UNIVERSITY OF GHANA

DEPARTMENT OF GEOGRAPHY AND RESOURCE DEVELOPMENT

ASSESSING SOCIAL COHESION AND RESILIENCE OF COASTAL COMMUNITIES AFFECTED BY TIDAL WAVE RELATED DISASTERS IN THE VOLTA REGION

BY

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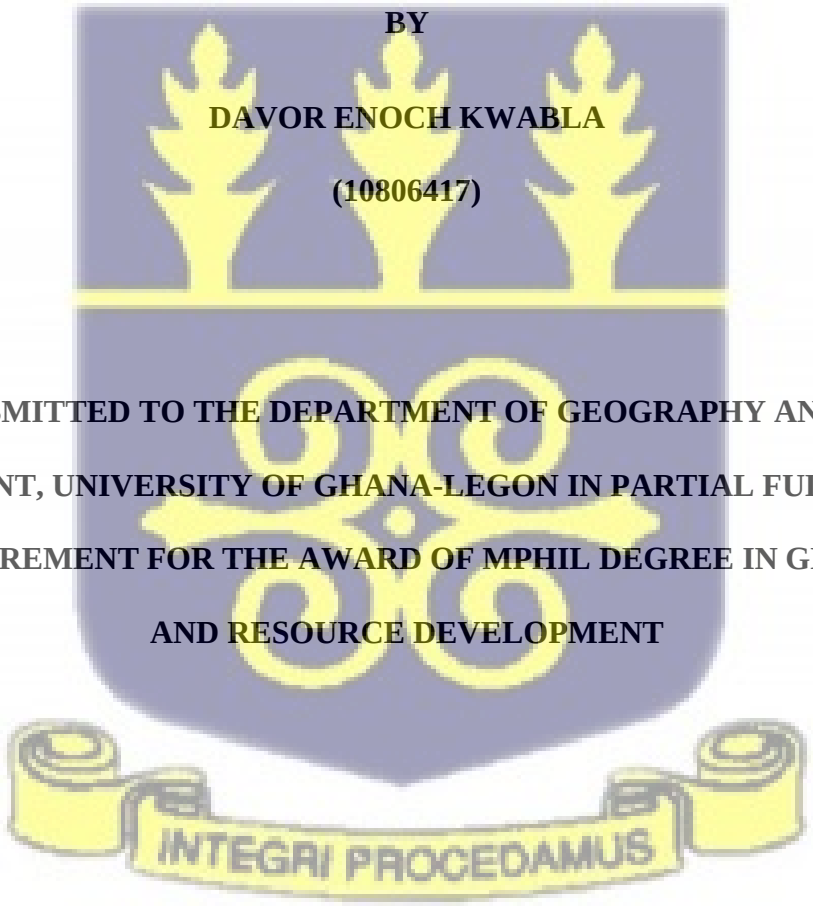

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DECLARATION

I hereby declare that this research work represents my own and has not been presented in any other institution for award of degree. The information derived from the literature has been duly acknowledged in the text and list of references provided.

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DEDICATION

I dedicate this thesis especially to my two Angels Miss. Felicia Zoyelley and Miss. Martina Mensah for holding me in high esteem, not forgetting of my children especially my lovely daughter Ella Hornam Davor and Alvis Sedem Davor (son) for, it is upon their memories that I derived comfort, renew my strength and remained sustained throughout every disheartening moment.

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LIST OF ABBREVIATION

IDRM	Integrated Disaster Risk Management
DRRM	Disaster Risk Reduction Management
DRR	Disaster Risk Reduction
HFA	Hyogo Framework for Action
CART	Community Advancing Resilience Toolkit
FM	Frequency Modulation
SFA	Sendai Framework for Action
BIC	Burkner's Index of Cohesion
IPCR	Indicators of Perceived Community Resilience
NCI	Neighborhood Cohesion Index
DFID	United Kingdom Department for International Development
UNISDR	United Nations International Strategy for Disaster Resilience
USA	United States of America
FEMA	Federal Emergency Management Agency
SAMHSA	Substance Abuse and Mental Health Services Administration
SPSS	Statistical Package for Social Sciences
SDWP	Sea Defense Wall Project
SD	Standard Deviation

NADMO	National Disaster Management Organization
NHIS	National Health Insurance Scheme
PPMC	Pearson Product Moment Correlation
SES	Social-Ecological Systems Resilience
PDCRM	Phases of Disaster Collective Reactions Model

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ABSTRACT

The insurgency of natural hazards as a result of climate change in recent times are causing havoc in vulnerable communities *thus* became a major source of disasters across the globe. In coastal communities, tidal-wave hazards in particular are the major causes of disasters, resulting in the loss of living/ habitat space, destruction of infrastructure, and loss of economic livelihoods among others. This study focused on the assessment of social cohesion and community disaster resilience in some selected tidal-wave affected coastal communities in the Volta Region of Ghana. Questionnaire administration was combined with focus group discussion to collect data in each study community. The Burkner's Index of Cohesion (BIC) and Index of Perceived Community Resilience (IPCR) were used to evaluate social cohesion and resilience of study communities respectively. Analysis of the data was done using descriptive statistics and one-way ANOVA to determine the significant differences in the intensity of BIC and IPCR between the communities whiles the FEMA model (figure 1) was used as temporal reference point to analyze the recovery cycle of communities that have experienced disaster at different time period and places.

Effective usage of social networks, the practice of neighborliness and social solidarity among community members were observed to be the major attributes to the moderate level of social cohesion experienced in the various study communities. As a result, resilience was found to be positive in each of the study communities but not adequate enough to build back better within the shortest possible time without a major external support. The study also identifies some key indicators relative to each study community that need to be improved upon in practical terms to enhance the community's social cohesion aspirations in other to help build a stronger disaster resilience in rural poor communities across the diaspora.

CHAPTER ONE

GENERAL INTRODUCTION

1.0 Introduction

In the field of geospatial predictive modeling, settlements are "a city, town, village or other agglomeration of buildings where people live and work" (Dutta et al., 2011 p.4). As population increases, it brings about new settlements even at hazard prone areas due to life pressures (Renz et al., 2012; Arnold, 2002). This may result in the creation of vulnerable conditions and disasters.

The concept "disaster" has evolved overtime in respect to the use of key terms such as risk reduction, adaptation strategy, vulnerability, coping capacity and resilience and has gained global endorsement among scholars and academics (Elwood, 2009; Nuon et al., 2017; Plan, 2010; Shook, 1997; Wouter et al., 2019; Yoon et al., 2016).

Current literature allude to the various paradigm shifts in disaster risk management adopted over the years and iterated in policies and actions for global disaster risk management at the local, national and international levels (Federation & Framework, 2004; Manyena, 2016; United Nations, 1994). These includes The Yokohama Declaration on Disasters in 1974; The Hyogo Framework for Action (HFA) in 1990 and the current Sendai Framework (SF) operational since 2015 through to 2030 and were championed by the United Nations International Strategy for Disaster Risk Reduction (UNISDR) (UNISDR & WMO, 2012).

In the words of Pantti et al (2012) disasters are cataclysmic events frequenting in todays globalized world. Disaster events are characterized with injury, destruction of homes and properties, loss of livelihood and human life to which one would require external assistance. Disasters often proceeds out of hazards from both natural and anthropogenic sources impacting on vulnerability.

A global report on disasters indicate that, natural hazards related disasters killed averagely 60,000 people every year globally and has accounted for 0.1 percent of total death over the past ten years (United Nations Office for Disaster Risk Reduction, 2015).

The predominant natural hazards related disasters emanates from storms, heat waves, floods, disease outbreak, landslides, droughts, volcanic activities and earthquakes being the leading events globally (Wouter et al., 2019). According to Wouter et al (2019), disasters originating from natural hazards such as Cyclones Idai and Kenneth has affected over three million people in Malawi, Comoros, Mozambique and Zimbabwe which resulted in the death of 1,294 people with several economic, social and physical assets left unquantified only in March and April 2019.

In coastal regions globally, tidal-waves remained the main source of hazard that often result into disasters among vulnerable coastal settlers.

Tidal-wave is projected as a frequently reoccurring shallow water wave that occurs as a result of gravitational interactions between the Sun, Moon, and the Earth" *(National Oceanic and Atmospheric Association., 2021)*. The strongest tidal-wave was registered in the United States of America and it reached a height of 524.26 meters on 07/10/1958 to which lives were lost, many injured, homes were destroyed and economy was shuttered (Duong et al., 2016). Hazards resulting from tidal-waves are expressed in the form of floods, windstorm, and coastal erosions. These often become a threat to people's life and property in vulnerable coastal communities depending on time, speed, intensity and magnitude of the event.

In Ghana, tidal-wave related disasters accounted for displacement of about 10,000 residents of coastal communities, loss of over 5000 built structures between 2019 and 2021, whilst over 367

km^2 of land surface area was annexed by the sea and the lagoon since the year 2000 (*Keta Assembly Press*, 2017).

In the advent of high scalable nature of disasters in the presence of climate change and variability in vulnerable communities, social cohesion become the first point to resilient approach. Most government have over the years recognized disaster as un-alienated components of human society and have adopted disaster resilience models to help increase capacity among communities and individuals in other to deal with the onset of disasters and to also undertake successful recovery programs (Djalante, 2012; Mannakkara et al., 2014; Preston, 2016; Townshend et al., 2015).

In the case of coastal areas in Southern Volta, there have been some sort of interventions in the form of constructed sea defense walls and insertion of groins (Awo et al., 2013; Boateng, 2009). Resultantly, some communities are advancing to recovery whilst others still remain susceptible to the impacts of the tidal-wave hazards.

Although there are several heurists of disaster studies on the selected municipalities of interest to this study, they were much on disaster vulnerability, adaptation strategies, and disaster risk assessment. As a result, this study sort to explore social cohesion and its relationship with disaster resilience in coastal communities that have experienced tidal-wave related disasters. This was done through a comparative analysis of proxy indicators of both social cohesion and disaster resilience in four tidal-wave affected coastal communities. The findings were contrasted after methodical approach to provide an in-depth understanding of how spatial differences influence cohesion.

1.1 Problem Statement

Natural Hazards impacting vulnerability (Cardona, 2011) over the years have fronted the destruction of economic livelihood's, increased poverty and oppressed the normal functioning of people who lived in hazard prone areas increasing their susceptibility to disasters.

In the advent of climate change and variability, tidal wave disaster become prevalence among coastal residents/ communities. In the case of Keta and its neighboring districts, tidal wave hazards raised havoc on many homes (Appeaning Addo & Adeyemi, 2013) with recent disaster recorded on 10th June, 2021 prior to this studies. Affected areas includes Agavedzi, Adina Amutinu and Salakope where over 1,000 residents and about 135 homes were affected and individuals rendered homeless (*Keta Assembly Press*, 2017). According the Keta Assembly Press, these has led to the destruction and halting of economic livelihood activities such as fishing, fish mongering and both inter and intra community trade (*Keta Assembly Press*, 2017). According to the Keta watch news agency report on 10th June, 2022, social amenities such as schools, churches, road networks were destroyed whiles social services such as funerals, marriage ceremonies, and school attendance among others were brought to a halt. Generally, tidal-wave events are more frequent in communities such as Kedzi, Fuveme, Adzido/ Vodza, Horvi, Blekusu, Salakope, Amutinu, Agavedzi, and Adina. Furthermore, there are also evidence of coastal erosion and occasional flooding that often result to huge sand bars depositions on roads and in open spaces of public agglomeration (*Keta Assembly Press*, 2017). These also reduce both inter and intra community movement which interns affect emergency responses.

The devastating nature of tidal-wave actions in the study areas even though has attracted the attention of the central government and other benevolent organizations, much has not been done

to salvage perineal flooding and disasters among coastal habitants as population increases in such a fragile environment amidst higher level of associated poverty.

Other triggering effects are the assimilation of the legendary historical site of fort Prinzenstein which was built since 1784. This has deprived the local government from generating income since the site was formally open to tourism.

Amidst these challenges, the residents and inhabitants of these coastal towns who had experienced disasters of different magnitude continue to live as one community whilst hoping to receive government intervention to proffer a lasting solution to the menace. They might as well have some unique strategies that they employ to cartel the impacts. It is upon this strength that this work seeks to assess the social cohesion and its correlation to disaster risk resilience within four famous communities that have experienced tidal wave disasters.

Although there have been several disaster publications and documentations made on the coastal area under study, most of it focus on vulnerability and adaptation studies (Addo et al., 2011; Adjibolosoo, 2017; Appeaning Addo & Adeyemi, 2013; Awo et al., 2013; Nortsu, 2018), to which not much emphasis has been directed to the assessment of disaster resilience and social cohesion.

1.2 Significance of the Study

The study aimed at offering understanding on the efficacy to which social cohesion is applied as a correlate to disaster resilience and its usefulness in building community resilience in communities that have experienced disaster at different places. In line with these, the study focused on the use of best practices to identify appropriate characteristics/ indicators relative to each study community and determine how these unique characteristics/ indicators positively or negatively affect

community disaster resilience. The study advocated for the adoption of positive indicators that help enhance social cohesion in each community whiles suggest for the need to improve upon lagging indicators for a very strong community social cohesion and disaster resilience.

As a result, the study focused on assessing social cohesion in the form of relationships between individuals and among communities and to examine the type of relationship that exist between social cohesion and community resilience under a multi-variate approached analysis. The study also compares demographic characteristics across communities that has indicated strong social cohesion whiles drawing on similarities and differences that prevailed among communities. Principally, the study was carried out to erudite lesson on best community practices that foster social cohesion whilst updating communities to hold on to those best practices that aimed at building resilience.

Findings from the study would be required to elicit the positive adaptive approaches, enactment of beneficial laws, traditional and religious beliefs and practices, realistic institutional measures, construction and designing of infrastructure, provision of health and educative facilities, and financial supports such as grants and donation and affordable loans to meet the societal needs of the study communities. In addition, achievements from the study will open more rooms for future research and scholarly work of reference in the fields of research and academics.

1.3 Study objectives

The main aim of this research is to assess community disaster resilience and to probe the relationship between social cohesion and disaster resilience in selected coastal communities in Ketu South and Keta Municipalities.

The specific objectives to realize the above main objective are stated as follows:

1. To evaluate community social cohesion and establish its relationship with disaster resilience.
2. To assess the strength of social cohesion in selected communities for disaster resilience.
3. To assess differences between social cohesion and resilience at different localities.
4. To examine the determinants of disaster resilience in the various communities.

1.4 Research Questions

The main question for this research is to find out the extent to which social cohesion predict or determine the level of disaster resilience in tidal-wave affected communities within Ketu South and Keta Municipalities.

Sub-research questions are;

1. What relationship exist between community social cohesion and community disaster resilience?
2. What is the degree of social cohesion for disaster resilience in each community?
3. What are the similarities and differences between social cohesion and resilience at different places?
4. What factors accounted for the type/degree of resilience in each community?

1.5 Proposition/ Hypothesis

1. The study is based on the assumption that, the ability of coastal communities to build resilience after experiencing tidal-wave related disasters depends on the social cohesion of affected community.
2. The study proposes that social cohesion is a correlate to disaster resilience and that the strength of social cohesion is similar across geographic space.

1.6 Scope of the study

The study focuses on community social cohesion and disaster resilience in four distinct tidal-wave disaster affected coastal communities in the Volta Region. Social cohesion is conceptualized in this study to include social ties within community groups most associated with family relationships and place of attachment (bonding), networking abilities made up of economic and other ties that are external to the community (bridging), and the interaction between social groups and community networks with the governing authorities, state organizations, and non-state local institutions (Adger et al., 2005) whilst disaster resilience is "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR & WMO, 2012 p.3). This is expanded to include indicators such as community leadership, community togetherness, community network, mentality outlook, ability to cope with division and change, and community problem solving to which all indicators were integrated as ways of expressing sense of community.

