

Research Article

Elderly Population, Climate Vulnerability and Social Security: Perspective of Bangladesh Coastal Zones

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Abstract

The population of Bangladesh is acutely vulnerable to climate change on shorelines, and elderly people are one particularly vulnerable group. The presented study provides a thorough evaluation of climate-related vulnerabilities, adaptation, and resilience mechanisms among the elderly residents in this high-risk area. It also provides a critical analysis of the effectiveness of existing governmental social safety nets and non-governmental support networks in mitigating the specific threats faced by this group during disasters caused by climate-related factors, such as floods and cyclones. A qualitative methodology was employed, and the study was conducted in a climate-vulnerable village in the Shyamnagar Upazila, Satkhira District. The results indicate that the vulnerability of older adults is a multi-dimensional entity, as intersecting physical, economic, and social conditions influence it. Physical barriers include reduced mobility and long-term illnesses that hinder evacuation and access to medical care. The lack of economic security, driven by frequent losses occasioned by disasters and inadequate social allowances, does not allow people to invest in emergency adaptive mechanisms. In addition, the migration of younger families out of the country also diminishes traditional support systems through social isolation. In response, elderly people turn to the mechanisms of resiliency, based on traditional wisdom, community coherence, and spiritual beliefs. These informal systems, however, are becoming subject to tension. Formal support is often inadequate, with government aid being hindered by bureaucracy and NGO assistance tending to be reactive rather than sustained. This study highlights a significant gap in climate adaptation policies based on age. It also concludes that there must be a strategic change, in the form of generalised aid being replaced with proactive, age-focused resiliency-building programs. Through the empowerment of local governments to establish and enforce specific countermeasures, including local shelters, built-in climate-adaptive healthcare, and stable communication networks, the chances of experiencing a safer and more dignified life for other ageing people in the Bangladesh coastal areas increase.

Keywords

Climate Change, Local Government, Older Adults, Vulnerability, Coastal Bangladesh

1. Introduction

There are few problems that shine with more brilliance on the human aspect of environmental crisis in the current global climate change discourses than the crossroads of climate vulnerability and ageing populations. The Bangladesh coastal

regions that are more vulnerable to the climate stresses, which include tropical cyclones, floods and rise in sea level, offer an interesting example on which to observe this crossover - with their elders constituting a vulnerable and marginalized group.

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Climate change in Bangladesh does not only bring about temperature variations and storm-related rise, but it is also transforming social fabric, livelihoods, and health and safety risks to the elderly who in most cases depend on their communities to sustain them [1].

Bangladesh overtime has been found out to be one of most climate vulnerable nations in the world primarily because of geographical positioning of the nation in the low-lying deltas of South Asia and having a much-rooted socio-economic structure in relation to natural resources. Coastal locations are the epicentre of the Astrophysical and socio-economical strain affecting Bangladesh's ageing population as it is increasingly put under danger from climatic effects [2]. For instance, rising sea levels and saline intrusion affect the land and water resources and heighten the risk to health and the ability of vulnerable older adults as they may have less mobility, poor health and limited chances of adapting. As the population is becoming an ageing population in Bangladesh, it becomes very important to know the peculiar vulnerabilities and adaptation mechanism of older persons [21].

Over the past several years, resiliency strategies and adaptation mechanisms have been recent topics of intense research among climate-vulnerable communities from around the world, and in this regard, a special effort has been made to understand how older adults adapt [5]. However, the particular needs of the elderly, their strategies, and their support systems in Bangladesh's complex socio-economic context, particularly in the coastal areas, are underexplored. There is some support from existing government programmes and Non-Governmental Organization (NGO) initiatives, but these generally do not address the total needs of older adults beyond immediate economic impact and physical displacement, but also psychological, health, and social support needs [9].

The purpose of this article is to critically evaluate the climate vulnerability, adaptation strategies, and resilience mechanisms utilised by older adults in coastal Bangladesh, with a particular case study in Shyamnagar Upazila, Satkhira District. This study aims to fill critical gaps in the research by analysing factors that affect these individuals' vulnerability and resilience to inform the development of targeted policies and interventions to support this ageing population in the region. This article also seeks to expand its significance for policymakers, community leaders, and organisations within the field of climate adaptation in pursuit of offering more adaptive social protection measures that render older adults more resilient.

