected by floods. There have been no reported deaths in recent years because of the disaster in the area, but it has had a considerable impact on the spread of infectious diseases, infrastructure damages, and economic losses. However, since these floods have strained the community's women's resilience to some extent, making recovery increasingly difficult with each subsequent event, it can be stated that particularly women are highly vulnerable to these disasters.

As mentioned above, the socio-economic impact of floods in *Kittampahuwa*, particularly women, are mostly affected by these events. Women, who are generally responsible for managing their household activities along with care duties as well as have additional challenges and burdens during floods. Loss of income, damage to their homes, and the need to care for elderly family members and children significantly limited their ability to recover and rebuild. These challenges draw attention to the necessity of conducting a thorough analysis of the socio-economic determinants like education, income level, cultural norms that influence women's coping strategies/mechanisms, and resilience in the face of floods.

Reason for Addressing Women

Women's caregiving and household responsibilities are shaped by socially assigned gender roles and household expectations. During floods, these roles can increase the practical demands placed on women, particularly when they are responsible for children, older family members, household assets, and recovery activities (Sharma et al., 2015; Gokhale et al., 2008; De Silva & Jayathilaka, 2014). At the same time, participants described active forms of preparedness, resource management, household protection, mutual support, and adaptation. Focusing on women therefore helps identify both the structural conditions that shape vulnerability and the agency through which women respond to and recover from floods.

Purpose and Significance of the Study (Rationale)

This study aims to examine the socioeconomic determinants that influence women's coping mechanisms and resilience in the face of floods in the 508 - *Kittampahuwa* GN division in Kolonnawa. This research is significant because it fills the gap in the existing literature on disaster resilience, which frequently ignores gendered aspects of vulnerability and recovery. By focusing on women, the research

aims to help in the creation of targeted strategies that increase their resilience and make them more capable of handling the effects of floods and other climate-related calamities. In communities confronting the rising danger of climate change, the findings of this research could inform policymakers, NGOs, and community leaders in designing and implementing more effective and equitable disaster risk reduction strategies that account for the unique needs of women in flood-prone areas.

Research Problem

How do socioeconomic and cultural conditions shape women's vulnerability, coping, and resilience to recurrent floods in 508-Kittampahuwa?

Objectives of Study

To understand how socioeconomic conditions and cultural practices shape women's vulnerability to floods in 508-Kittampahuwa GN Division.

To explore the strategies women, use to prepare for, cope with, and recover from floods.

To examine how knowledge, information, and early warning affect women's resilience.

Theoretical Framework

Intersectionality

The term intersectionality was first coined by Kimberle Crenshaw in 1989 (Crenshaw, 1989) and addresses overlapping and interconnected systems of disadvantage or discrimination. It is a framework and social theory that explains how social identities such as gender, social class, and ethnicity intersect and create unique forms of discrimination affecting individuals' daily lives.

Intersectionality is mainly rooted in critical race theory, which examines how race and racism intersect with other forms of marginalisation. Feminist theory also contributes by broadening the focus beyond gender alone, while post-colonial theory highlights how race, ethnicity, and colonial histories interact with other social categories.

The concept of social location explains how an individual's position within overlapping power structures shapes their experiences and perspectives. Race, gender, socioeconomic class, sexual orientation, and other factors contribute to this social placement.

In the context of *Kittampahuwa*, intersectionality will be used to analyse how women's socioeconomic status, ethnicity, and family roles intersect to shape their experiences and responses to flood situations. It helps understand how these identities interact to mitigate and reduce women's vulnerabilities and resilience throughout the disaster period.

Ecofeminism

French feminist Francoise d'Eaubonne (d'Eaubonne, 1974) first coined the term 'ecofeminism' to emphasize women's ability to spark an ecological revolution. Ecofeminism highlights the historical connection between women and nature and the relationship between the exploitation of women and nature under patriarchal systems (Mukherjee, 2013). It views environmental degradation and women's oppression as interconnected issues.

Ecofeminism offers an integrated view of social justice and environmental sustainability rather than separating human beings from the natural world. Its theoretical foundation is rooted in feminist critiques of patriarchy, which views patriarchy as a system that subjugates women and exploits nature (Ottuh, 2020). It is also influenced by socialist and radical feminism, deep ecology, social ecology, and Indigenous knowledge and spirituality.

In this study, ecofeminism is used cautiously to interpret the connection between environmental conditions and gendered household responsibilities. The empirical material most directly relevant to this perspective concerns flood exposure associated with low-lying land, drainage problems, and illegal or unplanned reclamation/construction, alongside women's responsibility for protecting household assets and maintaining domestic life during floods. The data do not provide sufficient evidence to make broad claims about women's environmental knowledge or natural-resource management; therefore, ecofeminism is treated as a contextual lens rather than a primary explanation for all findings.

Vulnerability Theory

Martha Fineman, a legal professor, was the primary developer of Vulnerability Theory during the early 2000s (Fineman, 2008). The theory emerged in response to traditional legal and political frameworks that placed the independent individual at the centre of rights and responsibilities.

Vulnerability Theory challenges the understanding of the universal legal subject as autonomous, independent, and fully functioning. Instead, it recognizes humans as inherently and continuously vulnerable because of their embodied existence, including physical, social, and emotional dimensions. It therefore challenges the notion of the autonomous, self-sufficient individual and calls for legal and social institutions to address universal vulnerability.