1.7 Research philosophy and orientation

Pragmatism is an ideal philosophical approach to the study for, the concept of disaster is changing frequently as noted in the paradigm shifts of Disaster Resilience and to meet these changing needs requires no other than pragmatic views that allow the flexibility to use other possible approaches to meet study specifications. Pragmatism as a philosophical movement began in the United States around 1870 and its development was credited to Charles Sanders Peirce. In his view, ideas of inquiry should be based on real doubt, but not just a mere verbal or hyperbolic doubt and established that, for one to better understand a conception in a realistic manner, one must consider the practical effect of the object of his/her conception. Then, one's conception of those effects is the whole of his/her conception of the object. It therefore equates any conception of an object to the general extent of the conceivable implications for informed practice of that object's effects.

Pragmatism as a method, offer an experimentational mental reflection arriving out of conceptions in terms of conceivable confirmatory or otherwise of circumstances. It is also receptive to the generation of explanatory hypotheses, and conducive to the employment and improvement of verification. Much of significance to this study was its ability to allow explanatory hypotheses as outside the usual foundational alternative between deductivist rationalism and inductivist empiricism.

1.8 Organization of thesis chapters

The thesis is organized in 5 chapters and debriefed below were the basic contents. Chapter 1 provides a general introduction out of which problem statement, scope and study philosophy were drawn. The chapter also include study significance, objectives and research questions.

Chapter 2 discusses the related literature of the study and comprises definition of some relevant themes of the topic under study. The chapter also discusses theories of social structure, disaster models and delineates the conceptual framework from the study.

Chapter 3 is dedicated to materials and methods used for the study. It includes the study location, demographic distribution, the housing types, economic characteristics, geology and soil as well as social and political administration. On the other hand, methodology contents include sampling techniques, data acquisition, questionnaire administration and data analysis. This eventually led to chapter 4. This chapter contain results obtained from the field work in the form of disaster events, demographic information, and social cohesion variables. Others include index of perceived community resilience and some covariates used as predictors of resilience. In addition, the chapter also discusses the result in line with study objectives which includes the relationship between social cohesion and community disaster resilience, the strength of correlation between social cohesion and community disaster resilience, the similarities and differences between social cohesion and community disaster resilience, and finally the factor that have accounted for the type of resilience in each study community.

Chapter 5 is the last section of the study and it centered on key findings, recommendations and study conclusions. In the key findings was summary of executive findings, findings from the covariates used for disaster resilience, as well as findings pertaining to the four objectives.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

This chapter focus on the review of relevant literature as expressed by authorities in relation to tidal-wave hazards and disaster risk resilience as conceptualized in academic discipline of Integrated Disaster Risk Management (IDRM). The review is to outline relevant academic and scholarly approaches to study ways in which people overcome disaster events and also to assess how community cohesion influence disaster risk resilience. The review of materials was done from information available in books, magazines, journals, Newspapers, hand-outs, unpublished materials, internet (on-line) audio and video medias (Radio FM and Television Stations) and research works that relates to the topic understudy. This chapter includes a review of relevant themes, theoretical concepts and conceptual frameworks.

2.1 Review of relevant themes

It is a bit challenging when considering propounding a definite definition on some of the main terms conceded in line with this study due to the complexity and evolving nature of knowledge, theories and school of thoughts in the related field of studies. Meanwhile, concepts such as disasters, hazards, tidal waves, vulnerabilities, disaster risk, exposures, adaptation strategies, and disaster risk resilience were premiered in definition as follows.

2.1.1 Disaster

Since the introduction of the concept Integrated Disaster Risk Management (IDRM) as an academic discipline, many scholars and publishers have myriad definitions to the term 'disaster'. (Appeaning Addo & Adeyemi, 2013; Cannon, 1994; Cardona, 2011; Djalante, 2012; Lechner et al., 2016; Manyena, 2016). According to some scholars, disasters are those events that negatively affect the operation and functional capacity of the affected local communities and rendered them inept to cope with the impact. Disasters occur when hazard(s) strike vulnerable human populations compromising economic and social assets, as well as destruction of physical structures and sensitive components of the environments (Plan, 2010; Shook, 1997).

In the words of Pantti et al (2012), disasters are cataclysmic events frequenting in todays globalized world. In his view, disasters take place everywhere and has assumed a global dimension but disasters vary in terms of intensity and magnitude based on hazard type and geographical location.

The United Nations International Strategy for Disaster Reduction UN/ISDR, (2004) defined disaster as "a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources" (cited in Cardona, 2011 p.22).

Whiles these definitions create a true picture of disaster event however, meaningful deductions from written literature point out that, peoples' life and property including their economic livelihoods comes under threat during disaster events to which the cooperate world is required to render support to affected individuals or communities so that, they can cope, adapt and possibly build resilience (build back better).

The spectrum of disaster effects varies in intensity and magnitude across all sectors of life being economic, social, environmental, human, and physical. To build resilience, the Sendai Framework for Action (SFA) seems to recognized and precluded human suffering, emotional stress and traumatization among affected individuals Manyena (2016) with the view that, people's home and businesses are often subjected to destruction with accompanied hardship. According to McEntire et al (2010) disasters take place when hazard impact vulnerability. Seneviratne (2015) observed that, disasters will be minimized if not eschewed when there is considerable reduction in exposure to vulnerability and increase preparedness for disaster risk. But on the contrary, the Hyogo Framework centralized on disaster recovery while Sendai opted for the need to build disaster resilience from the local level through to the national and international front (Gamaralalage & Premakumara, 2015).

2.1.2 Hazard

According to Ram et al (2019), a hazard is a phenomena or any elements composed of negative externalities with weighted potency capable to cause harm and are very dangerous to human population . It is a condition that can compromise human activities and may be life threatening and can even result to injury, death, and loss of property when impact vulnerable community. In other words, the term, hazard is a scalable phenomenon that exert negative causalities to man. Hazards may transform into disasters only in the presence of vulnerability where man and resources become subjugated to nature. In such events, a disaster is also said to occur when human population is affected on a large scale (Singh et al., 2018). Hazards emerge from anthropogenic sources as well as natural sources, and manifest in several risk forms. The natural hazard source is exacerbated when there is a blend in anthropogenic interruption with the natural set-up of the environment. For

example, the felling dawn of trees may result to a reduction in oxygen concentration in the atmosphere compromising air quality while, fumes from the exhaust of vehicle exacerbate the depletion of the ozone layer. In disaster risk reduction, hazards of natural origin may be environmentally related and expressed from geological, hydrological, meteorological, oceanic, biological, and technological sources, and may act as an individual or sometimes acting in combination. There has been quantitative description of hazards because of its varied form of expression in magnitude and intensity at different places in time.

Typical to this study is tidal-wave hazard. According to *National Oceanic and Atmospheric Association* (2021). The gravitational interactions between the Sun, Moon, and Earth on the ocean is argued to remain the potential source to the frequent reoccurring of shallow water wave and are referred to as tidal wave. Although some author's inconspicuously inter-changed tidal wave with tsunamis. Zurbenko & Potrzeba (2010) posit that, technological revolution has led to the discovery of new methods and designs which has over the years facilitated the detection of tidal-wave. With this, Antolinez et al (2015) observed that a rise and fall of ocean tides with equal period are strongly distorted as they transmit into estuarine systems. This distortion create difference in flood/ebb duration within the estuary and referred to as asymmetry (Djalante, 2012).

According to *National Oceanic and Atmospheric Association* (2021) tidal waves are naturally occurring phenomena which has uneven locational impact. This uneven impact is noted to have occurred due to nonlinear effects of tidal interaction with local topography. Antolinez et al (2015) posit that nonlinear advection coupled with "cross sectional constraints and quadratic friction lead to the generation and development of over-tides and compound tides" p12. This become a potential source of natural hazards to coastal dwellers. Antolinez et al (2015) could not disagree further as they provide an explanation concerting that, tidal distortion and asymmetry would occur in the

presence of astronomical combination with generated shallow-water. De Dominicis et al (2018) posit that 'when tides progress upstream, the amplitude of tidal oscillations depends highly on the change of water depth as the crest of high water may travel more rapidly than low water due to the greater depth of the crest. The tidal bore occurs at the distortion limit when the estuarine configuration causes the crest being steep enough to catch up with the trough' (Antolinez et al., 2015 p.775). According to Antolinez et al (2015p.775-791) 'a storm tide is a water level rise or fall caused by the combined effect of the storm surge and an astronomical tide. A storm surge depends on many factors, such as the tracks of typhoon movement, the intensity of typhoon, the topography of sea area, the amplitude of tidal wave, the period during which the storm surge couples with the tidal wave'. The rise and fall of the tides are observed to have a significant effect in the natural environment and thought to have created an indelible impact on marine world of business. Sea-level rise is a threat to coastal communities their long-term sustainability of valuable ecosystems such as coral reefs, salt marshes and mangroves that constituted the natural environment (Lawler, 2009).

Tidal-waves over the years brought forth flood and other associated hazards accounting for several disaster events along coastal communities across the globe (Amponsah, 2004). The significance of asymmetry in flood and ebb tidal velocities to the net sediment transport coupled with its effects on human life and property in an emergency situations leads to considerable research on disaster risk management, vulnerability assessment and resilience studies on both single and multi-hazards spectrum (Bowornwathana, 2005; De Dominicis et al., 2018; Fitzmaurice et al., 2017; Greene et al., 2015a; *National Oceanic and Atmospheric Association*, 2021; Pathak et al., 2020; Quataert et al., 2015).

2.1.3 Exposure

Exposure refers to the nature and extent to which a system is exposed to natural hazards (Preston, 2016). This according to Schafer et al (2008) refers to people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses. With reference to the above definition, the term ‘‘exposure’’ according to UNISDR (2017, as cited by Garnica-Peña et al., 2021) is the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas. The level of exposure is largely determined by several underlying factors such as bad governance, fragile economy, low level of technology, low level of education, and luck of strong and functional institutions (Garnica-Peña et al., 2021). Risk exposure can be managed by addressing residual risk Garnica-Peña et al., 2021). Furthermore, Metternicht et al (2014) also explains that, exposure is not limited to only physical climatic conditions such as temperature and precipitation but also to related factors such as altered fire regimes, shifts in vegetation types, increased salinity due to sea level rise, location of the species or system on landscape etc. For example, coastal communities may have high exposure to rising sea levels, salt-water intrusion and inundation than inland communities (Nicholls et al., 2007). According to Nicholls & Cazenave (2010), the continues increase in sea level rise will result to high exposure of coastal communities and habitats to the various associated negative externalities such as coastal erosion, perineal flooding among others. This notwithstanding, Nicholls & Cazenave (2010) identify the misplaced uses of vulnerability and exposure in disaster risk determination. It is clear that, as much as exposure may be a necessity, it may not be a sufficient determinant of risk. According to Nicholls & Cazenave (2010), it may be obvious to be exposed but not vulnerable. For example, by living in a floodplain but having sufficient means to modify building structures

and behavior to mitigate potential losses. Contrarily, to be vulnerable to an extreme event required the necessity to be exposed.

2.1.4 Vulnerability

Vulnerability is one of the defining components of disaster risk. According to The United Nations International Strategy for Disaster Reduction (UNISDR, 2009) defined vulnerability as "the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard." (Kelman, 2018 p.181). Vulnerability is noted by L et al (2013) to be the human causal factor of disasters and activated through a range of economic, social, cultural, institutional, political, and psychological processes that shape people's lives and modify the environment within which they dwell. Though, this assertion is true, the alternate use of terms such as 'predisposition', 'fragility', 'weakness', 'deficiency' or 'lack of capacity' in place of vulnerability has altered the meaning of the concept to different people in time and place. Some definitions of vulnerability have included exposure in addition to susceptibility to harm (Cutter et al., 2008). However, Cardona (2011) made it abundantly clear that exposure is separate from susceptibility elements of vulnerability since it is possible to be exposed but not vulnerable, whilst at the same time not susceptible to natural hazards. This assertion did not stop new divergence views over the meaning of vulnerability and as a result, (Cutter et al., 2008; Mayunga, 2007) posit that, to understand vulnerability, one requires more than analyzing the direct impacts of the hazard. The scope of vulnerability was widen to include environmental and social conditions that limit people and communities to cope with the impact of hazard not simply restrictive to poverty although the poor stand the higher chance to be more susceptible to disasters (Arnold, 2002).

Poverty is seen as both the driver and consequence of disaster risk especially in nations that lack the political will to ensure stringent risk governance system whiles economic pressures compel people to live in unsafe locations and encounter the brunt of hazardous conditions. Poverty and other multi-dimensional factors and drivers such as poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management may account for vulnerability and susceptibility to the impacts of hazards yet, not limited to people of certain age groups such as children and the aged, gender (men and women), the disables, migrants and displaced populations.

Many of the underlying drivers of vulnerability including poorly managed urban development are increasing, and have resulted in an increased vulnerability across many countries and regions of the world (Kotzee & Reyers, 2016; Diagne et al., 2003). But irrespective of the source of vulnerability being physical, social, economic, and environmental dimensions, Singh et al (2018) noted that wealthier, and well governed countries were able to reduce disaster risks and bit resilience. For example, Japan and China have exhibited rapid economic growth in the last few decades the means of effective disaster planning and adaptation of best disaster risk mitigation strategies to reduce vulnerability (Yoon et al., 2016).

2.1.5 Adaptation

According to Gough et al (2019), adaptation is the effort one make to relate well with the continues changes that take place with both the human system and the natural environment. Adaptation is therefore the ability for one to device any possible means to overcome the impact of disaster and also response adequately to any stimuli arising from disasters.

According to Preston (2016) adaptation may be anticipatory, reactive, and autonomous. To him, adaptation may not necessary be a conscious act in response to disaster stimuli but are necessitated by ecological changes in the natural environment and automatically by the human systems. On the other hand, adaptation take place in the presence of a deliberate policy decision, through awareness creation of possible dynamic changes.

2.1.6 Mitigation

In the context of climate change, mitigation refers to an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases (Garland, 2003). The forestry sector is known to have huge potential to contribute to the mitigation of the global climate change through carbon sequestration and often have a cost advantage over other mitigation strategies. However, in the context of disaster risk reduction management (DRRM), mitigation is the process of reducing the potential adverse impacts of both physical hazards and hazards from human-induced sources through actions that lessen the hazard, reduce exposure, and prevent vulnerability (Adger et al., 2003).

2.1.7 Adaptive capacity

Adaptive capacity referred to the ability of a system to adjust to extreme conditions such as climate change variability to moderate potential damages, deal with shocks and also to take advantage of opportunities so as to overcome extreme conditions (Vaitla et al., 2012). For a human system, adaptive capacity may be influenced strongly by a few key characteristics, or by a wide range of social characteristics. These characteristics includes but not limited to social cohesion, education, access to technology, and past experiences with hazard events (Adger et al., 2003). For example,

a community with knowledgeable leaders in disaster concepts will be in a better position to promulgate adequate laws, programs and projects to help build the adaptive capacity of the subjects. A household that has diversified sources of income and supplementary livelihood options would likely have higher adaptive capacity to the impacts of disaster than those that do not have (Ainuddin et al., 2012).

2.1.8 Disaster risk

Risk is the situation involving exposure to danger whilst disaster risk is the expected damage and loss (deaths, injuries, property, livelihoods, economic activity disrupted and damage to the environment) due to a particular hazard (Garland, 2003). A set of factors posed limitation to individuals, households, organizations and the community to protect themselves, and cope with or recover from the impact of disasters (Teitelbaum et al., 1991). In view of this, Mannakkara et al (2014) observed that, vulnerability is in proportional relation with disaster risk and as a result suggest that a risk of a social group exposed to a particular hazard can be reduced by minimizing their vulnerability and building a strong coping capacity.

Disaster Risk Reduction (DRR) is the process of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (Béné et al., 2012).

All are at risk yet there are variations throughout all levels been the country, communities and even among individuals depending on knowledge on the hazards, coping capacity and adaptation strategies. Disaster risk is therefore, the level of exposure to hazard.

2.1.9 Disaster Resilience

Resilience is a concept that gained its grounds in the subject of social-ecology Berkes et al (1998) but has been emerging in the fields of community development (Holling, 2013; Kulig et al., 2015; Norris et al., 2008). According to the United Nations Office for Disaster Risk Reduction UNISDR, resilience is defined as "the ability of a system, community or society exposed to hazard to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including the preservation and restoration of its essential basic structures and functions" (UNISDR & WMO, 2012 p.3).