This analysis pursues the identification of challenges but integrates findings into a broader discourse on sustainable and inclusive climate adaptation strategies. By adopting an analytical approach rooted in the experiences of older adults, this article addresses critical questions: What do older adults perceive and respond to in terms of climate-related stressors? How do these family, community, and institutional structures participate in their adaptive strategies? How can the findings from this study be used to inform policy frameworks that

prioritise the needs of Bangladesh's ageing populations in climate-vulnerable areas?

The central concept of this article is situated at the intersection of climate adaptation and social equity because climate resilience is defined by age, which separates climate justice and climate adaptation. An appeal to climate policy and disaster risk reduction to rebrand itself in a broader culture, in which older adults are welcome into the palette of climate resilience planning. It notes that this assists in successful adaptation of the vulnerable populations in Bangladesh in the coastal region, that is; effective adaptation should involve technological and infrastructural interventions and social and community-based interventions taking into account the specific vulnerabilities of older adults. This strategy will be fundamental in ensuring that sustainable, fair, and strong future of the coastal communities in Bangladesh is built upon the relationship with the communities who are already adjusting towards what is now the new reality and not on a misleading nature of a restoration of the old reality and its actual possibility.

2. Climate Vulnerability and Adaptation Among Coastal Communities: A Global and Bangladesh Context

Rising sea levels, intensifying storms, and shifting weather patterns rapidly make low-lying coastal regions vulnerable to climate change globally. These areas, from small island nations to vast deltas, are subject to similar infrastructure, resources and public health threats [7]. Research worldwide has demonstrated the acute climate vulnerability of coastal areas, from the Philippines to the Maldives to parts of Southeast Asia, which the countries face in common, vulnerable to floods, saline intrusion and habitat loss [22]. The constant exposure to these risks affects livelihood, which is largely based on agriculture and communities that rely on fishing, leading to an increase in the rate of displacement, food insecurity, and increased health crises [1].

One of the most acute cases of climate vulnerability globally continues to be found in Bangladesh, most evidently in the coastal region of Khulna, Satkhira and Bagerhat districts, where rising sea levels and saline intrusion frequently occur. Given that many rivers cross Bangladesh and extend to vast coastal lowlands, its geography predisposes the nation to flooding and cyclones, impeding livelihoods and public health [17]. The Intergovernmental Panel on Climate Change (IPCC) have reported escalating climate-induced risks in this region, including, in some cases, sharp increases in the frequency and intensity of such events [6]. As a result, the adoption of infrastructural measures, such as the construction of cyclone shelters and embankments and social measures focused on building community resiliency and early warning systems, have been adaptive to responding to climate events in Bangladesh [8].

Although these efforts display notable success, the risk of these marginalised groups (i.e., older adults) has been overlooked in adaptation strategies. Despite many adaptation interventions on community level, there is a dearth of studies on adaptation initiatives focused on older adults in coastal communities of Bangladesh. They are particularly vulnerable in disaster contexts, such as movement ability constraints, higher prevalence of chronic health conditions, and dependence on social networks.

2.1. Resilience Strategies Among Older Adults: Challenges and Adaptive Responses

Over the past few years, research on resilience strategies for older adults has grown in examining individual and community-driven adaptive responses to climate challenges. In response to environmental hazards, many older adults know, some have learned, and most can learn how to draw upon traditional knowledge, community bonds, and personal resilience. For example, studies in Japan and South Korea have shown how older adults used historical knowledge and family networks to respond to flood and heat-related situations. Older adults in African countries with regular droughts practice resource conservation strategies and intragenerational support systems to build resilience [19].

Similarly, for Bangladesh's rural and coast communities, older adults rely on familial support, community bonds and traditional knowledge to mitigate climate harm. However, as 'environmental risks' become more acute, these mechanisms are being stretched further [23]. A body of literature suggests that while older adults bring adaptive skills, they typically lack the resources to promote them well. For example, research indicates that Bangladesh's older adults have a low availability of monetary resources; this increases their vulnerability and hampers them from investing in adaptation measures, e.g., housing structure modifications or resilient livelihoods [16].

The role of psychological resilience in older adults – a factor not mentioned in adaptation frameworks – is vital in understanding and supporting their response to climate stressors. Existing studies show that older adults may have an unyielding will to keep at it but find their mental health further affected by social isolation, limited access to healthcare and the traumatic repetition of climate disasters. The results underline the incorporation of features such as mental health and social support into resilience strategies [10].