The theory is based on critical legal studies and critiques liberal legalism and the autonomous individual. Feminist legal theory also influences the theory by highlighting how social, economic, and legal frameworks create women's vulnerabilities. Social justice theories and welfare state theories further emphasize equal access to resources and opportunities and the role of the state in providing social safety.

A key concept is embodied vulnerability, which recognizes that physical embodiment creates vulnerability to illness, disability, ageing, and death, while also including emotional and psychological dimensions. The concept of resilience recognizes different levels of capacity to cope, respond, and recover, influenced by social, economic, and institutional factors such as resource availability, social support networks, and legal protections. Vulnerability Theory therefore advocates a “responsive state” that addresses human vulnerability through social and legal institutions.

In the context of *Kittampahuwa*, Vulnerability Theory is used to analyse why women may experience greater constraints when access to resources, healthcare, information, and institutional support is limited. Fineman (2008) describes a responsive state as one that recognises shared human vulnerability and organises institutions and resources accordingly. This perspective is relevant to participants’ accounts of uneven relief access and the reported loss of a functioning local flood-warning mechanism, shifting attention from individual responsibility alone toward institutional conditions that enable or constrain coping and resilience.

Literature Review

Vulnerability refers in this study to the socially and materially differentiated capacity of women to anticipate, cope with, respond to, and recover from flood impacts. Fineman’s Vulnerability Theory treats vulnerability as a universal condition while emphasising institutional responses to vulnerability (Fineman, 2008). Resilience is understood here as the capacity to prepare for, respond to, adapt to, and recover from flood impacts through individual, household, community, and institutional resources (Hutchins, 2024).

Previous research has pointed out that socioeconomic factors play a part in the way women experience and respond to floods. For instance, findings by the World Bank in 2010 were that the rate of women from the lowest socioeconomic backgrounds experiencing food insecurity and limited access to health care increased their workload at home after the floods (World Bank,2010). This was further exacerbated by their traditional gender roles, most often narrowing their economic opportunities and decision-making power (Syed Harir Shah, 2013).

The United Nations Office for Disaster Risk Reduction emphasised the intersectionality of gender, class, and other social identities in determining women's resilience to floods. For example, women from marginalised castes or ethnic groups may also experience discrimination and have limited access to services in their struggles toward recovery (United Nations, 2009). The intersectional perspective is one through which the complexity of variables setting out particular experiences of women the interlinking variables of women's experiences and vulnerabilities must be addressed.

Moreover, there are huge differences in vulnerability between males and females residing in flood-prone areas in Sri Lanka, according to the findings of the study carried out by De Silva and Jayathilaka

in 2014 in the Gampaha District. This study assessed that vulnerability includes broad categories of physical, social, and attitudinal vulnerabilities focused on the women's vulnerability regarding the women's primary occupation, status of activity, and number of family members. In comparison with men, it was observed that women were more vulnerable to floods in both villages. Among the physical factors were their main occupation and activity status, while among the social ones were reproductive roles, social norms, and mobility restrictions (De Silva & Jayathilaka, 2014). The role of women in community-based flood risk management in Sri Lanka was highly visible. They were very active in early warning systems, community preparedness plans, and post-disaster recovery efforts. This helped build resilience at the community level and ensured that concerns from vulnerable groups were conveyed in the process (Kumar et al., 2013).

Although previous studies have examined women's vulnerability to floods in Sri Lanka, less attention has been given to how socioeconomic disadvantage, household responsibilities, ethnic and religious diversity, and faith-related barriers to relief arrangements interact within an urban flood-prone settlement. The conceptual gap addressed by this study is therefore not simply the absence of research on one GN division, but the need to connect these intersecting dimensions with women's everyday coping and resilience practices.

Methods and Materials

Research Overview

Research philosophy reflects the assumptions and beliefs underlying knowledge creation (Saunders et al., 2012). This study adopted an interpretivist epistemology and constructivist ontology to explore women's subjective experiences, coping strategies, and socio-economic vulnerabilities within the 508-Kittampahuwa GN division.

An inductive approach was used to identify patterns, themes, and meanings emerging from women's narratives. A qualitative case study design was adopted to examine their everyday experiences and strategies for negotiating disaster risk vulnerabilities. Given the short-term nature of data collection at a particular time, a cross-sectional time horizon was employed.

Data Collection Methods

Data were primarily collected through in-depth interviews and observations, which elicited individual accounts of previous flood experiences, strategies, and risk perceptions. The interviews were conducted in a supportive environment intended to facilitate open dialogue and detailed accounts. These primary data were interpreted alongside the literature review, which provided theoretical and empirical context.

Study Area

This study was conducted in the *Kittampahuwa Rd 2/1* section of *508 - Kittampahuwa* Grama Niladhari Domain located in Kolonnawa Divisional Secretariat, Colombo District, Western Province, Sri Lanka. The reason to select the Kolonnawa Divisional Secretariat area for this study was according to the census and statistical data, Kolonnawa is the most flood-prone divisional secretariat in the Colombo District. As a numeric figure, 40 GN divisions out of 46 were affected by floods during the last decade (Department of Census and Statistics, 2021). When considering the composition of the study area, it has 1857 families with 3824 women and 3604 men belonging to different ethnicities mainly such as Sinhalese, Tamils, and Moors can be seen (Divisional Secretariat - Kolonnawa, 2024).