A disaster resilient community has also been described as one that functions well under stress, has successful adaptation, is self-reliant and has social capacity, Council of Australian Governments (2011 cited by Morley et al., 2014).

Other authors have described community disaster resilience as having the "capacity or ability of a community to anticipate, prepare for, respond to, and recover quickly from impacts of disaster" (Mayunga, 2007, p. 4). Resilient communities are able to deal with crisis in a manner that reduces the impact of disasters while developing a stronger position to attend to other events that may occur. Specific traits of a disaster resilient community include having people that understand potential risks for themselves and their community and being willing and able to work together to prepare for and deal with emergencies. Finally, the community also has an emergency management plan that is adaptive and flexible which will lead to an appropriate response from a strong volunteer sector (Townshend et al., 2015b).

A community resilience study in a cross-cultural set-up posits that, community is capable of building resilience only if the voices of the people are heard and also be allowed to participate in public events (Cutter et al., 2008, 2010). Rolfe (2006) added that the public's participation in social

activities is also their contribution to building social support networks, which they draw on to meet their needs and the needs of their families. This was later iterated by Norris et al (2008) when he described resilience as a process that depend on resources of the community to overcome emergency disaster conditions. As a result, a number of different frameworks have been designed and grounded in theory to describe the processes of resilience (Marzi et al., 2019; Mayunga, 2007; Parsons et al., 2016; Saja et al., 2018a, 2018b; Sherrieb et al., 2010) and were useful to this study although measurement of these concepts are sometimes problematics (Cutter et al., 2008, 2010b).

2.1.10 The concept of community social cohesion

In line with all reviewed definitions and discussions on resilience, disaster resilience is observed as a process rather than an outcome (Townshend et al., 2015). Past studies indicated that a disaster-resilient community has several potentials and traits, such as social cohesion (Ludin et al., 2018). The level of connectivity between social groups and associations in a particular societal system are remarkably an important attribute of social cohesion. The type of assistance obtained is dependent on the type of relationship that exist in social organizations. A good relationship can help foster enormous access to community assistance during disasters not only through institutional links, but also strengthen informal links with people who are not connected through bonding social capital (Aldrich & Meyer, 2015).

Social cohesion is an important correlate of resilience (Rolfe, 2006 cited by Townshend et al., 2015a). Having said that, it is important not to infer that social cohesion remained the only indicator that can be used to predict resilience. Therefore, resilience could be a function of several other intervening variables such as the type of disaster and the traits of the community. APA Health Center, 2004 recognized that, Amidst all these, social cohesion is recognized as a pivot on which

community's ability to bounce back can be assessed (Ludin et al., 2018). For example Vision (2004) was cited where investigating social factors as antecedent causes or indicators of low social cohesion, and concluded that, cohesive community has a higher level of volunteering, more involvement in sport or recreation activities, and more support networks than those lacking cohesion (Townshend et al., 2015). Three areas of measurement were identified and known to be;

1. Social and support networks (including access to social support in times of need).
2. Social participation (as the obverse of social isolation and being cut off from relationships providing friendship and company).
3. Community engagement (including volunteering which draws people together to work for the benefit of others).

Rolfe, (2006) could not disagree further with Vinson as he explained that social capital, support networks, social services and degree of unity are closely related with social cohesion.

Other concept associated with social cohesion was outlined by Gough & Olofsson, (1999) and were termed as system integration, social integration, and social exclusion as cited by (Chan et al., 2006). To other scholars, these were perceived to be tantamount to social inclusion, trust relationships and reciprocity (Townshend et al., 2015). One notable model designed and often used to measure cohesion was by Buckner, (1988) and it was centered on neighborhood or communities and became known as Buckner's Index of Cohesion (BIC). Out of three domains, namely neighboring; psychological sense of community and attraction, 18 separate items were deduced to provide a composite measure of cohesion.

This become one of the most resourceful tool adapted by many scholars to measure cohesion with its index and structure of subscales and have been replicated in several other forms of studies (Brown et al., 2006; Jewett et al., 2021; Li et al., 2011; Ludin et al., 2018; Robinson et al., 1995;

Ross et al., 2021; Svensson et al., 2021). Although many scholars held different interpretational opinions, several of them agreed that participation by community members played a significant role in promoting community cohesion.

According to Townshend et al (2015) many disaster events ignite the action of social cohesion as evident in the willingness of residents to assist each other during the rebuilding processes. The active voluntary participation, collaboration, and teamed work by all community members such as those witnessed during communal labor, people turned to foster a sense of collectiveness and belonging (Townshend et al., 2015c). These further translate into building resilience in communities. The frequency of disasters has led to a shift from risk management to enhancing resilience Saja et al (2018c) in a post-disaster phase. This sort to explore the links between cohesion and resilience as an important variable for theory and model buildings towards the achievement of disaster resilience and as a result the need to identify levels of resilience and cohesion in communities that have experienced disaster so as to be informed on the significance of these concepts to disaster preparation and recovery.

2.2 THEORETICAL FRAMEWORK

The theoretical framework for the study includes social-ecological system and '5S' social resilience framework. They frame and components are expressed below.

2.2.1 Social-Ecological Systems Resilience

The Social-Ecological Systems Resilience (SES) is a product of the general system theory and modelled through ecology Holling (1973 cited by Norris et al., 2008), and drawn from natural hazards and political ecology Adger (2006 cited by Norris et al., 2008). The social-ecological systems theory (SES) tries to explore and understand the dynamics of cross-scale interactions of human environment systems. In the field of integrated disaster risk management, the theory provides a variety of heurists in social works and disaster resilience (Walker et al., 2006 cited by Mayunga, 2007). Although SES theory was first conceptualized and modelled through a descriptive approach, it was later broadened in scope to include themes such as scale, self-organization, functional persistence as well as social learning which account for some flexibility to meet an enhanced policy need. These core themes as posit by the SES theory, offer a better ground to understand resilience in so many salient ways as they were rooted in the general systems theory approaches. They were therefore applied but not solely in the conceptualization of workable framework for this study with much focused on social sub-systems. This is because, they emphasize on the importance of scale in understanding resilience. It also creates room to embrace the disparities of different scales, the impact and direction of interaction between scales and, ensure the role of feedbacks. The functional persistence in the theory represents an outcome of the SES conception of resilience. Though it is not the only possible outcome, it has been the focus of considerable attention; with system collapse and transformation inclusive. Self-organization and social learning are both processes that can lead to resilience (Adger et al., 2005). While the later

constitutes a key focal point of contemporary resilience discourse, the former has been somewhat neglected in recent years. Finally, flexibility represents a means of interpreting the elements of resilience. These themes that showcase the ability of resilience were included in the study independently as covariates.

The SES theory although provided a holistic interpretation of resilience, it also has some weaknesses.

Four of these critiques iterate that it has no space for politics (Scoones & Jan-Peter Vos in Leach 2008 cited by Saja e t al., 2018), has no commitment to the sense of agency Brown & Westaway (2011 cited by Leichenko & Silva, 2014), and that its operability disengaged the emotional feelings and as well limit development opportunities when the systems resilience collapses (Pelling, 2011 cited by Béné et al., 2012). In the wake of this deficiencies, the SES theory was supported in guidance to this study by the adopted '5S' social resilience framework (Saja et al., 2018).

2.2.2 '5S' social resilience framework - structure and components

In support for the Social-Ecological Systems Resilience theory is the adaptive '5S' social resilience framework. This framework consists of five dimension sixteen characteristics and forty-eight proxy indicators (Saja et al., 2018a). The attributes were coded to indicate the mutual and essential relationships between humans and their environment.

The '5S' social resilience framework was activated as enabler to the selection of vital indicators, operationalization and precision to measure both social cohesion and community resilience (Parsons et al., 2016).

The framework was built upon three (3) layered structures with a sub-division made up of sixteen (16) unique social resilience characteristics and 46 indicators. The social resilience framework was finally coined to comprise five social sub-dimensions namely social structure, social capital, social mechanisms or competence or values, social equity and diversity, and social beliefs or culture or faith. The above categories of social resilience were the most commonly used as reviewed in literature and presented in several scholarly works (Gamaralalage & Premakumara, 2015; Saja et al., 2018).

The model has several advantages and they are as follows;

The model permits the addition of indicators when a specific context requires more than three main indicators to assess the characteristics of social resilience. The '5S' framework structure ensures the operability in the assessment of social resilience without leaving behind any significant indicator. It also give room to the individual researcher to select indicators of choice in relation to studies (Saja et al., 2018b). The model is said to be inclusive because it's a comprehensive set of key social resilience characteristics and indicators that have been incorporated within a single structure (Saja et al., 2018b). Below is the figurative expression of the 5S' social resilience framework.

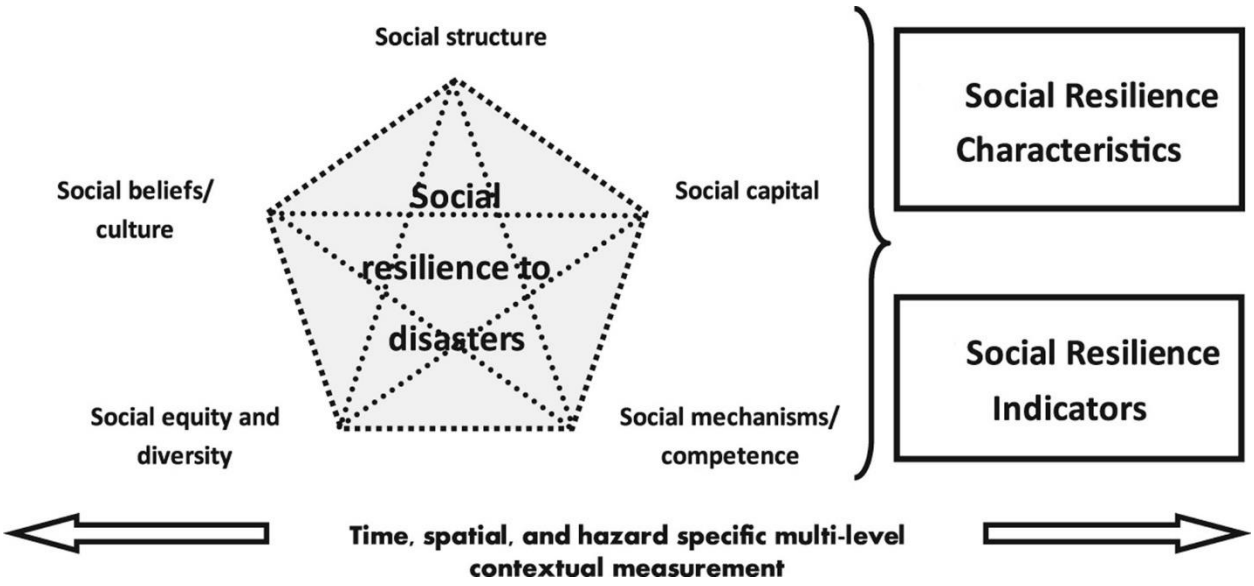


Figure 2.1: Adapted '5S' social resilience framework - structure and components

Source: (Saja et al., 2018b)

In figure 2.1 above, there are five interactive components constituting social resilience to disasters and they are social structure, social capital, social mechanisms or competence or values, social equity and diversity, and social beliefs or culture or faith. Each of the dimension contain three or more characteristics within which proxy indicators were drowned. Below is a detail outline of each dimension and respective indicators.

Table 2.1: Description of social dimension and key indicators for disaster resilience

Sub-dimension	Description (adapted from Cox & Hamlen & Sharifi as cited by Saja et al., 2018)
Social structure	Key social segments such as social demography, gender, and family structure; socio-economic stratification; and functions of the people in a community.
Social capital	Social bonds within socioeconomic groups based on an association of families and locality; networking abilities made up of economic and other ties that are external to the group; Interaction between social groups/networks with the governing authorities/local institutions.
Social mechanisms/competence/values	Mechanisms include developing community goals and priorities; engagement and competence of the community in the resilience-building process; collective attitude and shared values towards coping and adapting to disasters.
Social equity and diversity	Equal access to a diverse set of resources, skills, and services; a process of inclusive resilience initiatives; ensuring equity for people with specific needs to manage disasters.
Social beliefs/culture/faith	Social behaviors/local cultural beliefs and norms; faith-based values and practices

Source: (Saja et al., 2018)

2.3 Characteristics and indicators of community social resilience

2.3.1 Social structure

The scope of social structure is broaden to include some social characteristics such as relationships and networks (Nadel, 2013; Parsons et al., 2016). Meanwhile, some definitions of social structure were relegated to feature population distribution and composition in a geographic space. The distribution of population aspect of social structure comprises gender, education, ethnicity and income (Blau, 1977) was adopted for this study. Demographic parameters such as age distribution and household income are salient attributes of social structure and were useful in aid to understand and differentiate population and demographic concepts in the study (Renschler et al., 2010).

The three characteristics identified in social structure included social demography, household structure, and mobility of people and families.

2.3.1.1 Social demography

A spatial characteristic of a population classified in terms of age distribution, native status and educational attainment constituted a social demography of a community. According to Cutter et al (2010) a community with, for example, higher education attainment, less elderly and disabled people, and non-native language speaking population have shown comparatively higher social resilience.

2.3.1.2 Population profile

According to Cutter et al (2010), the composition of age and gender are significant population profiles which can be use in determining social resilience to disasters. Meanwhile, other population profiles that constitute demographic data and are worth considering includes ethnic and racial

identity (Mayunga, 2007); and age dependency ratio (Kotzee & Reyers, 2016). But the study did not prioritize the inclusion of all the various segments of the population.

Population with specific needs

In the context of people with specific needs, much attention was heeded to include single-person households, single-parent households, people with special medical needs, and female household heads (Parsons et al., 2016; Sherrieb et al., 2010; Yoon et al., 2016). In addition, locational details were considered in determining people with specific needs to ensure social demographic resilience. They therefore required greater help during evacuation and special attention in times of disaster response and recovery phases (Frazier et al., 2013).

2.3.1.3 Household structure

The target population for this study was household heads hence households or family structure under-pinned an important segment to this study. They are therefore crucial components and are noted at the micro-level structure of every community. As a result, the resiliency of a community was premiered on resilient household (households, who are prepared to face disasters, able to recover quickly from the impact of disasters and adapt to changes effectively) (Pasteur, 2011). Household characteristics were measured collectively using educational attainment, socio-economic, and health status and was termed as covariates.

A. Education level attainment

On education, the level of education attended by community members influences their knowledge and deepened their understanding on disaster concepts hence ensured disaster preparedness (Alshehri et al., 2015). For example, Joerin et al (2014) concluded that higher level of educational

attainment is strongly correlated to better community preparedness to disasters and can contribute to improving resilience. In this study, indicators such as the percentage of the population with high school education (Qasim et al., 2016; Sherrieb et al., 2010) and literacy rate (Joerin et al., 2014) were used to measure the educational level attainment. This was based on the assumption that, communities that has higher educated members will be more prepared to adapt best coping capacity, best adaptation strategies to minimize disaster risk and reduce recovery period so as to build back better. This is because, they become aware of early warning signs to disasters (Nuon et al., 2017). As a result, they will have the ability to translate these warnings into strength and become better prepared before the insurgency of disaster.

B. Socio-economic status

According to Kwok et al (2016), person's socioeconomic status has the potential to influence their susceptibility to disasters, and even recovery after disasters. Cutter et al (2010) observed that household level of income, income diversity, and employment status can affect social resilience to disasters and may be responsible in determining the rate of recovery from disaster losses. Therefore, income, employment status and livelihood strategies are salient indicators used in assessing resilience in this study. This was based on the assumption that people whose income are high may have the leverage to invest or save Cannon (1994) for future use when the unforeseen situations arise. Also, a community whose working class is gainfully employed may be at greater advantage for income sustenance especially when such engagement involves public sector enrollment with monthly salary or even private sector engagement with wages and accompanied with insurance packages (Wilkinson, 1999). Finally, diversification of livelihood activities Béné et al (2012) especially in areas that are perceived to be hazard free, may serve as a source of support

when other livelihood activities located within the study area get destroyed by tidal-wave actions. This will provide an alternative source of income to the individual so as to bounce back timely.