2.2. Existing Support Systems for Older Adults in Bangladesh: Government and NGO Initiatives

Over the past decades, the Government of Bangladesh and a range of Non-Governmental Organisations (NGOs) have invested in helping vulnerable groups in the coastal areas, including older adults [4]. Government social safety pro-

grammes, especially pensions, subsidies, and food assistance, are essential initiatives to support low-income older adults financially [11]. Critical economic assistance to older adults living in poverty is provided through programmes such as the Old Age Allowance, which was started in 1998, which enables them to afford necessities such as food and clothing [18].

Such programmes are vital financial support, but their relevance within a climate resilience context is narrow. However, research shows that such safety nets often lack the flexibility to address the needs triggered by climate change. For example, the Old Age Allowance provides financial assistance but fails to account for the need for climate-resilient housing, disaster-directed medical aid or transportation during evacuations. Mainly, the government's climate adaptation initiatives are based on significant infrastructure community investments like embankments and cyclone shelters, as opposed to investments in older adults' specific needs with mobility or specialised healthcare in emergencies [20].

Support for older adults living in climate-vulnerable areas has also been central to the work of NGOs. BRAC, HelpAge International and the International Centre for Climate Change and Development (ICCCAD) have been working on developing their community-based adaptation programmes for marginal groups [12]. However, studies show that such programmes have been relatively limited in scale and scope, especially in remote coastal regions where resources are scarce and logistical hurdles prevent service delivery [1].

2.3. Research Gaps and the Need for Targeted Adaptation for Older Adults

Though much has been done to document the vulnerability of coastal communities to climate change, fundamental gaps exist in understanding the specific needs of older adults in these places. It is found that the available literature lacks age-specific adaptation strategies in Bangladesh's coastal areas, which have implications for effective policy interventions, and community-based adaptation is weak. However, most adaptation frameworks focus on infrastructure and generalised community support rather than addressing more age-specific resilience vulnerabilities, including how health risks associated with extreme heat, access to climate-resilient housing and psychosocial support for older adults can be increased.

Moreover, research on adaptation mechanisms often focuses little on the psychological and social dimensions of resilience critical to older adults. In the literature, however, there is a gap in knowledge as to how social isolation, cultural expectations and family dynamics impact the adaptive capacity of older adults. However, these gaps limit the formation of holistic resilience frameworks that can support the well-being and survival of older adults in ever more hazardous environments.

History informs that while NGOs and government programmes provide meaningful services, their integration is

limited and support systems are broken into small pieces. Service duplication and critical gaps are left unaddressed because of a lack of coordination between the governmental safety net programmes and NGO-led community adaptation efforts. Future research should involve the design of integrated support frameworks that draw upon government, non-government and community resources to ensure targeted and broad support for older adults.

3. Research Methodology

This study utilises the methodology to examine the nuanced vulnerabilities, adaptive responses and resilience strategies of older adults living in coastal Bangladesh in the face of increased risks associated with climate-induced hazards. A qualitative approach is taken as the interest lies in understanding personal and community-level experiences for an in-depth understanding of individual perspectives and contextual realities. The study aims to collect rich, descriptive

data from older adults who have been or are regularly experiencing ongoing climate stressors in daily life. The research seeks to counter prevailing quantitative approaches that usually oversee insights into resilience and adaptation presented in this population by centring the voices and experiences of this population.

The study is based in a coastal village in Bangladesh's Shyamnagar Upazila of Satkhira District. Specifically, this location was chosen because it is highly exposed to climate-sensitive impacts, including flooding, saline intrusion, and socio-economic stresses that will impact climate-sensitive coastal regions. Shyamnagar is one of the most climate-affected areas in Bangladesh, where older adults, particularly vulnerable to climate-induced hardship, adapt to and cope with climate challenges. Location is also determined by the fact that its population's livelihood depends on climate-sensitive livelihoods like agriculture and aquaculture, which translates to climate impact being more immediate and accessible in their day-to-day lives.



Figure 1. Map of Shyamnagar Upazila of Satkhira District (Source: Local Government Engineering Department, Government of Bangladesh)¹.