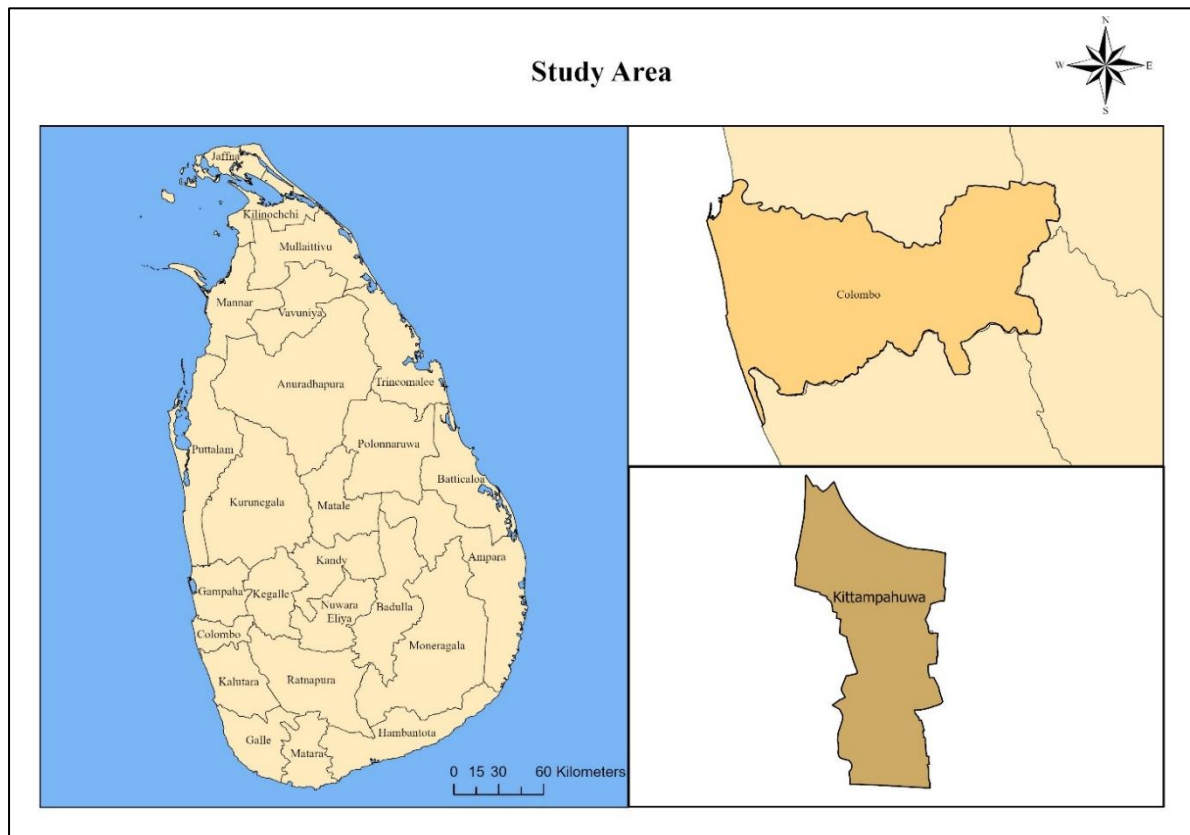


Figure 1: Study Area Map

Sample and Sampling Methods

Twelve in-depth interviews were conducted with women living in the study area using purposive and snowball sampling. The sample was selected to capture variation in educational background, income, religious affiliation, and ethnic background. Participants are referred to as P1–P12 to protect confidentiality. The final sample size was determined based on thematic saturation. During the later interviews, participants' accounts increasingly repeated themes identified in earlier interviews, particularly regarding flood exposure, household responsibilities, access to assistance, coping practices, information and early-warning systems, and recovery challenges. Data collection was therefore

concluded when additional interviews were no longer generating substantial new themes relevant to the research questions.

Data Analysis Techniques

The interview material was analysed using thematic analysis following Braun and Clarke (2006). The analysis involved repeated reading, initial coding of statements relevant to vulnerability, coping, caregiving, resources, knowledge, information, culture, and early warning; grouping related codes into candidate themes; reviewing and refining themes against the interview material; defining the scope of each theme; and producing the final narrative. Trustworthiness was strengthened by maintaining a clear link between themes and participant quotations, using pseudonyms (P1 to P12), and comparing interpretations across interview accounts and relevant literature.

The three theoretical perspectives were used as complementary interpretive lenses. Intersectionality guided attention to the interaction of gender, socioeconomic position, ethnicity/religion, and family roles. Ecofeminism provided a limited lens for considering environmental conditions and gendered household responsibilities. Vulnerability Theory directed attention to social and institutional structures, including access to resources, relief, and early warning. These perspectives were related to the interview themes rather than treated as separate explanations.

Ethical Considerations

To ensure that every participant was fully informed, an information sheet was provided describing the study process, goals, and objectives. The sheet explained participants' rights and confidentiality through the consent process. Participants could choose whether to continue and could decline to answer sensitive or personal questions. Each participant was referred to by a pseudonym, and personal information was kept confidential. No personal information was shared publicly. All collected data were to be deleted two years after publication.