C. Health status of families

Norris et al (2007) noted that higher degree of psychological wellness coupled with a healthy life-style of individuals, and community well-being are important resilience characteristics. More so, several frameworks included health status such as physical and mental health wellness as indicators under the social dimension (Alshehri et al., 2015). In this study, a percentage of households with health insurance was used to determine social resilience (Cutter et al., 2010a). This is because, even though, health facilities may be readily available based on the evenly distribution of health centers across the country as well as the study communities, there is the problem of accessibility in terms of health finance especially during emergencies at the local level and among the rural poor of Ghana. It was this gap that the National Health Insurance Scheme (NHIS) hope to bridge.

2.3.1.4 Mobility of people and families

According to Adger et al (2008) when there are greater mobility of people, social resilience can be enhanced to help improve effective disaster response, especially during disaster evacuation and recovery. Migration and mobility are therefore very important resilience characteristics and included degree of labor mobility or temporal changes in the population (Adger et al., 2005). The mobility in this study was collectively measured using indicators such as home-ownership, access to transport, and street connectivity within the area and with the neighborhood.

Home-ownership

The study uses homeownership, rented and other means of housing type to determine the trend of mobility of people before, during and after a disaster. This is because, the percentage of owner-occupied housing units (Cutter et al., 2010a; Peacock, 2010; Renschler et al., 2010) or housing type (leased long-term or rented) (Mayunga, 2007) are proxies that indicate the trend in the mobility of people before, during, and after a disaster. People without alternative housing or sheltering options are identified to be associated mostly with people in low socio-economic status (Saja et al., 2018c).

2.3.2 Social capital

Social capital is another dimension predominantly used in the determination of social resilience to disasters (Aldrich et al., 2015; Griswold, 2014; Orencio & Fujii, 2013; Putnam et al., 1993). Originally, the focus of social capital which was based on relationships in social structures and networks has been expanded to include features of social organizations such as networks, norms of reciprocity, and trust that facilitate action and cooperation for mutual benefit (Aldrich et al., 2015; Sanyal & Routray, 2016). This resultantly was grouped into three namely linking capital, bridging, and bonding (Aldrich et al., 2015) and was further categorized as structural and cognitive social capital (Sanyal & Routray, 2016).

For the purpose of this studies, social capital includes social ties within community groups most associated with family relationships and place of attachment (bonding), networking abilities made up of economic and other ties that are external to the community (bridging), and the interaction between social groups and community networks with the governing authorities, state organizations, and non-state local institutions (Adger et al., 2005). Under the social capital sub-

dimension, two resilience characteristics were used and they include social support, and social networks in line with the original framework.

2.3.2.1 Social trust

Social trust is a components of social cohesion (Leykin et al., 2016). Trust among members of the community and other neighboring communities' helps to facilitate positive coordination and cooperation for effective disaster response and allow access to resources and resource redistribution (Ainuddin et al., 2012). The direct measurement of social trust although is a bit cumbersome, the perceived trust is often used in several studies to measure social trust through community questionnaire surveys and observations (Uslaner, 2016).

2.3.2.2 Community leadership

The leaders in our various communities play a crucial role in ensuring the promotion of social cohesion by encouraging inclusiveness and ensuring equity among the people at all level (Ludin et al., 2018a; Marzi et al., 2019). Rubin et al (1985) advanced an argument whiles positing that effective and trustworthy community leadership that believe and give priority to disaster resilience activities can promote social resilience. Therefore, acceptance of a community leadership and the willingness to work together as a team can serve as an indicator of building a strong community cohesion that can transform into resilience during disasters (Rubin et al., 1985). Community leadership can be measured by the frequency of meetings between community leaders and their followers as well as followers active participation (Kusumastuti et al., 2014), and the willingness to allow or accept the views of individuals to make a collective meaning for community development (Joerin et al., 2014).

2.3.2.3 Connection between groups/societal systems

The level of connectivity between social groups and associations in a particular societal system are remarkably an important attribute of social cohesion. The type of assistance obtained is dependent on the type of relationship that exist in social organizations. A good relationship can help foster enormous access to community assistance during disasters not only through institutional links, but also strengthen informal links with people who are not connected through bonding social capital (Aldrich & Meyer, 2015). The strength and number of ties within different social groups can measure social cohesion by asking behavioral questions through community surveys (Aldrich & Meyer, 2015; Kusumastuti et al., 2014).

2.4 Conceptual Framework

Since this study is community based assessment, the characteristics and indicators of '5S' framework were adjusted Townshend et al (2015c) to meet the geographical settings and the hazard type experienced by the four study sites. the dimensions of social resilience and their respective proxy indicators included in the model and used for the study are as follows; social structure, social capital, social mechanisms or competence or values, social equity and diversity and social believes or culture or faith out of which eight characteristics were formed with seventeen indicators carefully selected and modelled in accordance with Burkner's Index of Cohesion (BIC) to meet social cohesion specification whiles eighteen indicators were revised to meet the Index of Perceived Community Resilience (IPCR) and were embedded with attributes such as the presence of community infrastructure, engagement of people and places, community networks and governance (Townshend et al., 2015). According to the conceptualized framework adapted for the study, a community is in a fixed geographical location within which social factors evolved. Social

characteristics involved included but not limited to the leadership style, community and social network within and outside the community, mentality outlook of the individual expressed in social cohesion and community togetherness, social support and neighborhood solidarity during emergency, trust, and ability for one to take initiatives in solving communal issues. The various dimensions, characteristics and indicators selected for the study is presented in table 2.2.

Table 2.2: Selected indicators for social cohesion and resilience

Dimension	Characteristics	Indicators	Justification
Social Capital	Social cohesion	Social trust	(Ainuddin et al., 2012)
		Community led leadership	(Kwok et al., 2016a)
		Connection between groups and social systems	(Aldrich et al., 2015; McMillen et al., 2016)
	Social network (social associations)	Civic engagement in social network	(Peacock, 2010; Pfefferbaum et al., 2013)
		Effective civic organizations	(Peacock, 2010)
		Volunteerism	(Peacock, 2010; Yoon et al., 2016)
	Social Support	Social support system mechanism	(Joerin et al., 2014)
		Shared assets and collective experience	(Joerin et al., 2014)
		External support system	(Cutter et al., 2010a; Joerin et al., 2014)
Community social resilience indicators			
Social Mechanism competence and values	Community engagement	Political participation	(Renschler et al., 2010;)
		Community engagement strategy	(Norris et al., 2008)
		Involvement in public affairs	(Joerin et al., 2014; Paton & Irons, 2016)
	Community goals and efficacy	Collective efficacy	(Kusumastuti et al., 2014)
		Strategies goals and priorities	Ahmed S.M (2009 in Béné et al., 2012)

		Community perception	
	Community shared values and attitudes	Place of attachment and sense of community pride (community connectiveness)	(Menoni et al.,2012)
		Shared beliefs and values	Buckle (2004 in Norris et al., 2008)
	Community processes	Planning (community plans)	(Cutter et al., 2010b)
		Collaboration frameworks	(Ludin et al., 2018)
		Collaboration problem solving and decision making	(Kwok et al., 2016b)
	Community competence	Knowledge of local risk or perceptions	(Cutter et al., 2008; Kusumastuti et al., 2014)
		Past experiences with disasters (recovery / learning from the past)	(Ainuddin et al., 2012)
		Information and communication	(Adger et al., 2005)
Covariates and demographic indicators			
Social structure	Social demography	Population profile (age and gender)	(Sherrieb et al., 2010; Joerin et al., 2014)
	Household structure	Socio-economic status	(Cutter et al., 2008; Kwok et al., 2016a)
		Health status	(Cutter et al., 2008; Norris et al., 2008)

		Educational level/ attainment	(Sherrieb et al., 2010; Joerin et al., 2014)
		Street connectivity	(Sherrieb et al., 2010; Joerin et al., 2014)
	Mobility of people and family	Housing ownership	(Cutter et al., 2010a; Peacock, 2010; Renschler et al., 2010)
Social beliefs/ culture faith	Religion	Current religious practices Faith based engagement	(Cutter et al., 2008) (Kotzee & Reyers, 2016)

Source: Author, 2021

The approach to the study is summarized in the framework below. It includes series of community activities that are influenced by outside factors such as New ideas, Credit facilities and External supports. Others include economic downturn, mind closure and health of the individual. How the above factors played will facilitate disaster resilience either in the negative or positive. The information above is diagrammatized in figure 2.2 below.

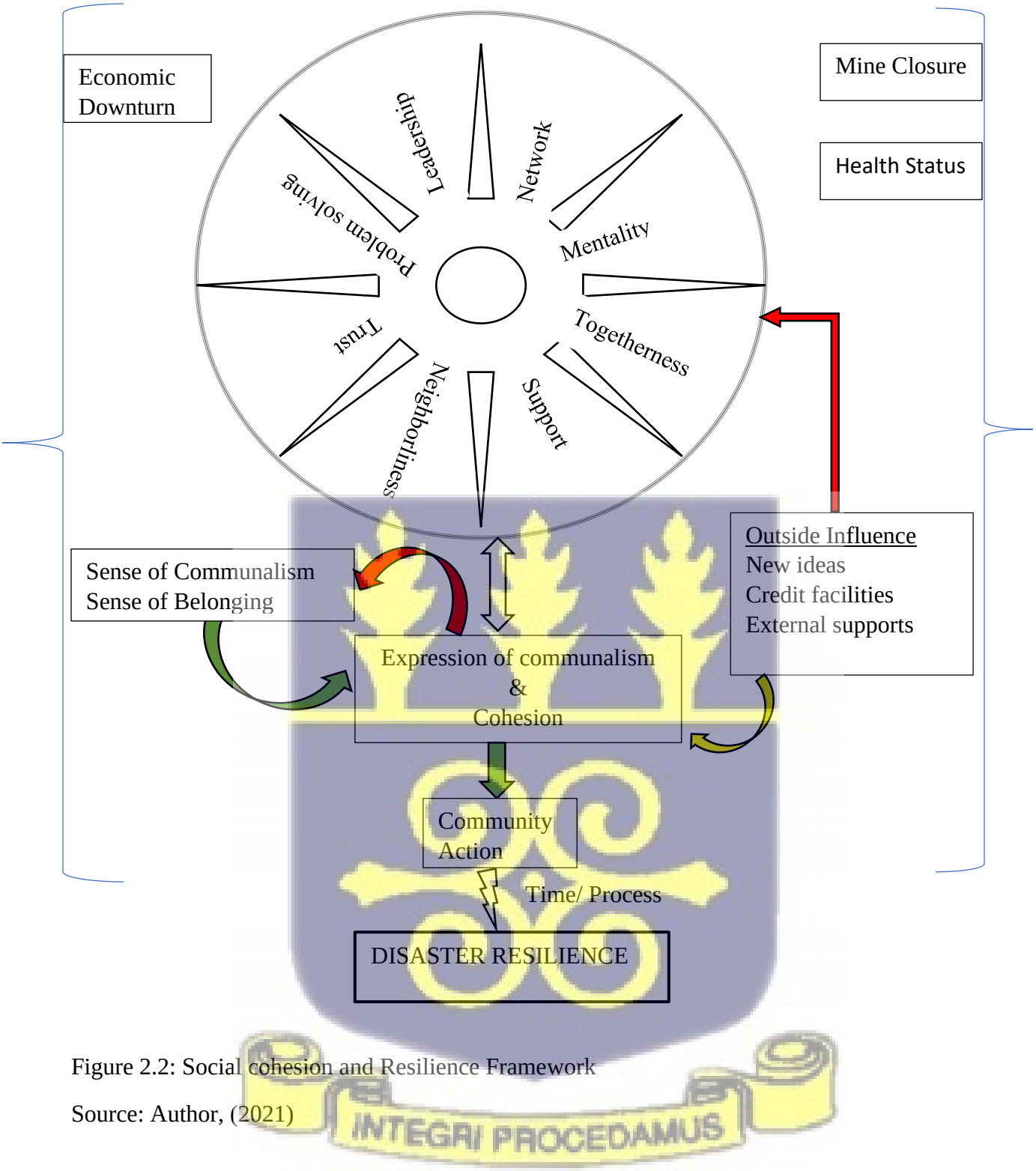


Figure 2.2: Social cohesion and Resilience Framework

Source: Author, (2021)

The assumption to the inclusion of the selected indexes is explained as follows.

Leadership style

The leaders in our various communities play a crucial role in ensuring the promotion of social cohesion by encouraging inclusiveness and ensuring equity among the people at all level (Ludin et al., 2018a; Marzi et al., 2019). Rubin et al (1985) advanced an argument whiles positing that effective and trustworthy community leadership that believe and give priority to disaster resilience activities can promote social resilience. Therefore, acceptance of a community leadership and the willingness to work together as a team can serve as an indicator of building a strong community cohesion that can transform into resilience during disasters (Rubin et al., 1985). Community leadership can be measured by the frequency of meetings between community leaders and their followers as well as followers active participation (Kusumastuti et al., 2014), and the ability allow the views of individual to make a collective meaning for community development (Joerin et al., 2014).

Mentality outlook

The way and manner which people perceived leadership style, community and social network within and outside the community influence their behavior. The mentality outlook of the individual can be expressed in social cohesion and community togetherness, social support and neighborhood solidarity during emergency, trust, and ability for one to take initiatives in solving communal issues.

It is believed that, the aforementioned characteristics have both positive and negative traits to building resilience after disaster had occurred. They are therefore influenced by both intrinsic and extrinsic factors expressed based on individual sense of communalism and the sense of belonging.

Intrinsic factors emerged as a result of natural forces that initiate each characteristic processes and may include attitude, behavior, fear, jealousy among others. For example, an individual may not subscribe to a particular leadership style and interns, ignore leadership directives. People of such cohort may simply not be willing to participate or work with leadership regarding matters that will yield developmental results. In the absence of these, there will be patriotism among individual members of the community when leadership style is been subscribed to.

Extrinsic factors (Outside Influence) in this framework include the emergence of new ideas, availability/ accessibility of credit facilities (either community based or not), and donor support among others.

Emergence of New Ideas

New ideas are the unique ways in dealing with long pending problem with the intent of resolving, mitigating, risk reduction so as to avert disaster impact by providing methodical approaches to meet the needs of systemic failure. In times of disaster, new and innovative ways are required to manage disaster situation in other to build resilience at all levels of life. The readiness or timely availability of such knowledge may help reduce the time duration to build back better.

Availability / accessibility of credit facilities

The availability and accessibility of credit facilities will enable borrowing especially in times of economic downturn where disasters caused shuttered livelihood activities, loss of capital and

infrastructure as well as damage to life and property among vulnerable residents (communities). This will serve as a restoration point and may help the affected individuals to pick up early in other to quickly overcome their worry timely so as to build resilience.

Donor support

The United Nations International Strategy for Disaster Reduction UN/ISDR, (2004) defined disaster as "a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources" (cited in Cardona, 2011 p.22). This suggests that, there is the need for external support in other to build back batter. Al hitherto, in the absence of these negative influences, there is hope for higher resilience precision among communities. This will ultimately have a triggering effect through time and processes to arrive at resilience.

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.0 Introduction

This chapter outlined the materials used, methods implore and approaches adopted to successfully address the study objectives. Appropriate methods that explored the concepts of social cohesion in disaster risk resilience were reviewed. The chapter iterate on the research design which comprised of the method use, data collection methods or procedures, selection of research participants and data analysis.

3.1 Location and map of the study areas.

The Keta Municipality lies within Longitudes 0.30°E and 1.05°E and Latitudes 5.45°N and 6.005°N. It is located to the east of the Volta estuary, about 160km from Accra and shares a common boundary with Akatsi South District to the north, Ketu North and South District to the east, South Tongu District to the west and the Gulf of Guinea to the south (Ghana Statistical Service, 2014a) whilst Ketu South Municipality is between latitudes 60° 03¹ north and 60° 10¹ north, and longitude 10° 6 ¹ east and 10° 11¹ east. It shares a boundary with the Republic of Togo on the east, the Keta Municipality on the west, the north with Ketu North District and the Gulf of Guinea to the south (GSS, 2014b).

Keta and Ketu South Municipalities has a total land size of approximately 753.1km2 and 779 square kilometers respectively (GSS, 2014b, 2014a).