¹ <https://oldweb.lged.gov.bd/UploadedDocument/Map/KHULNA/Satkhira/shyamnagar/shyamnagar.jpg>

Purposive sampling selects study participants as residents of a given study location aged 65 and above. The criteria for this age group were to ensure that participants had lived through different stages of climate change in the region and had firsthand experience of the impact. Several factors based on which participants were chosen, including gender, socio-economic status, and health condition, reflect a diverse cross-section of the older adult population in Shyamnagar. Different backgrounds are included in this, ensuring that more experience and insight are captured across the spectrum to portray a holistic view of the region's resilience and adaptive strategies of older adults.

The principal data collection methods employed in this study consist of Key Informant Interviews (KII), In-Depth Interviews (IDI), and Focus Group Discussions (FGD). In all, thirty (30) individuals were involved in the study; 15 older adults- for in-depth interviews (IDI), 10 community leaders- for key informant interviews (KII) and a group of five older

adults- for focus group discussions (FGD). Key Informant Interviews are conducted with community members with specialised knowledge of leadership roles in the community, including local government representatives, health workers and community leaders. Characterisation of challenges, resources, and community dynamics that shape resilience and adaptation outcomes emerges from these interviews as part of understanding the context in which resilience and adaptation occur locally.

However, In-Depth interviews are conducted directly with selected older adults to acquire personal narratives attuned to the particular experiences, challenges, and adaptive responses to climate impacts within their shared lives. By providing participants with an opportunity for uninterrupted conversations in a confidential format, these interviews allow them to tell their stories and their deeply personal struggles with daily climate impacts.

Table 1. Socio-demographic Characteristics of KII Participants.

Sl	Age	Gender	Occupation	Years in Community	Key Role in Community	Education Level
1	68	Male	Farmer	50	Community Leader	Primary Education
2	65	Female	Teacher	40	Local Educator	Higher Secondary Education
3	72	Male	Retired	55	Health Worker	Higher Secondary
4	66	Female	NGO Worker	30	Local NGO Coordinator	Bachelor's Degree
5	70	Male	Fisherman	45	Union Parishad Member	Primary Education
6	69	Female	Homemaker	48	Community Volunteer	Secondary Education
7	71	Male	Agriculturalist	52	Traditional Healer	No Formal Education
8	64	Female	Health Assistant	38	Local Health Worker	Diploma in Health
9	73	Male	Shopkeeper	50	Community Advisory Member	Primary Education
10	67	Female	Retired Nurse	47	Supporter in Medical Camps	Higher Secondary

Source: Prepared by the Author

Focus Group Discussions (the supplement to data collection) involve small groups of older adults in which they can talk over the common issues, adaptive practices, and reflect together on the community support mechanisms. FGDs enable discussion to emerge community-specific resilience policies and how the social support systems can be effective with the elderly. The participatory aspect of FGDs means that participants will be interested in proposing answers at the top of one another, which at times will reveal common problems and group adaptive actions that may not be evident in individual interviews. Through synergistic collaboration of these approaches, the research will generate a holistic and multi-

faceted knowledge of how the landscape of resilience and adaptation of older adults becomes a manifestation of the study area.

The data was collected in the period between four weeks in June-July 2024 and the length of every interview is 45-90 min according to the availability of the participant and the extent of information they share with the interviewer. In-depth interviews were used to explore the personal experiences; specialised knowledge of the community leaders was collected using the key informant interviews and focus group discussions were used to help in sharing experience and reflecting on the community level. Each participant's interview was

scheduled individually to accommodate personal preferences and reduce the likelihood of recall fatigue.

Because the participant population is vulnerable, ethical considerations are of utmost importance in this research. The Authors have taken the ethical approval from The Faculty of Social Sciences of Jahangirnagar University, ensuring adherence to ethical protocols. All participants provide informed consent after being informed of the purpose of the study, the voluntary nature of their participation and their right to withdraw at any time. Additionally, the study tries to protect confidentiality and privacy and address the concerns of older adults in rural Bangladesh about sharing personal information. The research team also takes precautions not to create any emotional or psychological strain for people who have experienced significant loss or hardship during interviews because climate impact is emotionally distressful to discuss. The research team uses culturally sensitive interview techniques to build trust and ease, further considering older adults' unique needs and weaknesses.