Results and Discussion

Intersection between flood disaster risk vulnerability and Women's socioeconomic status into coping strategies

Women's capacity for coping with flood catastrophes is significantly impacted by the combination of limited access to resources and cultural norms in the *Kittampahuwa* GN division, Kolonnawa. Women's socioeconomic standing in this community has a significant impact on how vulnerable they are to floods and how they prepare for, respond to, and recover from floods. This section aims to comprehend the coping strategies used by women in the flood-prone 508 *Kittampahuwa* GN division by focusing on two important areas: limited access to resources and culture.

Poverty in *Kittampahuwa* has a huge impact on the lives of residents. Sri Lanka Updated Poverty Line (UPL) has been established at 6966.00 LKR, or approximately US\$37 per individual per month, highlighting the financial challenges that many people encounter. 1.8% of households in Colombo City, belong to this criterion, demonstrating the magnitude of urban poverty (Department of Census & Statistics 2022). The economic condition in Kolonnawa, *Kittampahuwa*, remains low-income with a monthly minimum income of 7700.00 LKR or US\$ 41.2 (H.U.S. Samaraweera, 2023). This financial instability is exacerbated by unpredictable working circumstances, which provide no contracts, job security, or vital benefits such as minimum salaries, saving for retirement, or insurance. As a result, many inhabitants have trouble obtaining finance and other sources of income, increasing their vulnerability to flooding.

This widespread poverty in *Kittampahuwa* severely impairs women's capacity to deal with flood disasters. Their inability to afford essential preventive actions, including procuring emergency supplies, buying flood insurance, or strengthening their homes, keeps them from responding appropriately. They are consequently left with limited options for recovery and are extremely vulnerable to the immediate consequences of flooding.

Interview data indicate that cultural and household expectations can shape women's options during floods. One participant described remaining at home while her husband worked, while another explained that she preferred going to her mother's house rather than a relief camp because staying in a shared camp was difficult for her as a Muslim woman. These accounts suggest that gendered household roles and culturally appropriate arrangements can influence preparedness and access to assistance, but they do not support a general claim about all Muslim women in the area.

P1: "We don't do jobs. Both my husband and my son-in-law are working. I and my daughter both do daily work at home."

P5: "Most of the time I am alone at home. My husband works. Children go to school. That's because when there is a flood, I put all the special things I want to take in bags. Then I can leave home quickly. Children's books and mattresses are all placed on top. If there is a flood, there will be no damage."

Although these culturally dictated responsibilities restrict their involvement in the formal economy, they are essential to disaster preparedness and preserve their families' survival and well-being in the event of flooding. They take on important duties around the house, like putting emergency supplies together and arranging belongings to reduce flood damage.

P7: "We do not go to relief camps during floods. We are going to our mother's house. As a Muslim woman, it is hard to stay together in the relief camps"

According to the statement, Muslim women's access to relief camps during floods received a low proportion. Because of the potential social and cultural obstacles, they would encounter in relief camps, many Muslim women are used to staying out on the upper floors of their homes or leaving their houses and going to the houses of relatives and friends. They become even more isolated as a result, which limits their access to resources and organised support during catastrophes.

When examining women's economic independence, though, it is evident that the women living in this region actively participate in the economy. Even though women are subject to different social and cultural restrictions, many pursue small businesses in the face of financial challenges. Small-scale income-generating jobs like domestic labour or supplying homemade snacks to nearby shops may become necessary for these women. Although these initiatives provide some financial support, they are often insufficient to fully address the financial hardships caused by the floods. However, they do assist with post-flood clean-up and home repair costs.

Impact of limited access to resources on coping mechanism

Generally, a scarcity of resources originating from poverty creates a variety of hurdles that influence how women prepare, respond, and recover from flood events. The current analysis probes how poverty impacts women's possibility of coping with floods through an assessment of the case of women struggling with limited access pointing out the constraints and barriers.

Economic Constraints and Flood Preparedness

Economic burden directly affects the ability of women in these areas to prepare for floods. Women from low-income families in these areas lack the financial ability to invest in flood prevention measures such as fortifying their homes, purchasing flood insurance, or stocking up on emergency supplies. Also, without adequate financial resources, these women are unable to take preventive measures that can reduce the impact of floods. In such a case, the people of that area will receive the support of their relatives.

Inadequate Housing and Increased Vulnerability

The link between poverty and inadequate housing conditions is another challenge faced by women during floods. Many poor families in *Kittampahuwa* live in improperly constructed houses that are not flood-resistant. The combination of substandard construction and poor drainage infrastructure increases the likelihood of serious damage during a flood. Women, often responsible for managing household needs and caring for children, face heightened challenges as they navigate the compounded difficulties of inadequate shelter and flood-related destruction.

Sample further explained that the existing houses are flood-resistant due to the current illegal construction of reclaimed land. Women living in such conditions are often forced to deal with significant

damage to their homes and belongings, which can result in displacement and increased stress on their coping mechanisms. Lack of adequate housing infrastructure directly affects their ability to recover quickly and effectively.

Limited Access to Emergency Resources and Support

Poverty also limits access to emergency resources and support services. In floods, access to immediate aid such as food, clean water and medical care is critical. However, women from low-income backgrounds often struggle to access these essential services due to transport barriers or lack of financial means to cover the associated costs. Families in this area are said to receive no government assistance in the event of floods, so they struggle to access the relevant facilities. Limited access to emergency services means that these women may face greater challenges in managing the immediate effects of the floods and may experience longer-term difficulties in navigating the recovery process.