All the four coastal communities that formed the study area are rural communities based on urban and rural definitions from the Ghana Statistical Service. According to GSS (2013), rural areas or

communities are defined as a town or community with a population less than 5000. The four communities are located along the Gulf of Guinea in the South Eastern corridor of the Volta Region in the Keta and Ketu South Municipalities. The communities include Adzido-Vordza, Blekusu, Agavedzi and Adina. All the selected communities are observed to be homogeneous in language, economic activities, and governance. They depend primarily on natural resources specifically fishing from the sea and the lagoon. This was common among the four communities but salt mining was prevalent in Blekusu, Agavedzi, and Adina. Fishing and fish mongering were predominant economic activities that characterized the study areas. Although, they all have a community-based health center, the four communities shared a common health facility at the Keta Government Hospital during extreme cases that seems beyond the community-based health facilities. Majorly, the study areas were inundated/ noted for tidal-wave related disasters. Although they are neighboring communities, they have clear administrative delimitation and were purposively selected based on the fact that, they are coastal communities predisposed to the impacts of tidal-wave disasters. And that, members of each community have experienced disaster in one form or the other and were unique in approaches to disaster risk reduction interventions. The map below in figure 3.1 shows the study area.

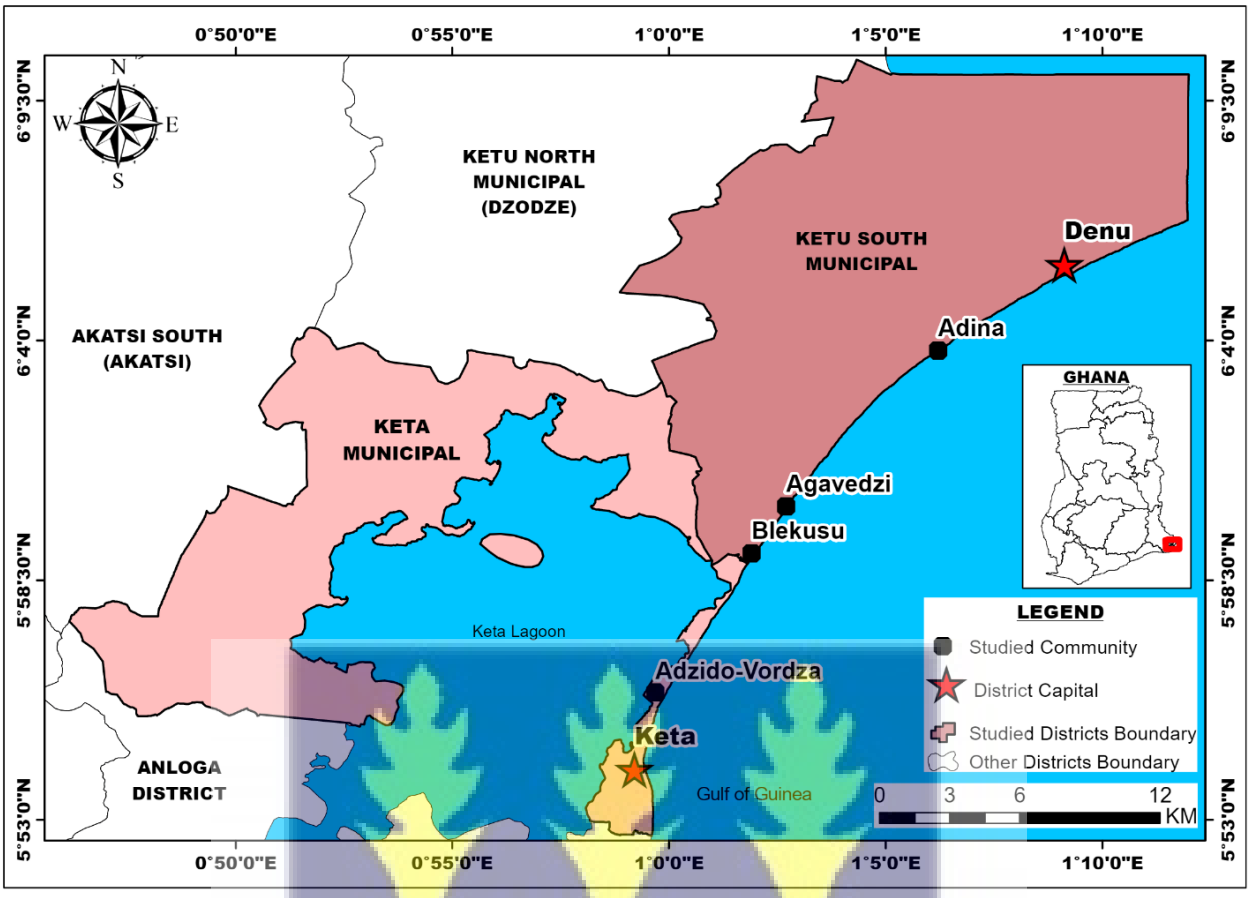


Figure 3.1: A map of Keta and Ketu Municipalities showing study communities

Source: Author, 2021

3.2 Disaster profile of the study communities

The impact of disaster in the various communities is classified in table 3.1 below with a vivid account on its effects on people and property. The common disaster events associated with tidal-wave hazards in the study areas are floods and coastal erosion. It has been observed that, most people are often affected whenever disaster strike. Although evacuation takes just one day in most communities, it takes five (5) to thirty (30) days for life to return to normalcy. Mostly, people's houses, land, private businesses and personal effects are common assets that get damaged during disaster events. These were common in all the four study communities.

Table 3.1: Description of tidal-wave related disasters

Community	Type of disaster	Population affected (Average)	Year of occurrence	Length of evacuation	Property losses
Adzido-Vordza	Flood/Erosion	480	2002	18 days	Land, Houses, Personal belongings, Private businesses
Blekusu	Flood/Erosion	540	2017	7 days	Land, Houses, Personal belongings, Private businesses
Agavedzi	Flood/Erosion	135	2021	5 days	Houses, Land, Personal belongings, Private businesses
Adina	Flood	397	2017	2 days	Land, Houses, Personal belongings, Private businesses

Source: Author's Field Survey, 2021

The pictures in figure 3.2 below shows the trail of disaster impact in the study areas as a result of tidal-wave actions. Physical damages to both natural and built environment was paramount in all the study communities. These further translate to affect social, economic, and human assets of the various communities.

The picture labeled 'A' contain an example of buildings that collapsed as a result of excessive erosion of the coast at Agavedzi. Picture 'B' shows the eroded vegetation cover at Agavedzi.

Figure 3.2: Pictorial view of disaster impacts at Agavedzi

Source: Field Photograph, 2021

The four communities' although have overages of historical antecedents of tidal wave disasters, they were unique in their experiences and have different interventional approaches.

Adzido-Vordza was reclaimed after being submerged in flooded water, filled up (raised) and new houses built as government of Ghana's' intervention project during the insertion of the Sea Defense Wall Project (SDWP). Although, majority of the residents were natives of the twin town Adzido and Vordza, they occupied their current residents for less than 18 years (period of relocation). Adzido-Vordza and Blekusu are two towns that had benefited from the Sea Defense Wall Project (SDWP). About six (6) groins ranged from Horvi to Agavedzi were constructed in aid of land reclamation process at Blekusu. Agavedzi is the adjoining community to Blekusu and had no form of physical intervention at the time of this study. They were the youngest community that had suffered the brand of tidal wave action resulting in the latest disaster events experienced in the study communities.

3.3 Demographic distribution

According to the GSS (2010) census report, the population of the Keta Municipality was 147,618; made up of 68,556 males (46.4%) and 79,062 females (53.6%) whiles Ketu South Municipality has a total population of 160,756 with males representing 47.1 percent and female population also representing 52.9 percent. Based on urban and rural classification of communities GSS (2014 cited by Mustafa 2015), Ketu South Municipality has its majority of population representing 53.4 percent living in rural areas with a sharp contrast of Keta Municipal which has 53.3 percent of its population urbanized (GSS, 2014).

The study communities have a combined population of 12,025, made up of 5607 (46.6 %) males and 6418 (53.4 %) females (GSS, 2014).

Adzido-Vordza is the largest among all the study communities and recorded a total population of 3,369. It is composed of 1,532 males and 1,837 females. It has 778 households with 884 houses.

Adina the second largest of the study communities has a total population of 3,291 and composed of 1,594 males and 1,697 females. It has a total household number of 735 with 484 houses.

Blekusu is the third largest among the study communities has a total population of 2,971 and composed of 1,385 males and 1,586 females. It has a total household number of 767 with 532 houses. Agavedzi has 595 households in 385 houses with a total population of 2,394. The population was made up of 1,096 males and 1,298 females.

3.4 Housing

The housing stock for Keta and Ketu Municipality stands at 30,309 and 25,180 with respective urban total houses being 15,164 (50%) and 15,56 (61.8%). Proportionally, the rural areas have 15,145 and 9,619 houses representing 50 and 38.2 percent respectively. Average population per house in urban areas were 5.1 and 4.5 in rural settlements in the Keta Municipality and 6.2 in the Ketu South. Majority of the structures in both urban and rural areas were constructed with cement blocks/ with a significant disproportion of 79.2 and 64.6 percent as compared to 0.1 and 0.4 percent burnt bricks (least used materials) respectively (GSS, 2014). The occupancy and ownership status of dwelling units by households was predominantly household members with statistical reference of 58.6%.

3.5 Economic characteristics

The four study areas are primarily fishing communities due to their geographical location, trapped between the sea and the vast lagoon. There is therefore non availability of farmlands for possible cultivation. About 90 percent of the population engaged in fishing and its related fish mongering and trading activities (GSS, 2014b). Fishing in the study areas is seasonal and locally regulated to help improve yield. The major fishes include tilapia, anchovy 'keta school boys", crabs and tuna.

3.6 Geology and soil

The study areas are underlain with the Keta Soil Association and mainly characterized by deep loose and yellowish sands which are found along the coastal plain of the Gulf of Guinea and predominated the southern part of the Municipalities (GSS, 2014b). The prevailing soil type in the study areas greatly influence agricultural activities and the type of crops produced. Although the soil supports the production of mainly shallots and vegetables, the non-availability of the land in term of size prevents farming practices hence zero tilting of the soil. This explains why in the 2010 Population Housing and Census only 17.3 percent of persons 15 years and older are employed in skilled aqua-culture practices and its related activities and has a lot of implications for food security in the Municipality (GSS, 2014b).

3.7 Social and Political Administration

The highest political and administrative authority rest in the stewardship of the Keta and Ketu South Municipal Assemblies, headed by a Municipal Chief Executive. They derived their powers from the 1992 Constitution under the Local Government Act, (Act 462 of 1993) (Republic of Ghana, 1992; 1993). Other legal instruments that grounded the statutory functioning of the

municipalities includes the Local Government Service Act, (Act 656 of 2003), and Local Government (Departments of District Assemblies) (Commencement) Instrument, 2009, L.I 1961 (Republic of Ghana, 2003) (GSS, 2014b). The various communities within the municipalities' channels their needs and derived support through an elected representative called Assemblyman or woman.

The traditional authority is the second functional operative authority in the various localities in the study area. The traditional authority derived their administrative powers from the stool.

Although there is the need for collaborative approach to trigger development, the case of Adina is with some challenges in discharge of traditional powers for governance.

3.8 Methodology

The methods used for the studies include both quantitative and qualitative research approach

3.8.1 Data Sources:

Primary and secondary data were used for the study. Primary data sources include direct administration of questionnaires, observations, interviews, focus group discussions as well as key informants.

On the other hand, secondary data were collected from manuscripts in the municipal assemblies and record books from the local office of the National Disaster Management Organization (NADMO). These included information on the community, type of disaster, population affected, the year of occurrence, length of evacuation and property losses.

3.8.2 Reconnaissance Survey

Prior to the main field work, a reconnaissance survey was carried out with the assistance of a liaison officer to obtain firsthand information about the study areas. In a transect walk, physical assets available to the various communities were assessed and areas that had experienced tidal wave disasters were also identified. These included the nature of coastal erosion, flood, and damage houses as well as economic and livelihood activities. Displaced households whose houses were washed away by the ravaging sea were also identified to be included in the study. The reconnaissance survey became very important because it helped shape the general views and cleared the percepts developed in the initial conception stage of the topic. The approach also aided in scheduling of interviews, completion of field observation sheets, and mobilization of field equipment and logistics as well as determination of study areas.

3.8.3 Sampling Technique

The purposive sampling technique was used to select four communities for the study. The four are Adzido-Vordza, Blekusu, Agavedzi and Adina. The selection was based on available evidence that they are coastal communities predisposed to the tidal wave hazards and have experienced disaster (Appeaning & Adeyemi, 2013; Awo et al., 2013).

In other to achieved optimum coverage, and minimize error, in selecting respondents, proportional sampling technique was used to calculate the total number of respondents for each study community whiles systematic sampling was used to select respondents in households within the community (Qasim et al., 2016).

3.8.4 Sample population

The target sample population were household heads. There were 2,872 households in all the four study communities distributed as follows: Adzido-Vordza (775), Blekusu (767), Agavedzi (595) and Adina (735).

Sample Size

In determining the sample size for each of the study community, proportional sampling technique with percentage proportion was used resulting into the followings.

Adzido/Vordza (n=67, 26.8%), Blekusu (n=67, 26.8%), Agavedzi (n=52, n=20.8%), and Adina (n=64, 25.6%).

3.9 Data Acquisition

The data was collected from four different rural coastal communities that have experienced tidal-wave disasters since June, 2000 to July 2021. A major disaster events that results to destruction of properties, threaten livelihood sustainability, and subjugate the individual inhabitants to nature. The affected individual household heads were purposefully selected for the study. The range of years were also significant to the study because it enables review of duration used for recovery and resilience building by each of the study community. In all the four communities, a questionnaire was administered in a household survey. The questionnaire includes two separate Likert type questions based on Buckner Index of Cohesion (BIC) Buckner (1988) and Index of Perceived Community Resilience (IPCR) (Pfefferbaum et al., 2013). They were meant for the assessment of community social cohesion and community disaster resilience respectively. In addition, questionnaire on demographic characteristics were also administered alongside four

covariates that have been reviewed in literature to include "years in community; years in current residence; health status of families; mode of transportation" and were used to assumed categorical variables. were formed with seventeen indicators carefully selected and modelled in accordance with Burkner's Index of Cohesion (BIC)

3.9.1 Estimation of Social Cohesion scale

To estimate social cohesion for the study, 17 statements (indicators) were drawn from eight characteristics crafted from two dimensions in accordance with Burkners' Index of Cohesion (BIC) – (Appendix 2). This is also referred to as Neighborhood Cohesion Index (NCI). This is because, the NCI/BIC exists specifically in a neighborhood context and was developed to include all the necessary collective-level attributes of sense of community (Townshend et al., 2015). Moreover, the Burkner Index of Cohesion focusses on the expression of the sense of community belonging and neighborliness and have been used and adequately validated in some scholarly research works (Townshend et al., 2015). The Burkner Index of Cohesion (BIC) is grounded in the theory of sense of community as a unidimensional as against multidimensional construct parented by social ecological system theory. It is therefore the ideal tool to use in assessing individual perceptions. However, item 4, and 9, were modernized to meet the environmental and cultural dynamics of the selected study communities. The item four (4) was changed to help present the differences in the cultural environment (fishing communities) as against the new resettlement environment (farming communities). Item three (3) was coined in recognition of neighborhood conflict. This was to assess how prepared neighbors are in readiness to assist others when disaster strike despite their individual differences and item nine (9) aimed to test the individual's loyalty

to his/her people and community and the willingness to defend them at all cost. The table below shows the statements that elucidate responds for the study.

Table 3.2: Adapted Buckner Index of Cohesion - BIC

Item	Statements
1.	Are you very much attracted to living in the community?
2.	Do you pay a visit to your neighbors in their homes?
3.	Do you think that you will avail yourself when others need you?
4.	If given the opportunity to relocate upland, would you move out of your community?
5.	If the people in the community were planning something, do you think of it as something "we" were doing rather than what "they" were doing?
6.	Do you seek advice from your neighbors?
7.	Do you think you will agree with most people in the community about what is important in life?
8.	Do you think your neighbors would help you during an emergency?
9.	Do you pledge loyalty to the people and service to your community?
10.	Do you borrow things and exchange favor with your neighbors?
11.	Do you think of yourself as similar to other people who live in your neighborhood?
12.	Do you do invites neighbors over to your house to pay you a visit?
13.	Do you regularly stop and talk with people in your community?
14.	Does living in the community gives you a sense of community belonging?
15.	Do you have the feeling of fellowship that runs deep between you and other people in the community?
16.	Will you work together with others on something to improve communal resilience?