Data analysis for this study has been conducted thematically – transcripts of interviews and discussions are organised to find recurring patterns, themes and insights. Themes are refined to find more nuanced meanings highlighting the inseparability of personal resilience, community support systems, and the macrostructural socio-economic context. Thematic analysis allows the study to focus on individual and collective adaptive strategies, demonstrating how older adults cope with climate change within personal, social and environmental constraints. The findings are contextualised with existing literature to link the lived experiences of older adults in Shyamnagar with a more extensive theory on climate vulnerability and resilience. An asset of this approach is that it enables the study to give locally relevant insights and contribute to the global discourse on climate adaptation among vulnerable populations.

4. Findings

4.1. Vulnerability Assessment

These older adults are characterised by profound physical, economic, and social vulnerabilities that greatly exacerbate their risks, given their need to rely exclusively on limited resources to reconstruct their lives when recurring climate disasters like floods and cyclones occur [14]. Most of the physical vulnerabilities spring from the fact that aged people move much less and tend to become ill chronically. Many participants indicated that older adults had trouble evacuating quickly and getting to safe shelters, and in cases where an individual was disabled or had mobility impairments and relied on others for transportation, the move could prove problematic. Limited medical support and the area being some of the most remote lands in Australia meant that many reported worsening their health conditions during and after climate events.

Older adults are economically hard hit, often with no regular income or savings. Furthermore, the recurring cycles of climate calamity make the economic strain even worse, destroying houses and fields repeatedly. Many older adults rely on family or social safety nets to survive since the inadequately small Old Age Allowance or disability benefits cannot cover basic needs, much less rebuild post-disaster. Due to financial insecurity, their vulnerability is accentuated by an inability to invest in adaptive measures.

Older adults become socially isolated because of weakened family ties and reduced involvement with their local support networks, which have always been important in their lives. Some participants mentioned they would become isolated since their younger relatives migrated to the cities for employment, to be closer to jobs. Limited access to information, resources, and emotional support makes social isolation this much more deadly during crises. Community networks do exist. However, their capacity to assist with large-scale disasters is often stretched to its limit.

4.2. Adaptation Mechanisms

Despite this, the community of older adults in Shyamnagar has developed multiple adaptation mechanisms reflecting traditional practices and extending support from the community. Many people were willing to prepare small emergency kits with food, clothing, and other things unrelated to the workplace because they were ready to do things immediately. It's an approach of generational knowledge built up over generations of coping with floods and cyclones, having taught many how best to protect their houses using makeshift barriers like sandbags or plinths. Herbal remedies, something traditional instead of lacking formal health care, are also utilised in managing health challenges during climate events [14].

The adaptation efforts of older adults are centrally dependent upon family, community, and local institutions. Family members provide both financial and evacuation support when possible. The IDI responses suggest that neighbours and extended community networks also provide vital aid, such as temporary shelter and repair assistance, after disasters. One of the main support systems to the non-close family members is the community-centred approach. These local adaptations can work; however, when events become too severe or too frequent, they cannot cope with the resulting event.

4.3. Resilience Strategies

In Shyamnagar, old age has a major effect on the resilience of older people both psychologically and socially. It is usually spiritual or communal practices that strengthen psychological strength or capacity to endure stressors and keep a healthy mind. Many of the participants claimed that the emotional worth of religious faith had helped them seek

stability and quality during a problematic life period. Mosques serve as a venue of joint prayer and as means of coping to aid in replenishing physical, spiritual and emotional resources and aid in maintaining resiliency among refugee and migrant women.

The informal networks in the community reinforce social resilience. In other words, family and community-based support systems are a limited safety net for older adults. It turned out that FGDs revealed that in emergencies, younger community members would often help their elderly counterparts with physical life tasks like building barriers, gathering resources and evacuation. The way they immediately help each other, often based on an informal network of local mosque committees or youth volunteer groups, is a local, informal safety net for facilitating resilience among older adults without appropriate formal support. The perceived strength of informal systems provides recognition of their importance and need for augmentation with additional resources and organisational support [15].

4.4. Effectiveness of Existing Support Systems

The presence and limitations of formal support systems, such as government or NGO interventions, were also revealed when addressing older adults' needs in the face of climate challenges. Some relief comes from government programmes, such as the Old Age Allowance and periodic emergency relief distribution. While it is not adequate to meet the needs of older adults in general, accessibility and timely distribution are critical issues during adverse climate events. Most participants complained of long bureaucratic hurdles to accessing aid and about the complicated procedures and aid drops, often very far away, leaving them unsupported.