Economic Hardship and Recovery Challenges

Economic hardships imposed by poverty also affect women's ability to recover from floods. After a flood, the financial burden of repairing homes, replacing lost property, and covering other flood-related expenses can be overwhelming. For women in poverty-stricken households, the inability to bear these costs leads to delayed recovery and continued financial stress. Economic downturns further entrench their poverty and make it difficult to regain stability and resilience in the long term.

The coping and recovery capacities from floods in the *Kittampahuwa* GN Division are badly affected by poverty. The financial situation, with insufficient housing, and little access to emergency resources and health facilities, puts women below the poverty line at a high level of challenge. These are issues that require specific interventions to reinforce community- and institutional-level support structures for reducing poverty, improving housing, enhancing access to emergency services, and increasing resilience among women residing in areas prone to flooding.

Impact of cultural practices on coping mechanism

Due to limited access to resources and cultural norms in Kolonnawa, *Kittampahuwa* GN Division, resilience to flood disasters is significantly affected. It is possible to investigate how cultural practices in this community have influenced coping mechanisms.

This area is inhabited by different ethnic groups, and the daily cultural practices may be affected by the disaster situation. The Muslim and Tamil people especially can be more affected by this situation. One of the problems found in gathering information in that area is that the main problem is the disruption of their religious practices. Islamic and Tamils are especially facing this situation.

Participants described using safe centres or other temporary arrangements during floods. One Muslim participant specifically reported avoiding relief camps and going to her mother's house. The interview

material also indicates that prayer, dress, privacy, and access to appropriate food can influence the suitability of shared emergency accommodation for some Muslim women. These issues are treated as participant-reported experiences rather than generalisations about the whole community.

They also stated that when there is a flood situation during their festive seasons, such as Ramazan and Hajj, there will be problems in the proper implementation of their rituals in relief camps. Therefore, although fasting in the month of Ramadan is mandatory, some people stated during the survey that due to the lack of food in the camps where they are staying, there is a greater chance of missing those cultural opportunities. This is another problematic situation faced by Muslim community members in times of flood.

The study area includes Sinhalese, Tamil, and Muslim residents. The available interview material indicates that cultural and religious practices can be difficult to maintain during flood displacement, particularly where suitable food, privacy, or space for religious practices is limited.

In addition to this, another problem faced during the flood periods in this area is to perform religious rituals due to flood situations during funerals. They stated that due to the limited access and lack of resources, people may face difficulties in performing their funeral rituals which can also be attributed to the influence of cultural practices.

Relationship between women's caregiving responsibilities and coping mechanism throughout the disaster period - Special reference to past flood experiences

With the occurrence of a disaster, the environment in which one lives every day changes. Because of that, as women, they have to engage in specific roles during that disaster period. The roles they play during the disaster period are combined with responsibilities. Moreover, roles and responsibilities can be divided into community, domestic and occupation (Fothergill, 1999). The responsibilities of a woman in a disaster are wide ranging from pre-disaster preparation to post-disaster recovery.

Household Management

P2: "My husband, children and I are here and we are taking care of my mother"

P12: "Me, my husband and children are there"

Considering the families of the participants, most of them belong to the nuclear family structure while few of them live in extended families. For example, P2 described living with her husband, children, and mother, while P4 and P11 described caring for children or a mother when the husband was absent. These accounts shows that while not all participants share the same household structure, caregiving responsibilities during flood situations can span across multiple generations of women.

P4: "If the husband is not at home when the flood comes, I will take care of the children alone and collect the household goods..."

P11: “Even if the water is high, it is difficult to go, so I stay inside the house to take care of my mother...”

Accordingly, these females are given the responsibility of protecting both their kids and elders at the same time during unexpected hardships. Not only that but carrying their belongings to safer places is also considered to be done by them.

Preparedness can reduce the disruption caused by floods, and previous research highlights the importance of disaster preparedness among women (Sharma et al., 2015). In this study, participants described practical preparedness measures such as moving books and clothing to higher places, wrapping belongings in polythene, monitoring water levels, and leaving when water rises.

P9: “I put my son's books on top. Put the clothes in the closet wrap them in polythene and be ready. Go as soon as the water rises. I check from time to time whether the water is rising.”

All the women who participated in the study had a deep understanding of floods because most of them have been living in the *Kittampahuwa* - 508 area since their birth. Therefore, they are well aware of flood disaster management and can take necessary actions to face them beforehand. After the disaster, women bear the primary responsibility of restoring or recovering their families. As per the women who participated in the study, the widespread of various diseases after floods can be seen in this area. To minimize the risk, they carry out the primary responsibilities of protecting their family members and cleaning and restoring the houses. According to them, in some cases, they have to do all this cleaning and restoring stuff by themselves without the support of anyone else.

P2: “After the flood, we women have a lot of work and have to clear everything by ourselves....”

P8: “It is very difficult to clear the house and the ground is still rough....”

P10: “It takes about a week to clear the garbage in the houses....”

Resources Management

P3: “The government gives us sanitary pads, food and clothes for the big flood

P4: “When there is a small flood, some people and from the mosques give rice parcels...”

P12: “The people asking for votes bring rice parcels, they also give rice parcels at night, but they don't bring rice for all three meals...”

During the floods in the *Kittampahuwa* -508 area, various resources such as food, clothes and sanitary items are provided by the government, religious places and some elite people. There, such resources are scarce during small floods. Women have to make a special contribution to sharing sanitary and accommodation facilities with other families when they have to stay in safe places such as schools during floods. In addition, women make sure to frugally manage and use food for their family's needs when food is scarce.