17. Will you like to remain a resident of the area for a number of years?

The social cohesion was estimated using 17 items (indicators) deduced out of two dimensions of the "5S" social system framework and modeled on five-point Likert-type scale items (1 = strongly disagree, 2=disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree) (see appendix 1 B). Each respondent sense of community is reported as the mean score for the 17 items, with a higher score representing a greater level of community cohesion.

3.9.2 Estimating Community Resilience scale

The Community's disaster resilience was assessed through the adaption of Community Resilience Advancing Toolkit (CART) also known as Index for Perceived Community Resilience (IPCR) (Pfefferbaum et al., 2013). The community resilience indicators were built to assess social, economic, physical, and environmental parameters. They were made-up of eighteen (18) questions (indexes) drawn from the following characteristics; community competence (skill and knowledge); resource dependency; community processes; community aspirations, goals/ efficacy; community engagement; community shared values and attitude social institutions; and social support. Three questions were drawn from each of the characteristics except resource dependency and social institutions. The questions were administered on a five-point Likert-type scales ranged from 1-5. (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4=agree, 5 = strongly agree) (See Appendix 1 C). This tool was selected because it was developed to be used in community level resilience assessment (Pfefferbaum et al., 2013). Every respondent sense of resilience was valued as the mean score for the 18 items. Having meet the expected indicators required for use in

the study, the Indicators for Perceived Community Resilience (IPCR) was adopted (Pfefferbaum et al., 2013) as shown in appendix 3.

3.9.3 Covariates

Predictors of resilience was included as covariates in the study. They were "years within which one lived in the community" and "years within which one lived in his/her current residence". Others includes health status of families and educational levels of study participants. Each of these was slated to assumed a categorical variable and predict resilience independent of the other (Townshend et al., 2015). A cutoff point was chosen to portray the people's connection to their environment, displacement and settlement pattern before and after disasters since the calendar year 2000. The categorization ended in the following groupings: '0-10 years', '11–20 years', '21–30 years', and 31 + years.

The first covariate sort to assess 'years in the community' and were model as followed; those respondents who are in the '0-10 years' group represented those respondents who are non-natives and had experienced disaster and were willing to be relocated from the area (Townshend et al., 2015). Those who are in the '11–20 years' were those who had experienced disaster and may be natives or non-natives and were willing to be relocated from the area. Those who are in the '21–30 years' and 31 + years' were those who are natives and unwilling to relocate.

The second category was based on the assumption that, people whose houses were affected or destroy by the tidal-wave impact will have a short period living in their current residence. They may be renting, squatting or build new houses all over. Any of such approach will be an indication of the individual's level of resilience. Especially when the individual was capable of building a

new house better than what he has lost, the person is said to be more resilient than he who could afford only rent. In addition, the years one lived in current residence help established his/her years of disaster experience and such that guided the study to understanding the resilience period as posit by the FEMA model. Therefore, those who are in the '0-10 years' group represented those respondents who were frequently displaced and included those who were renting and had experienced disaster and have low resilience level. Those who are in the '11–20 years' were those who had experienced disaster but has moderate level of resilience. Those who are in the '21–30 years' and 31 + years' were those who are natives and has high resilience level.

3.10 Questionnaire Administration

The survey questionnaire was made-up of three parts. Part 'A' = Socio-demographic characteristics and covariates; Part 'B' = Neighborhood cohesion and Part 'C' = Community resilience. All the three parts were administered in a systematic household survey (structured interview) in all the four study communities (Adzido-Vordza, Blekusu, Agavedzi and Adina) on 19th June, 2021 through to 29th July, 2021 with the help of two research assistants who were trained to understand the study aims and objectives. The questionnaires were developed to provide information on three different issues of interest; social cohesion, disaster resilience, and basic demographics. They were administered to household heads or any adult member of a household who is of sound mind and can communicate and have experienced disaster in person before the study. Each participant consent to participate in the study were orally obtained prior to data collection.

3.10.1 Focus Group Discussion (FGD)

Focus group discussion was organized in each community to obtained information which could not have been assessed using the questionnaires.

Although Peacock (2010) was of the view that, focus group discussions does not create a cordial atmosphere for all participants to contribute effectively during discussion especially when the groups are not composed with people with equal strength. Based on this understanding, the study focused on likeminded respondents Cagney et al (2016) with a sum participants of five per each study community as means of adhering to best practices in focus group management. Participants for the discussion were drawn from respondents who strongly disagree (group 1) and strongly agree (group 2) in response to a household questionnaire "If given the opportunity would you move out of your community?".

The second category sort to provide reasons why most people living in hazard prone environment are without a valid national health insurance. This is because National Health Insurance will enable the individual to have access to healthcare in times of disaster since disasters are emergency situations and often mark a period in one's life where one become cash trap.

All discussions were held in camera and transcribed later whiles summary of issues was jotted in field notebook

3.10.2 In-depth interview

An in-depth interview was administered to the Director - National Disaster Management Organization (NADMO), the Municipal Coordinating Director, and Assmebly Members of the study communities. This was done to help filled the disaster events matrix form in each of the

study community and to establish empirical evidence that the people living in the selected communities have experienced disaster.

3.11 Data Analysis

The data collected from the four study communities were collated for analysis using the Statistical Package for Social Sciences (SPSS version 20). Descriptive analysis for mean, standard deviation (*SD*), and percentages were undertaken and percentage bar graphs were drawn for discussion. Mean scores were measured for IPCR and BIC. The mean scores were classified on standard cutoff points (low 1.00–2.33, medium 2.34 –3.66, and high 3.67–5.00) (Yahya & Husain, 2012 *in* Ludin et al., 2018).

Also, a correlation analysis on the BIC and IPCR indices was carried out for all the four communities individually. This was done to assess the correlation between social cohesion and disaster resilience. The Pearson correlation co-efficient was used to test the significant level to which social cohesion predict resilience.

One-way ANOVA was used to determine if there were significant differences in the mean intensity of both BIC and IPCR scores in each of the communities. This help to understand the differences and similarities that exist between cohesion and resilience.

Data from focus group discussion and in-depth interviews were transcribed and thematic coded whiles similar themes such as views on "unwilling to obtain a valid health insurance" or "refusal to be relocated to upland areas" were combined. Although the data was cleaned, the data was finally presented through direct quotes from the transcription.

Finally, because communities experienced disaster at different occasions and time, they probably may have different recovery periods hence the FEMA model (figure 3.3) was used as temporal reference point to analyze the recovery cycle of communities that have experienced disaster at different time period and places.

The adopted Federal Emergency Management Agency (FEMA) Substance Abuse and Mental Health Services Administration (SAMHSA) Counseling Program Application Toolkit (2012) originated as a legislative act of federal disaster relief in the United State of America following the occurrence of a wild fire that destroyed large areas of the city's seaport out of which millions of dollars and properties were lost at Portsmouth, New Hampshire in December 1802 (Kates et al., 2006).

To assess the level of resilience among disaster victims after donor funding and support led to the development of this framework by the federal agency and became known as Substance Abuse and Mental Health Services Administration (SAMHSA) Counseling Program Application Toolkit (2012) - (see figure 3.3). The model was categorized to include three broad phases with each phase having its corresponding emotional expectations to be either low or high. Phases of Disaster Collective Reactions Model (PDCRM) was applied to understand the similarities and differences experienced during recovery and resilience of communities that has experienced disaster at different time and places. This model was adopted to meet the gap created by the Social Ecology System Resilience theory which was deficient in meeting the emotional needs of the study since this model was designed to assess the emotional status of people affected by disaster and how they overcome their predicaments with time.

The core recovery capability for health and social services is the ability to restore and improve health and social services networks to promote the resilience, health, independence and wellbeing of the whole community. This model support locally-led recovery efforts to address public health, health care facilities and coalitions, and essential social service's needs. For the purposes of this study, the use of the term health was referred to and included public health, behavioral health and medical services. This establishes (1) a local focal point for coordinating recovery efforts at the local level specifically for health and social service's needs; and, (2) a local operational framework outlining how local agencies plan to support local health and social services recovery efforts.

This framework is flexible and can be adjusted during a disaster to complement local efforts as required.

Figure 3.3: Adapted FEMA Resilience Model

Source: (Kulig et al., 2015)

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter is made-up of research findings and discussions. It includes socio-demographic characteristics of study respondents, the association or correlation of social cohesion and community disaster resilience in the various communities. The strength of correlation between social cohesion and disaster resilience is also discussed.

4.1 Socio-Demographic Information of respondents

The socio-demographic characteristics of respondents is measured using indicators such as gender, religious status, marital status, and education. Others include residential status and source of income. According to Cutter et al (2010) a community with, for example, higher education attainment, less elderly and disabled people, and non-native language speaking population have shown comparatively higher social resilience.

The demographic characteristics of respondents collected in four separate communities representing the study area is presented in table 4.1 below.

Table 4.1: Socio-Demographic characteristics of the study communities

Communities/ Demographic variables	**ADZIDO-VORDZA**	**(%)**	**BLEKUSU**	**%**	**AGAVEDZI**	**%**	**ADINA**	**%**
GENDER								
Male	40	*59.7*	39	*58.2*	31	*59.6*	41	*64.1*
Female	27	*40.3*	28	*41.8*	21	*40.4*	23	*35.9*
RELIGION								
Christianity	24	*35.8*	34	*50.7*	27	*51.9*	34	*53.1*
Islamic	4	*6.0*	6	*9.0*	0	*0*	4	*6.3*
Traditional	26	*38.8*	25	*37.3*	18	*34.6*	23	*35.9*
Others	13	*19.4*	2	*8.3.0*	7	*13.5*	3	*4.7*
MARITAL STATUS								
Married	47	*70.15*	48	*71.6*	32	*61.5*	44	*68.8*
Single	13	*19.40*	12	*17.9*	13	*25.0*	11	*17.2*
Divorced	7	*10.45*	6	*9.0*	7	*13.5*	9	*14.1*
Cohabitation	0	*0.00*	1	*1.5*	0	*0*	0	*0*
EDUCATION								
Elementary/ Primary	7	*10.4*	24	*35.82*	15	*28.8*	15	*23.4*
Middle/JSS/JHS	36	*53.7*	11	*16.4*	13	*25.0*	19	*29.7*
O'Lvevel/ Secondary	13	*19.4*	6	*9.0*	6	*11.5*	10	*15.6*
Tertiary	11	*16.4*	5	*7.5*	3	*5.8*	3	*4.7*
No Education	0	*0*	21	*31.3*	15	*28.8*	17	*26.6*

RESIDENTIAL STATUS								
Self-owned	36	*53.7*	56	*83.6*	21	*40.4*	52	*81.3*
Rental	8	*11.9*	10	*14.9*	7	*13.5*	7	*10.9*
Squatter	2	*3.0*	1	*1.5*	24	*46.2*	5	*7.8*
Government assisted homes	21	*31.3*	0	*0*	0	*0*	0	*0*
SOURCE OF INCOME								
Private business	50	*74.63*	47	*70.2*	48	*92.3*	57	*89.1*
Public employment	4	*6.0*	8	*12.0*	4	*7.7*	6	*9.4*
Casual works	7	*10.4*	4	*6.0*	0	*0*	1	*1.6*
Remittances	6	*9.0*	8	*12.0*	0	*0*	0	*0*

Source: Author's Field Survey, 202

Gender

The respondents were largely household heads and included both males and females. Although, both genders were fairly represented, male-headed households were predominant in all the study communities but with just a small margin of difference. This allowed a comparative analysis of disaster impacts and the level of resilience on both sex since disaster affect gender differently (Cutter et al. 2010).

Religion

Again, the study discovered that Christianity and Traditional Religions were the leading religious affiliations in the four communities with a competitive Christian majority at Blekusu, Adina, and Agavedzi (margin was very small as compare with Traditional religion) whilst Traditional practices more prevalent at Adzido-Vordza.

Islamic Religious practice was relegated to the background at Agavedzi with zero practitioners, but it is gradually gaining attention at Adzido-Vordza, Blekusu, and Adina although at its slowest pace.

Marital status

The marital status of respondents suggests that, most of the study participants were married and formed the majority of the total respondents. This was followed by those who were single and never married whiles divorcees were also relatively low across all the study communities. People living together as couples but were never married (cohabitation) was not common throughout the four study communities and registered the least percentage of the study participants.

Education

On education, the level of education attended by community members influences their knowledge and deepened their understanding of disaster concepts hence ensured disaster preparedness (Alshehri et al., 2015). Adzido-Vordza and Adina were predominated by Middle or Junior Secondary School respondents whiles Blekusu and Adina were characterized mainly by elementary or primary school leaver respondents. In totality, majority of respondents were middle school or Junior Secondary School leavers followed by those who had elementary or primary education. Only small proportion of respondents had acquired tertiary or higher education. Findings from educational status of respondents suggest that, the level of education attainment of most respondents is low in all the study communities. This is also an indication that, there is low level of resilience in the various study communities in as much as higher level of educational attainment is a strong correlate to an enhanced community preparedness to improving disasters resilience (Joerin et al 2014). Again, this low-level resilience is exacerbated by the large proportion of respondents who had no form of education particularly at Blekusu, Agavedzi and Adina except Adzido-Vordza which recorded higher level of literacy among all communities.

Housing type

The residential status of respondents was not homogeneous in all the four study communities. In general, majority of respondents lived in their own houses, especially in Blekusu and Adina respectively. This was only reflected at Blekusu and Adina. Majority of respondents in Adzido-Vordza are residents in government-assisted homes whiles majority of respondents at Agavedzi lived as squatters. With majority percentage of owner-occupied housing units (Cutter et al., 2010a; Peacock, 2010; Renschler et al., 2010) or housing type (leased long-term or rented) (Mayunga,

2007) in the study area. There is therefore an alternative housing or sheltering options identified to be associated mostly with the least vulnerable people with low socio-economic status (Saja et al., 2018c). This as a result, culminate into tidal-wave disaster resilience.

Employment

Finally, majority of respondents in all the study areas were self-employed. Most of them were engaged in private businesses. Agavedzi topped all the communities' whiles Blekusu recorded the least but in majority for those who were engaged in private businesses. Meanwhile respondents whose source of income originated from remittances recorded the lowest and these as well, cut across all the study communities.

4.2 Assessment of Social Cohesion

In table 4.2, Agavedzi is the only community within which respondents wish not to remain a resident. This is evidence as it recorded a low mean intensity. At Agavedzi, only half of the total respondents regularly stop to chat with each other when they meet at different places rather than their community but the practice is common in the rest of the three study communities.

Opinions on seeking advice from neighbors indicated high patronage in Adina but practiced in moderation at Adzido-Vordza, Blekusu and Agavedzi. Inversely, as there is high practice of one paying visit to their neighbors in their homes in three of the study communities, this practice is in moderation at Adzido-Vordza.

Meanwhile, it is of an outstanding observation to note that, most people are attracted to living in their respective communities. All the people meant a lot to each other in the various communities. Again, high number of respondents often agree with most people in their communities about what is important in life. Most of the people in the various study communities believed that they will be assisted whenever disaster strikes them. They also pledge their loyalty to the people in their community. Majority of respondents have the feeling of f fellowship that runs deep between them and other people in their communities and hope to work together. Thy also vow to remain a resident in their respective communities.

Finally, most of the respondents prefer not to move out of their community even if given the opportunity.