Following major climate disasters, NGOs are more immediate and active in providing relief, temporary shelters, medical camps, and basic supplies. In addition to filling immediate gaps in governments' efforts, some NGOs have tailored their support to the standard but neglected need for psychological support for older adults. While NGO support is generally reactive and deployed in response to major acute events, lack of sustained support leaves older persons without consistent support when facing more regular but less severe climate events.

Both government and NGO systems have significant gaps, with little age-specific programme to meet the specific needs of older adults. This population is particularly vulnerable because there are no age-friendly accessible shelters, regular health screenings, or transportation for evacuations. There is also weak coordination among government bodies and NGOs to reach remote communities where older adults live efficiently. However, there remains a need for targeted, proactive interventions that are demonstrably protective of and supportive of older adults, whose populations are escalating in frequency and intensity of climate-related disasters.

5. Discussion

5.1. Interpreting Vulnerabilities Through Climate Adaptation and Resilience Theories

Such age-disaggregated evidence of vulnerabilities in coastal Bangladesh to climate-induced stressors shows how adaptation models usually inattentive to demographic detail have limitations. Resilience theory refers to resilience not as a feature of an individual but as the capacity of a system, dependent on various levels of support - family, community and institutional frameworks. The results of the research show that older residents are at great risk physically in the coastal areas as they have low movement, poor strength, chronic health problems, social isolation and poor socio-economic conditions. From the adaptive theory of resilience perspective, all these factors undermine person's adaptive capacity by cutting down peoples' access to resources, health services, and timely information in emergency situations, implying creation of support mechanism (which is supposed to enhance resilience) for vulnerable groups [13].

Other structural characteristics of structural inequities in social protection systems are also revealed in the study as chronic economic instability. Social Vulnerability Index (SoVI) determined the two interconnected vulnerability indicators that can be crucial to older adults in disaster-prone regions, poverty and age. The narrow coverage and access of social safety nets enriches the correlation in Bangladesh. The Old Age Allowance is a relief, of a sort, although not quite a relief, and is not constantly paid. When social safety nets are redefined to the specific needs of older adults living in coastal districts, where frequent access to readily available financial assistance and healthcare is on the order of the day, an inadequacy is implied.

5.2. Comparative Analysis: Insights from Global Case Studies on Coastal Resilience

A comparative analysis with similar global studies shows that older adults in coastal regions worldwide share common vulnerabilities. However, the intensity and multidimensional nature of these vulnerabilities in Bangladesh are exacerbated by unique socio-political and economic conditions. For instance, research in Florida's coastal towns post-Hurricane Katrina revealed significant age-specific challenges but emphasised the existence of more robust evacuation protocols and readily accessible healthcare systems for older adults. In contrast, the infrastructure and resources in Bangladesh's coastal areas are far less developed, with logistical obstacles that hinder older adults from accessing shelters and relief services effectively [19].

Comparing this study with resilience-focused research in Japan highlights the critical role of community networks in bolstering older adults' adaptive capacity. In Bangladesh, informal social networks are a vital source of support, but the

findings indicate that the recurring frequency of climate events strains these networks. Unlike Japan's formalised community networks for disaster management, Bangladesh's reliance on informal networks reflects a gap in integrating community-level support into official disaster management frameworks. Therefore, enhancing community resilience in Bangladesh will require formal recognition and reinforcement of these social structures, possibly through government partnerships with local volunteer groups and NGOs.

5.3. Policy Implications: Strengthening Local Government and Institutional Support Systems

The findings present clear policy implications, particularly the necessity for a more robust, older adult-centric approach within local governance and institutional support. The current reliance on broad, generalised aid packages fails to address the unique needs of older adults who are disproportionately impacted by climate events. The findings indicate the need for local government roles to transition from reactive relief distribution to proactive resilience-building initiatives. For instance, disaster preparedness training targeted at older adults and regular community-based health check-ups could be integrated within the Union Parishad's annual programmes to enhance the anticipatory resilience of this demographic.