Community Network

Women are people who are constantly building relationships with their surrounding society. Therefore, they cooperate, maintain communication with neighbours and share resources in case of disaster (Gokhale,2008). Therefore, this community network among women is very important to survive and recover from a disaster. As per the women who participated in the study, they have a high frequency of building relationships with their neighbours since they spend most of their time in homes. In some cases, blood relations are also living in each other's neighbourhoods. Therefore, this community network among women is very important to survive and recover from a disaster.

Participant P1: "Because the water is high, we find a house with an upper floor and go to the upper floor of that house and all the people cook and eat. We cook and eat at our own expense..."

Participant P6: "The people near our houses go one by one to see if the water in the canal is rising...."

Adaptation

Women bear the primary responsibility for adapting their families to disaster situations. The women of this area mainly leave their houses to face more flood situations. They said they would go to a safe place, a school or a relative's house. They said that some women decide to go upstairs or stay at home. Women take the primary responsibility of adapting their family to safe place where they have gone to stay temporarily. If there are small children there, they are made to adapt to the new environment. Also, women adapt their families to support each other by sharing limited resources if they are in a relief camp during the disaster.

Knowledge, awareness and information

Education and awareness are critical components of resilience building, as they equip individuals with the knowledge and skills necessary to anticipate, respond to, and recover from flood events. However, many women in the 508-Kittampahuwa area never attend the awareness programs about flood and preventive methods. Therefore, their preparedness is generally based on experiences that they have experienced. Not on systematic knowledge. Education and awareness can significantly enhance their ability to develop effective coping mechanisms. Risk perception and preparedness, health and safety practices, empowerment and decision-making, and access to information are all essential for building resilience.

Knowledge, Awareness and Information in Coping and Resilience

Further, factors associated with the enhancement of resilience at community levels in flood-prone areas, such as the 508-Kittampahuwa GN division, Education and Awareness, are an inherent part of constructing community resilience as mentioned above. These contributions manifest in areas such as

risk perception and preparedness, health and safety practices, issues of empowerment and decision-making, and access to information.

Risk perception and preparedness

Participants described preparedness primarily through prior flood experience and practical observation. For example, participants reported monitoring rising water, protecting household belongings, and leaving when water levels increased. Two participants specifically stated that they had not participated in awareness sessions. These accounts suggest that experiential knowledge currently plays an important role in preparedness, while formal awareness and training remain limited in the participants' accounts.

Health and Safety Practices

Health and safety are very important during flood times. Health and safety practice education empowers women to take measures that protect their families from health hazards. Sanitation, hygiene, and first-aid awareness programs can arm women with the skills necessary to mitigate health hazards related to waterborne diseases and injuries. Women are aware of proper sanitation, how to purify, etc. and hygiene in a post-flooding scenario can reduce health risks to a large extent. First-aid knowledge, on the other hand, provides a sense of security and enables a woman to administer the first critical care during an emergency. Lacking formal education on these issues, many women in the 508-Kittampahuwa GN division have relied on past flood practical experiences. This is an experience that could be supplemented and formalised by structured educational programs to improve health and safety practices.

Empowerment and Decision-Making

P3: "I went up to grade 5 and unfortunately I had to stop my education from there"

P8: "At that time I was in grade 8. Suddenly my father died and, at that point, I stopped my education because of the family pressure"

Education will empower women to make informed decisions before, during, and after a flood. Moreover, women who are educated are more likely to actively take part in community disaster management and related decision-making processes. They can work towards formulating community-based flood response plans and argue for resources and support that need to be available. Many women in the 508-Kittampahuwa GN division do not have formal educational qualifications, yet through exposure to floods in the past, they have developed a rich experience that is very valuable. This experiential knowledge is of paramount importance and needs to be integrated into community planning and decision-making. Education and training for women empower them in terms of leadership, decision-making, and community resilience.

Access to Information

Information that is appropriate and timely is one of the critical sectors in effective flood response. This is assured through educational programs and creating awareness among the public. Women who are informed about flood risks and resources available after recovery are better positioned to find help and make decisions in the middle of and following a flood. Specifically, information about emergency shelters, health services, and financial support may significantly affect recovery processes.

P5: “No, I did not participate in any kind of awareness session”

P7: “We do not have awareness sessions”

Since there are no structured awareness programs, the majority of women in the 508-*Kittampahuwa* GN division continue to rely on informal sources of information or word of mouth in their decision-making. Enhancement of access to reliable and timely information through proper and focused education may improve preparedness for floods among such women.

This becomes very important in building resilience in flood-prone areas, considering the behavioural factors of educated and informed women. While the absence of formal education and structured awareness programs in the 508-*Kittampahuwa* GN division desecrates a challenge, it simultaneously highlights experiential knowledge. Education and awareness are needed to promote risk perception and preparedness, health and safety practices, empowerment, and access to information. Presenting formal education as it is interlinked with the rich experience of local women, targeted awareness programs can enhance community resilience and preparedness during flood situations. With further comprehensive educational campaigns to meet such needs, women would be better placed to respond to floods and build long-term resilience in their communities.

Impact of flood early warning implementation into coping mechanism

Participants described recurrent flooding in the study area and linked it to the low-lying environment, proximity to waterways, illegal construction, and unplanned development. Several participants reported repeated flood experiences between 2016 and 2024. Because this study used qualitative interviews rather than a survey, these accounts are presented as participants' experiences rather than population-level frequency estimates.