Table 4.2: Descriptive statistics of social cohesion variables

	Adzido-Vordza		Blekusu		Agavedzi		Adina	
Social issues	Mean	Description	Mean	Description	Mean	Description	Mean	Description
1. I'm attracted to living in this community	4.33	High	4.57	High	3.81	High	4.28	High
2. I visit my neighbors in their homes	3.52	Medium	3.88	High	3.46	Medium	4.02	High
3. Other people in the area mean a lot to me	3.88	High	4.19	High	4.48	High	4.28	High
4. I will move out of my community if given the opportunity	2.77	Medium	2.28	Low	2.5	Medium	2.23	Low
5. I will prefer 'we 'feelings than 'they'	3.84	High	4.36	High	4.04	High	4.47	High
6. I seek advice from my neighbors	3.05	Medium	3.54	Medium	2.88	Medium	3.94	High
7. I will agree with most people in the community about what is important in life	3.71	High	3.76	High	3.98	High	3.89	High
8. My neighbors would help me during an emergency	3.71	High	4.34	High	4.79	High	4.55	High
9. I feel loyal to the people in my community	3.94	High	4.37	High	4.79	High	4.02	High
10. I borrow things and exchange favor with my neighbors?	2.85	Medium	2.93	Medium	2.55	Medium	2.55	Medium
11. I think of myself to be similar to other people who live in my neighborhood	3.63	Medium	4.25	High	4.53	High	4.25	High
12. I do invite my neighbors over to my house	3.32	Medium	3.16	Medium	2.64	Medium	3.19	Medium
13. I regularly stop and talk with people in my community	3.85	High	4.22	High	3.23	Medium	4	High
14. Living in the area gives me the sense of communalism	3.95	High	4.21	High	3.69	High	4.12	High
15. I have the feeling of fellowship that runs deep between me and other people in the community	3.92	High	3.78	High	4.08	High	3.31	High
16. I will work together with others on something to improve communal resilience	4.26	High	4.69	High	4.94	High	4.71	High
17. I will like to remain a resident of the area	3.85	High	3.82	High	2.24	Low	3.73	High

Source: Author's Field Survey, 2021

Table 4.3: Descriptive statistics of Community Resilience

Assessment of community resilience	Adzido-Vordza		Blekusu		Agavedzi		Adina	
	Mean	Description	Mean	Description	Mean	Description	Mean	Description
1. People in my community are committed to the well-being of the community.	3.64	Medium	3.93	High	3.9	High	3.86	High
2. People in my community have hope about the future.	3.97	High	3.91	High	2.52	Medium	3.69	High
3. People in my community help each other.	3.55	Medium	4	High	4.87	High	4.61	High
4. My community has the resources it needs to take care of community problem (resources includes money, information, technology, tools, raw materials and services)	3.34	Medium	3.04	Medium	3.58	Medium	3.44	Medium
5. My community has effective leaders.	3.16	Medium	3.39	Medium	3.23	Medium	3.62	Medium
6. People in my community are able to get the services they need	3.18	Medium	3.22	Medium	3.4	Medium	3.47	Medium
7. People in my community know where to go to get things done	3.78	High	3.36	Medium	4.02	High	4.05	High
8. People in my community communicate with leaders who can help improve the community	4.06	High	4.06	High	4.5	High	4.37	High
9. People in my community are aware of community issues that they might want to address together	4.01	High	4.21	High	4.19	High	4.24	High
10. People in my community discuss issues so they can improve the community	4.03	High	4.31	High	4.44	High	4.42	High
11. People in my community work together to improve the community	4.09	High	4.57	High	4.83	High	4.55	High
12. My community looks at its successes and failures so it can learn from the past	3.58	Medium	3.4	Medium	3.87	High	4.08	High
13. My community develops skills and find resources to solve its problems and reach its goals	3.15	Medium	2.84	Medium	1.46	Low	2.83	Medium

14. My community has priorities and set goals for the future	3.27	Medium	3.07	Medium	1.6	Low	3	Medium
15. People in my community actively take part in elections of leaders People in my community actively take part in elections of leaders	2.54	Medium	3.22	Medium	2.19	Low	2.98	Medium
16. My community actively prepares for future disasters	2.16	Low	2.04	Low	1.21	Low	2.66	Medium
17. My community can provide emergency services during a disaster	2.1	Low	2.36	Medium	1.29	Low	3.02	Medium
18. My community has services and programs to help people after a disaster	1.85	Low	1.73	Low	1.19	Low	2.86	Medium

Source: Author's Field Survey, 2021

4.3 Community Resilience

From table 4.3 above, most people in all the four study communities are aware of community issues that they might want to address together. As a result, they communicate with their leaders, discuss issues, and work together to improve upon their respective communities.

Meanwhile, almost all the four study communities neither has services and programs in place to help people after a disaster nor actively prepares for future disasters except Adina that does this but in moderation.

Agavedzi is the town that has experienced a fresh disaster and as a result recorded the lowest resilience in six (6) indexes but moderate in four (4) indexes. It has therefore been noted as the least resilient community while Adina become the highest resilient community with moderate to high index subscriptions.

4.4 The Strength of Correlation Between Social Cohesion and Disaster Resilience.

The second objective in this study is to assess or quantify the strength of correlation between social cohesion and community resilience in each community under study. Table 4.4 provided a summary of the correlation between social cohesion and disaster resilience in each of the study community.

Table 4.4: Pearson Product Moment Correlations Between BIC and IPCR

	n	r	p
Adzido/Vordza	67	.526	.000
Blekusu	64	.635	.000
Agavedzi	52	.245	.040
Adina	64	.408	.000
All communities	250	.479	.000

Correlation is significant at 0.05 level

Source: Author's Field Survey, 2021

The correlations shown in Table 4.4 above indicated weak to moderate correlation, with coefficients ranging from a +0.245 at Agavedzi to a moderate +0.635 in Blekusu.

On the other hand, modeling the variables as a simple univariate predictor of resilience, social cohesion as represented by BIC in the table shows that, Agavedzi recorded the lowest variance in resilience 24.5% (R^2=0.245) while Blekusu recorded the highest variance in resilience 63.5% (R^2=0.635). Social cohesion among all the four studied communities explains 47.9% out of the total variance in resilience scores (R^2=0.479). There is therefore one common linkages among all the communities and thus, all positive and linear, and seems to suggest the absence of spatial

variation in the direction of social cohesion and disaster resilience across all study sites. Again, there is a significant spatial variation in the strength of these associations. This is seen in the magnitude of the coefficients obtained in each of the study community.

4.5 Analysis of covariates as predictors of resilience

The following known predictors of resilience included as covariates in the model are Years in Community, Years in Current Residence, Education, Transportation, and Health. They were used to assume a categorical variable and are analyzed below.

4.5.1 Number of years lived in the community

The statistical table of "number of years lived in the community" in table 4.5 portray the people's connection to their environment, displacement, and resettlement pattern Townshend et al (2015) before and after disasters since the calendar year 2000. In general, majority of the study participants in the four study communities indicated to have lived in their community for a long period. This according to Townshend et al (2015) indicated that most of the study participants have experienced disaster one way or the other. It also means that tidal-wave disasters are household topics among residents of the study communities.

Adzido-Vordza recorded the highest for the lowest cut-off point to portray the impression of respondents who had lived in a new community. All hitherto, the respondents have lived in this community because it is their ancestral homeland for a very long time until a major tidal-wave disaster dislodged them in the years between 2000 and 2002 during the period within which the Keta Sea Defense Project. This compel the government of Ghana to initiate land reclamation

project whiles houses were built and distributed among affected individuals. The Adzido-Vordza community had undergone a major restructuring process of which a new settlements/ community evolved and indicated higher level of resilience in the physical asset parameter.

At Blekusu, Agavedzi, and Adina, majority of respondents said to have originated from their respective localities. The longevity of living together and originating from a particular locality by respondents indicated higher level of neighborliness which translate to "we identity", and sense of communalism. This became a tool for building disaster resilience through social support.

Meanwhile, small proportional percentage of respondents indicated their recent stay at Blekusu, Agavedzi, and Adina indicating the presence of possible new ideas to building resilience. They were those who have also experienced tidal-wave disasters after relocating to the area. They may have adaptation strategies as they have been able to endure several forms of disasters encountered in the area.

Table 4.5: Number of years lived in the community

Years	Adzido/Vordza Percent	Blekusu Percent	Agavedzi Percent	Adina Percent
>10years	31.3	10.4	11.5	4.7
11-20years	11.9	13.4	13.5	7.8
21-30years	9.0	16.4	9.6	6.3
31+ years	47.8	59.7	65.4	81.3
Total	100.0	100.0	100.0	100.0

Source: Author's Field Survey, 2021

4.5.2 Number of Years in Current Residence

The year's one lived in current resident is presented in table 4.6 below. It shows the movement pattern and displacement of the population (respondents) who has experience disaster. Most of the respondents at Adzido-Vordza and Agavedzi changed their residency frequently and indicated that they have either experienced disaster recently and prior to the study or the community had experienced disaster long ago and had resettlement packages. Based on these, Adzido-Vordza and Agavedzi synonymously has witnessed a higher amount of displacement, but both communities had different conclusions. At Adzido-Vordza, the displacement was seen largely due to government provision of resettlement homes and has moderate resilience level whiles at Agavedzi, the displacement was as a result of the community recording new disaster cases and a large number of respondents resorts to squatting and has a low level of resilience.

On the contrary, Adzido-Vordza did not record any response for longer period of living in current residents ("years in current residents" with "31+ years" cutoff points). This indicated that, the community in general emerged out of resettlement after a catastrophic disaster event unlike Adina that had recorded the highest among residents who still occupy their own residence indicating high level of resilience and possibly how cohesive they are socially even though had experienced catastrophic disaster events.

Blekusu appeared to have witnesses almost both catastrophic disaster events and disaster resilience. Almost half of the respondents were displaced where majority of them shoulder the responsibility to build back better within 11 to 20 years. Table 4.6 present the number of years individuals lived in their current residents.

Table 4.6: Number of years lived in the current resident

Years	Adzido/Vordza	Blekusu	Agavedzi	Adina
	Percent	*Percent*	*Percent*	
>10	65.7	22.4	59.6	21.9
11-20	31.3	32.8	1.9	18.8
21-30	3.0	19.4	1.9	10.9
31+	0	25.4	36.5	48.4
Total	100.0	100.0	100.0	100.0

Source: Author's Field Survey, 2021

Although all the four study communities were indigenous old ancestral homes for most of the current residents, and had experienced disasters, the duration, time and intensity of disaster varies among them. As a result, Adzido-Vordza community was completely salvage and new settlements were raised by government in aid to the residents. This led to the majority of residents in Adzido-Vordza community to acclaimed government residential status and have lived in current residents below twenty years demonstrating resilience.

4.5.3 High Education as A Predictor of Community Resilience

The level of education attended by community members influences their knowledge and deepened their understanding of disaster concepts and as a result ensured disaster preparedness (Alshehri et al., 2015). The data on levels in educational attainment for respondents in the four study communities (see table 4.1of page 66) is discussed below as a covariate to community disaster resilience building.

At Adzido-Vordza, although all the respondents had acquired formal education with none without any form of education, majority of the respondents had acquired basic education whiles secondary and tertiary education attainment is at the barest minimum. The high level of low basic education in Adzido-Vordza suggest that, there will be low disaster resilience since this is inverse to the proposition that resilience drive well when majority of community members attained higher education (Alshehri et al., 2015).

At Blekusu, while there is majority formal basic education among respondents, it is evidence of high illiteracy. This is because most of the respondents had acquired only elementary/ primary education with a large proportional percentage have no formal education. Meanwhile, secondary and tertiary education attainment was at the barest minimum. The high level of low basic and no education coupled with low secondary and tertiary education in Blekusu suggested that, higher education was not a key indicator in the type of community resilience measured in the community.

The trend in education at Agavedzi depicted similarities in pattern with Blekusu as there was high rate of illiteracy coupled with higher basic education among respondents with a small proportion that has acquired secondary and tertiary education. This again, posit the insignificant contribution that education have contributed to the type of resilience experienced within the Agavedzi community.

The case of Adina is not exceptional to other two (2) of the study communities as majority of respondents had acquired only basic education whiles proportional percentage did not encounter any formal education. There was also very small proportional percentage of respondents that has acquired secondary and tertiary education. Using higher education as an indicator to community disaster resilience, the Adina community recorded low level of resilience.

In general, there was very low level of education among residents in the four study communities. Tertiary education attendance was statistically insignificant among respondents across all the four study communities. All hitherto, there was significant higher elementary/ primary and middle/JSS/JHS education in three communities except Adzido-Vordza. Classically, based on the work of Joerin et al., (2014) who asserted that a higher level of educational attainment is a strong correlate to better community preparedness to disasters and can contribute to improving resilience, the result in this study, using indicators such as the percentage of the population with high school education (Qasim et al., 2016; Sherrieb et al., 2010) and literacy rate (Joerin et al., 2014) warrant the conclusion that, although the majority of respondents had lower education, most of them did not have access to higher education (tertiary) hence all the communities are likely to experience a low-level resilience.

4.5.4 Health status of families as an indicator of community resilience

Scholars concluded that, health status of families is an indicator of community resilience (Cutter et al., 2010b; Norris et al., 2008). From the graph presented in figure 4.1, there has been a dominant "Yes – Valid" response to having health insurance throughout all the study communities with Adina recording the highest whilst Agavedzi recorded the least. The higher percentage number of people with health insurance indicated a higher degree of psychological wellness coupled with a healthy lifestyle of individuals, and community well-being. These experiences have demonstrated an important resilience characteristic in all the four communities and serves as an enhanced resilience source to disaster. Meanwhile, the response to acquisition of health insurance was thought to vary between men and women due to their mentality outlook.

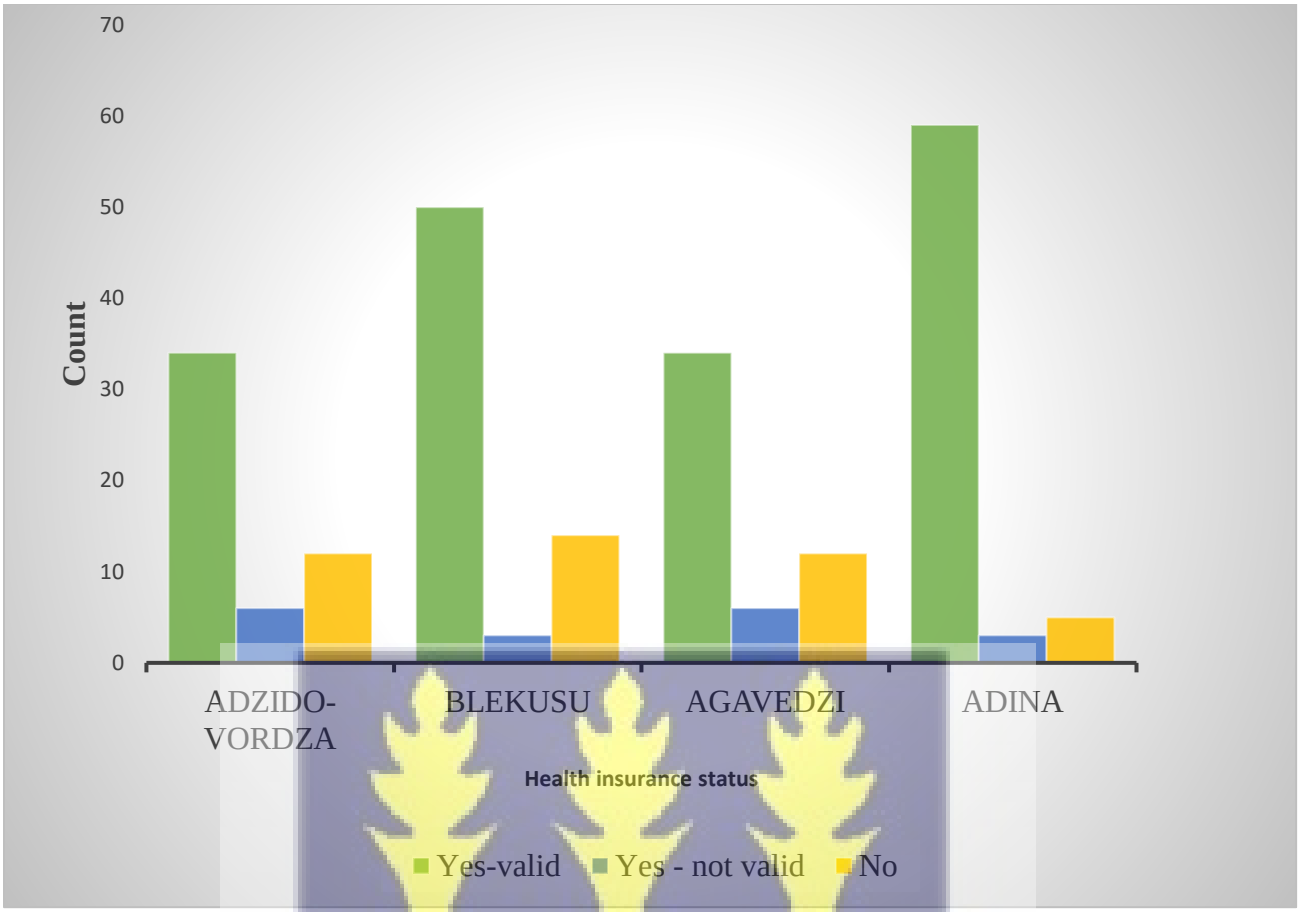


Figure 4.1: Health status in the four study communities

Source: Author's Field Survey, 2021

Gender as a determiner to health insurance acquisition

Also, gender of the individual does not facilitate one's ability to acquire health insurance as these became statistically insignificant throughout the four study communities and represented in table 4.7 The notion that genders is a determiner of health insurance acquisition is rejected. This is because, gender has no relationship with the acquisition of health insurance in all the four study communities.