While NGOs are essential in providing post-disaster aid, their sporadic presence limits continuity in resilience-building. Therefore, the policy should shift towards creating synergistic partnerships between the government and NGOs, where NGOs supplement government initiatives by providing specialised support such as mobile healthcare and mental health counselling tailored for older adults. Expanding the local government's capacity through training and resource allocation for emergency response, particularly in climate-prone areas, is equally critical. As identified, older adults are often hindered by a lack of access to accurate information on available resources; hence, policy should prioritise establishing accessible, dedicated communication channels for older adults, possibly using community-based focal points or digital tools.

5.4. Revisiting Resilience Frameworks with Age-Specific Adaptation Strategies

The results suggest that traditional resilience frameworks fall short in addressing age-specific adaptation strategies. For older adults, resilience is closely linked to psychological and social factors, which play a more significant role than physical resilience alone. Community solidarity and informal support systems have emerged as primary sources of resilience, yet frequent climate events overtax them. As such, resilience-building frameworks for coastal regions in Bangladesh should incorporate social-ecological resilience principles, emphasising ecosystem-based adaptation that includes ac-

cessible health services and mental health support [3].

However, this last piece, mental health resilience, is so often overlooked in disaster resilience but is vital. Climate events add to the recurrence of trauma and emotional stress that older adults experience and increase their vulnerability. As a future policy practice, administrators can draw on this research to institute counselling services and peer support groups for older adults as a standard part of disaster response. Services can be delivered with the support of local religious institutions or community leaders to enable older adults to regain emotional resilience through contact with familiar social contexts.

5.5. Addressing Structural Gaps and Building Long-Term Adaptive Capacity

This analysis finds that building resilience to ageing in coastal Bangladesh necessitates filling structural gaps in support systems and reorienting policies to underpin sustained adaptive capacity. It suggests a policy design failure in the response to government and NGO, and has caused a lack of response to the gaps in shelters and health to be unaddressed and age-specific. The establishment of mobile clinics can be significant means of making critical adjustments, and systems of financial support that are established to consider the cyclicity of the climate events should be established.

There should be a paradigmatic change in the resilience policy. An integrated model of resilience of older adults is established based on the findings and incorporates the age-sensitive healthcare, financial security, and supportive infrastructures through an integrated local governance model. With the escalating climate risks in Bangladesh coastal areas, this age-focused strategy will play a significant role in preserving the adaptability of the elderly people. Such targeted interventions are required, without which the resiliency of this vulnerable group will be weakened. We are constantly demanding radical rethinking of policies and strategic planning in the long term to develop an actual inclusive climate resilience framework.

6. Recommendation

In the susceptible coastal regions in Bangladesh, there is a need to develop the capacity-building in different governance and social infrastructure levels to promote the climate resiliency of the older adults. Next, both have to occupy a certain position; the local governments, NGOs, and even policy-makers are to create a support system that would supplement the needs of this population.

They have a unique opportunity to create a dedicated climate-resilient infrastructure for older adults. We could establish dedicated shelters equivalent to at-risk areas, with medical supplies and trained personnel ready to protect us against natural disasters. Since older adults have health and mobility constraints, integrating climate resilience into healthcare service is to ensure continuing service. Emergency medica-

tion supplies and personalised evacuation assistance plans for those most at risk could be part of routine health cheque-ups at local clinics with climate-related health risks in mind.

An age-inclusive communication system needs to be developed to improve the reach of emergency information. This would include disaster preparedness guides tailored to each person—social workers, community volunteers, local leaders—with information on resources, routes and protocols shared with them. In addition, creating community-based volunteer programmes, which empower young adults to assist older community members in a crisis, effectively evacuate and immediately access the essentials of survival, emphasises an intergenerational approach to resilience.

NGOs give crucial relief and recovery support in their absence, but they need to adopt more directly appropriate strategies for older adults. NGOs can, therefore, ensure timely assistance after disasters by expanding mobile health and psychological support services. Examples of psychological support include individual counselling or group sessions with older adults to assist them in dealing with the trauma and disorientation that usually ensue after catastrophic events. NGOs could institute mobile outreach by bringing resources to those who cannot travel to central distribution centres because of isolation and limited mobility.