Participant P10: “Back in the days before the flood came to our village, an announcement was made. We weren't sure if it came from the government or some other organisation. Eventually, those announcements stopped, and nowadays, whenever it rains, we head to the canal to check if it is overflowing”.

In the context of the Flood Early Warning Systems (FEWS) within the 508 - *Kittampahuwa* GN division of Kolonnawa, it is noteworthy that there exists a singular early warning system that previously

facilitated notifications before flood events. Regrettably, this system is currently non-functional, compelling residents to depend on their customary practice of regularly monitoring the canal for indications of potential overflow.

This gap in early warning systems significantly impacts the ability to respond to the community effectively, especially for women who frequently bear the burden of caregiving for children, the elderly, and individuals with disabilities. Historically, when early warning systems were operational, they played a crucial role in improving the preparedness of communities vulnerable to flooding. Timely early warnings empowered women to facilitate the evacuation of their families to safer areas or designated shelters before the onset of floodwaters, thereby greatly minimising the potential for injury and loss of life. Additionally, these systems provided women with the means to safeguard vital household assets, such as livestock, food supplies, and important documents, which are essential for post-flood recovery.

In addition to individual preparedness, early warning systems have significantly improved the coordination of community response initiatives, including the distribution of relief supplies and the delivery of emergency services. Women who were informed through these early warnings could engage actively in these initiatives, thereby addressing the needs of their families and communities. Such coordination is essential for a successful disaster response and recovery process. Furthermore, the psychological benefits of early warning systems are considerable; the existence of a reliable system can reduce the anxiety linked to the unpredictability of flood occurrences. This sense of security allows women to concentrate on preparing their households, thereby strengthening their overall resilience.

However, the effectiveness of early warning systems is influenced by several key elements, such as the accuracy of the warnings, the effectiveness of the communication methods employed, and the level of trust the community has in the system. In 508-Kittampahuwa, it is crucial to make these early warning systems accessible to all members of the community, with particular attention to women, and to ensure their integration with comprehensive disaster management strategies. This requires providing education and training on how to respond to early warnings and ensuring that women are actively involved in the design and execution of these systems. By focusing on these aspects, the community can enhance its coping mechanisms and recover from future flooding incidents

Limitations of the Study

This study has several limitations. Mainly, the sample consisted of 12 women from one GN division, so the findings are context-specific and are not statistically generalisable. Further, purposive and snowball sampling may have introduced selection and network bias. Moreover, translation and interpretation of participants' accounts may have affected the wording or nuance of quotations. And also, researchers' positionality may have influenced interviewing, interpretation, and thematic development. Furthermore, participants' accounts of earlier floods may be affected by recall limitations.

In addition, the study did not include men, government officials, disaster-management personnel, or other institutional actors, so their perspectives on relief, early warning, and service provision are not represented.

The present study adopted the perspective of socioeconomic view and women's experiences; hence, other parameters related to physical, environmental and political factors that impact the vulnerability and resilience of women can also be a matter of further studies.

Moreover, although the study focused on floods, Kolonnawa is vulnerable to other natural hazards such as storms/hurricanes, and lightning. Examining women's experiences and coping mechanisms about these additional hazards would provide a more holistic understanding of their resilience.

Conclusion

The findings show that women's vulnerability to recurrent floods in *508-Kittampahuwa* is shaped by interacting socioeconomic and cultural conditions, including limited financial resources, inadequate housing, household and caregiving responsibilities, and barriers associated with relief arrangements. At the same time, participants demonstrated agency through advance movement of household goods, monitoring water levels, using relatives' or neighbours' homes, sharing resources, and undertaking post-flood cleaning and recovery. Preparedness relied substantially on prior experience because participants reported limited access to formal awareness programmes. Participants also indicated that an earlier local warning mechanism was no longer operating, leading residents to monitor the canal themselves. Together, these findings directly address the study objectives by showing how socioeconomic and cultural conditions shape vulnerability, which coping strategies women use, and how knowledge, information, and early warning influence resilience.

Recommendations

Eco-sustainability Measures

The promotion and use of sustainable land-use and ecosystem management practices should occur, such as agroforestry, terracing, and maintenance of natural vegetation buffer zones. Women should be involved in environmental conservation, management activities, education, and community monitoring to promote flood risk reduction.

Policy Transition and Implementation

There is a need to scale up gender-sensitive initiatives in disaster risk reduction, climate change adaptation, and flood risk management policies at the local level. More effort is needed to promote and advance women's participation and leadership in local governance at various levels of policy planning and decision-making.

Capacity Building

Women's involvement in disaster management requires appropriate capacity-building interventions. Capacity development initiatives such as training on disaster preparedness, response, leadership, sustainable development and environment, and flood risk management should be promoted. Women's role in community disaster planning and decision-making processes must be strengthened.