Especially in helping small-scale income generation, NGOs are provided with the capacity to facilitate livelihood restoration efforts that are explicitly geared toward older adults. Training these programmes on traditional crafts, assistance in setting up local markets, or the giving of mini grants on stand-alone projects is brilliant in stabilising economic stability following disasters to this group. Inclusion of efforts by both NGOs and local government agencies can further improve such efforts by enabling the NGOs and local government agencies to regularly coordinate their efforts to enable the emergency response efforts be more effective and the use of resources be rationalised to suit the prevailing conditions of older adults.

In the meantime, it is the responsibility of the policymakers to develop those desired measures into a strong national climate policy framework. This would entail writing older adult needs as the key aspects of national adaptation policies as indicated by the allocation of priorities with regard to resources and establishment of infrastructure that facilitates age sensitive health and social services. Given the fact that ageing is a high health risk, an ageing resilient climate sensitive health program may prioritize emergency medical inventories and chronic disease control highly on the list of services in the health centres located in the coastal regions to be able to reintegrate the older people in health services during a climate event when emergency supplies may be essential.

This should be provided in the form of long term funding mechanisms that would be committed to local level resilience-building effort. Physical technology retrofitting the homes of older adults and placing flood barriers, e.g. should receive permanent support in finances by the local govern-

ments so as to help the communities become more resilient to the recurrence of the extreme weather. Further policy initiatives would also be enhanced by the research on age-specific needs of adaptation (e.g., the study of older adults social support networks or physical needs of older adults in evacuations), and such policy interventions can also be informed by the evolving problems that climate change is presenting to this group overtime.

The resilience effort can include community knowledge and conventional practices that can enhance the sustainable success of community-based organisations efforts. Resilience-related events organised at local religious and cultural locations such as mosques or community halls are also useful in ensuring the resiliency education on climate risks is accessible to the older generation. The local leaders are vital to the process and can be assisted by communal funds allocated towards resilience which can offer important flexibility to the way communities respond and distribute resources during a crisis. This strategy operates at a local level, which takes into account cultural and social interactions of the communities within all the above-mentioned aspects, where a fully embedded model of resilience within the community is implemented.

This should be institutionalised by conducting regular monitoring and assessment on behalf of the national policy-makers. The success of other resilience-building activities will be monitored over time and across different communities based on feedback loops provided by older adults and community leaders in order to support and improve support. Setting up of quick response emergency assistance funds to provide emergency aid immediately after a disaster will be able to disperse the economic strain on older adults quickly, covering repairs to their houses, food, and health insurance premiums and hasten recovery of a path.

7. Conclusion

In Bangladesh, the elderly in the coastal areas are at their most vulnerable level due to the threats presented by climate change and the paper highlights this vulnerability and the necessity of policies and adaptation methodologies to enable them to cope. This group has an issue-based intersection between physical, economic, and social aspects to a significant extent depended on the exposure to frequent natural catastrophes such as floods and cyclones. Older adults are already vulnerable due to limited mobility, health issues, financial issues, and social isolation, and as a population, they are among the most vulnerable in coastal communities. There is some informal support offered by families and community solidarity but they are unable to do so much to manage the needs that are brought about by increasing climate impacts.

There is no substitute for tailored responses to the specific population needs of older adults: doing so protects one of our nation's most vulnerable segments while increasing local coastal communities' resilience. Critical are enhanced support

systems both from governmental and non-governmental entities. Alongside formalised social safety nets, dedicated infrastructure (including accessible shelters and healthcare services) is needed to provide more reliable aid in the midst of and aftermath of climate events. In addition, promoting long-term resilience requires older adults to develop adaptive capacities, for example, through emergency preparedness training and healthcare tailored to their physical limitations.

This analysis shows a clear need for targeted resilience strategies for older adults within broader climate adaptation frameworks. Integrating age-sensitive policies in climate resilience planning would limit the immediate and long-term challenges of older adults and support Bangladeshi coastal social and economic stability. Once resources, infrastructure, and policy innovations are prioritised and aligned with older adults' distinctive needs, local and national authorities can ensure a better, more equal and more effective response.

Abbreviations

FGD	Focus Group Discussions
IPCCAD	International Centre for Climate Change and Development
IDI	In-Depth Interviews
IPCC	Intergovernmental Panel on Climate Change
KII	Key Informant Interviews
NGO	Non-Governmental Organization
PCC	Panel on Climate Change
UN	United Nations

Author Contributions

Md. Zaki Faisal is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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