Mitigation and Adaptation Measures

Flood mitigation and adaptation strategies such as improved water management, climate-adapted approaches, housing, livelihoods, and agriculture should be promoted and supported to enhance community resilience to floods. Enhancing access to financial services and products such as credit, insurance, and other risk transfer mechanisms for women will increase their resilience to floods

References

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, 1989(1), 139–167.
- d'Eaubonne, F. (1974). *Le féminisme ou la mort*. Pierre Horay. <https://www.scirp.org/reference/referencespapers?referenceid=3199453>
- De Silva, K., & Jayathilaka, R. (2014). Gender in the Context of Disaster Risk Reduction; A Case Study of a Flood Risk Reduction Project in the Gampaha District in Sri Lanka. *Procedia Economics and Finance*, 18(December 2014), 873–881. [https://doi.org/10.1016/s2212-5671\(14\)01013-2](https://doi.org/10.1016/s2212-5671(14)01013-2)
- Department of Census and Statistics. (2021). Grama Niladhari Divisions Statistics - 2020 Colombo District. http://www.statistics.gov.lk/Population/StatisticalInformation/GND_Reports/2020/Colombo
- Dissanayaka, M. L. S., & Sangasumana, P. (2017). Issues and challenges of urban flood hazard management in North Colombo Region (A case study of 2016 Flood Affected Kolonnawa Urban Council). *International Journal of Scientific and Research Publications*, 7(10), 310.
- Divisional Secretariat - Kolonnawa . (2024). Divisional Secretariat - Kolonnawa . Ministry of Home Affairs. <http://www.Kolonnawa.ds.gov.lk/index.php/en/statistical-information.html>
- Fineman, M. A. (2008). The vulnerable subject: Anchoring equality in the human condition. *Yale Journal of Law & Feminism*, 20(1), 1–23.
- Flood Warning System - Real-Time Monitoring & Alerts. (n.d.). AEM. <https://aem.eco/solution/flood-risk-management/>
- Fothergill, A. (1999). Women's roles in a disaster. *Applied Behavioral Science Review*, 7(2), 125-143.
- Gokhale, V. (2008, October). Role of women in disaster management: An analytical study concerning Indian society. In *The 14th World Conference on Earthquake Engineering* October (pp. 12-17).
- H.U.S.Samaraweera. (2023, August 19). Exploring complexities of disaster risk and vulnerability: Everyday lives of two flood-affected communities in Sri Lanka, Wiley online library. <https://doi.org/10.1002/sd.2723>
- Hutchins, S. (2024). Flood resilience: A review of evolving definitions. *Natural Hazards*. <https://doi.org/10.1007/s11069-024-06627-9>

- Jayarathne, S. S. (2014). Women's Potential in Dealing with Natural Disasters : A Case Study from Sri Lanka. *Asian Journal of Women's Studies*, 20(1), 125–136.
<https://doi.org/10.1080/12259276.2014.11666175>
- Kimber, L. R., & Steele, J. F. (2021). Feminist advocacy on international agreements for disaster risk reduction: From Yokohama to Sendai. *International Journal of Disaster Risk Reduction*, 64, 102457.
<https://doi.org/10.1016/j.ijdr.2021.102457>
- Kimberle Crenshaw: Biography, Books & Quotes | StudySmarter. (n.d.). StudySmarter UK.
<https://www.studysmarter.co.uk/explanations/english-literature/literary-criticism-and-theory/kimberle-crenshaw/>
- Kishan, by Ravi. (n.d.). What is Intersectionality Theory? Explained. *Www.socialworkin.com*.
<https://www.socialworkin.com/2022/08/what-is-intersectionality-theory.html>
- Kumar, A., Paramanathapillai, S., Juvanendiran, S., & Senthees., T. (2013). COMMUNITY BASED DISASTER RISK REDUCTION IN SRI LANKA A Compendium of Good Practices.
<https://preparecenter.org/wp-content/uploads/2024/03/Community-Based-Disaster-Risk-Reduction-in-Sri-Lanka.pdf>
- Merry. (2021, October 25). Why Did Kimberle Crenshaw Intersectionality - *Livelaptopspec*.
Livelaptopspec. <https://www.livelaptopspec.com/why-did-kimberle-crenshaw-intersectionality>
- Mukherjee, R. (2013). Eco-feminism : Role of Women in Environmental Governance and Management. *Galgotias Journal of Legal Studies*, 1(2), 1–7.
- Ottuh, P. O. O. (2020). A Critique of Eco-Feminism : An Attempt Towards Environmental Solution. *International Journal of Environmental Pollution and Environmental Modelling*, 3(4), 167–179
- Samie, A. (2023, December 13). Intersectionality | Definition, Kimberle Crenshaw, History, Applications, Criticism, & Facts | *Britannica*. *Www.britannica.com*; *Britannica*.
<https://www.britannica.com/topic/intersectionality>
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (6th ed.). Pearson.
- Sharma, R., Kumar, V., & Raja, D. (2015). Disaster preparedness amongst women, the invisible force of resilience: A study from Delhi, India. *International Journal of Health System and Disaster Management*, 3(3), 163.
- Syed Harir Shah. (2013). Building resilience by learning - *The Disaster Risk Management Handbook*.
https://www.preventionweb.net/files/32968_32968buildingresiliencebylearningth.pdf

United Nations. (2009). Making Disaster Risk Reduction Gender-sensitive: policy and practical guidelines. In International Strategy for Disaster Reduction. <https://www.unisdr.org/2022/dipecholac.net/docs/files/62-makingdisasterriskreductiongendersensitive.pdf>

What Vulnerability Theory Is and Is Not – Vulnerability and the Human Condition. (n.d.). <https://scholarblogs.emory.edu/vulnerability/2021/02/01/is-and-is-not/>

World Bank. (2010). Disaster Risk Management for Women: A Guide for Practitioners. Washington, D.C.: World Bank.