Table 4.7: Cross-tabulation of gender and health insurance acquisition

		Health insurance			Total	Goodness of fit	
		Yes - Valid	Yes - Not Valid	No		Chi-square	P
ADZIDO-VORDZA							
Gender	Male	35	3	2	40		
	Female	22	1	4	27		
Total		57	4	6	67	2.192[a]	.334
BLEKUSU							
Gender	Male	28	1	10	39		
	Female	22	2	4	28		
Total		50	3	14	67	1.869[a]	.393
AGAVEDZI							
Gender	Male	20	3	8	31		
	Female	14	3	4	21		
Total		34	6	12	52	1.505[a]	.826
ADINA							
Gender	Male	38	1	2	41		
	Female	21	2	0	23		
Total		59	3	2	64	2.355[a]	.308

Source: Author's Field Survey, 2021.

Table 4.8: Parameter estimate and likelihood ratio test of health status of families as an indicator of community resilience

Community	Parameter Estimates		Likelihood Ratio Tests	
ADZIDO-VORDZA	Health insurance	Sig.	Chi-Square	P-Value
	Yes - Valid	.000	77.285	.000
	Yes - Not Valid	.530		
BLEKUSU	Health insurance	Sig.		
	Yes - Valid	.000	55.473	.000
	Yes - Not Valid	.015		
AGAVEDZI	Health insurance	Sig.		
	Yes - Valid	.002	24.258	.000
	Yes - Not Valid	.166		
ADINA	Health insurance	Sig.		
	Yes - Valid	.000	98.799	.000
	Yes - Not Valid	.657		

Source: Author's Field Survey, 2021

The assertion that health status of families is an indicator of community resilience is significant in all the study communities in a Likelihood Ratio Tests in table 4.8 with $p < 0.05$.

Also, valid health insurance is statistically significance in all the four communities and has indicated that there is good health, higher degree of psychological wellness, and healthy lifestyle among individuals and the community. Since respondents with valid health insurance formed the majority among all responses, it is obvious that the four study communities have higher resilience to disaster in as much as health status of families is concerned to be a measure to resilience. But a parameter estimates interestingly suggest that the use of a valid health insurance as a proxy indicator to measure resilience appears to be not entirely true. This is because an invalid health insurance response at Blekusu is also statistically significant as $p = 0.015 > 0.05$ to which one

failed to reject the null hypothesis that states that: "the higher percentage number of people with health insurance will indicate a higher degree of psychological wellness coupled with a healthy lifestyle of individuals, and community well-being" may not be entirely true in all context.

Based on these, a parameter estimates and likelihood ratio chi test was conducted in a multinomial logistics regression which exposes the weakness of the model and posit that even though people are without health insurance, they were able to access good healthcare and afford their psychological needs and live a healthy lifestyle.

Remarkably, these are what some youth respondents at Blekusu who were without valid health insurance have to say during an in-depth interview.

Y1 HINV:

> *"What use has it being in our hospitals? I used to have a valid health insurance card but each time you visit the hospital, the hospital workers will delay you and finally give you low-cost drugs and asked you to go and buy the rest of the medications which are usually very expensive. They claimed national health insurance does not cover some of the drugs and it all appears like you have wasted the whole day without achieving nothing"*

From the response above, there appear to be complete loss of trust in the current health insurance scheme and many thought that it is not useful to acquire it as they pay much and get nothing in return (Woolhandler & Himmelstein, 2002). They therefore preferred an alternative source to health care delivery rather than patronizing the nation's health insurance that provide them with nothing except for cheap drugs that does not help solve their health needs. This response also

seems unanimous among other respondents who either did not subscribe or have an expired health insurance.

Y2 HINV whose narrative seems different is recounted as follows:

> *"National Health Insurance (NHI) can only afford you a paracetamol today. Everything is about money and if you go to hospital without money, believe me not, you will die certainly. Even in an emergency, they will ask you to deposit money before work commence. They should just stop it because politicians are only fooling us"*

From the response above, there is the believe that, health is a non-negotiable asset and as a result, health authorities will not compromised its quality to health insurance that hardly pay (Cheng, 2015). This notion was confirmed when a health administrator at a reputable hospital within the Ketu South Municipality says the followings:

> *"Many people nowadays come to hospital with National Health Insurance card to access healthcare and there is much pressure on our facility. This is because we pre-finance everything that we use during the health delivery process and then, get disbursed later. But this disbursement delays too much that we have to practically result to borrowing. We cannot continue this way so we prefer the cash and carry system. When people pay for their health services, it makes the work much easier for us all".*

Y3 NHINV asserted the 'non-functionality' of the health insurance scheme as follows:

> "*National Health Insurance (NHI) is not working here in Ghana. Me, I have not renewed it again since it expired six (6) years ago. Each time I'm not feeling well, I go to private hospital at Aflao where I received better and humane treatment. I preferred to continuously pay for my hospital bills and received proper attention rather than holding national health insurance card where they won't treat you well yet still collect your money"*

4.5.5 Availability of Transport.

The four study communities have class 1 road networks and other feeder roads that linked the main business districts to each of the study communities within the respective municipalities. There is therefore an access road network that help facilitate quicker response in emergency situations.

The means of transport availability among respondents in the four study communities is presented in the graph below.

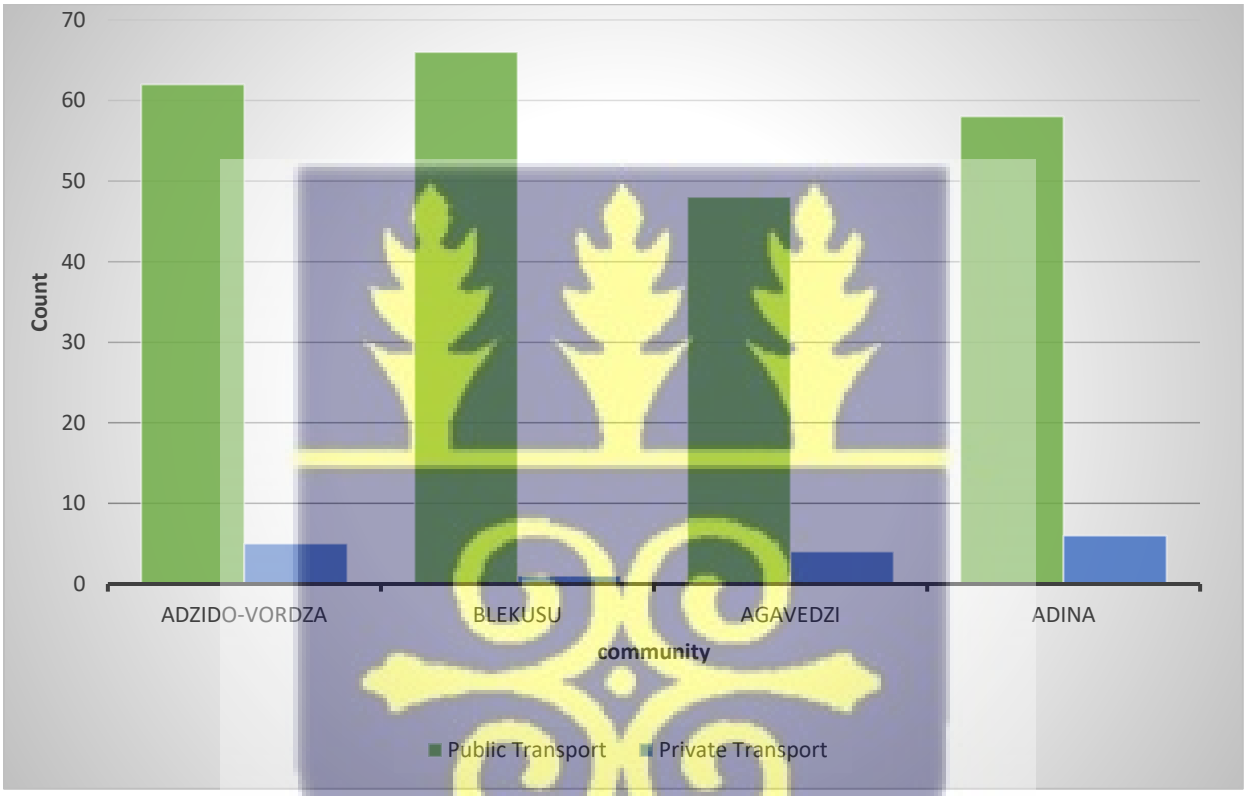


Figure 4.2: Means of transport in the four study communities

Source: Author's Field Survey, 2021

From the graph above, public transport is the predominant means available to commuters. Majority of the respondents in the various study community commute to-and-fro in taxis and 'trotro' whiles just a few individuals commute from one point to the other in their own private cars.

Even though, public transportation is the common out-sourced medium for most respondents, there is greater mobility of people. This is because, operability of public transport system makes transport services available at every node across all trunk roots in all the four study communities.

According to Adger et al (2008) when there are greater mobility of people, social resilience can be enhanced to help improve effective disaster response, especially during disaster evacuation and recovery.

4.6 Association/ Correlation Between Social Cohesion and Disaster Resilience.

Social cohesion is an important correlate of resilience (Rolfe, 2006 cited by Townshend et al., 2015a). The correlation between social cohesion and community resilience in each of the study communities is presented in a scatter plot below. The line of regression coefficient was used to determine whether there was a positive or negative correlation between communities' social cohesion and disaster resilience. This was done to meet the expected needs of the first objective of the study - association or correlation between social cohesion and community resilience.

In figure 4.3 representing Adzido-Vordza community, the coefficient of determination is 0.276. This means that only 27.6% of the variation in the data values of social cohesion and resilience is determined by the regression line. In other words, about 72.4% of the variation between social cohesion and disaster resilience was determined by other indicators rather than the line of regression.

Furthermore, the plot suggests a positive correlation between social cohesion and disaster resilience in the Adzido-Vordza community.

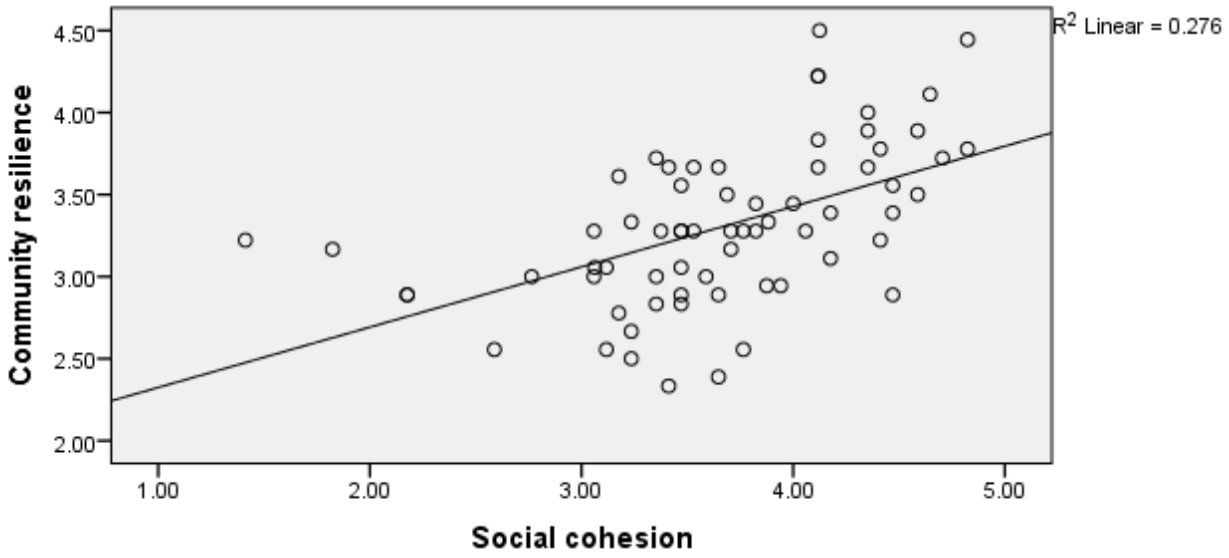


Figure 4.3 :Scatter plot of social cohesion and community resilience – Adzido/Vordza

Source: Author's Field Survey, 2021

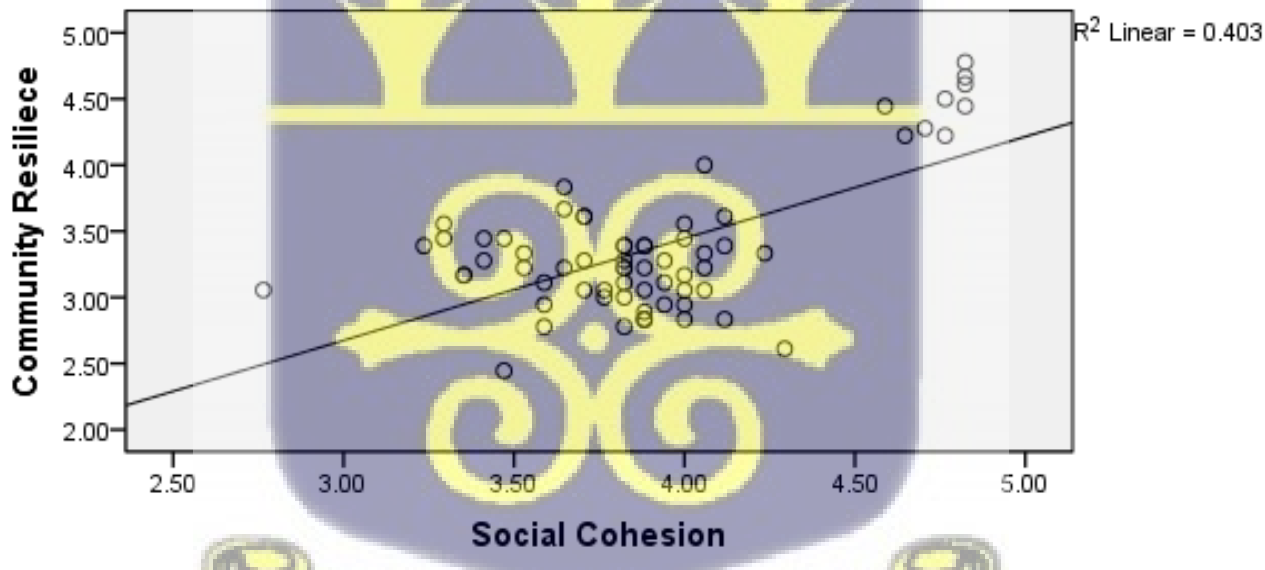


Figure 4.4: Scatter plot of social cohesion and community resilience - Blekusu

Source: Author's Field Survey, 2021

In figure 4.4 above which represent Blekusu community, the coefficient of determination is 0.403. This means that only 40.3% of social cohesion and resilience is determined by the regression line.

In other words, about 50.7% of the variation between social cohesion and disaster resilience at Blekusu was determined by other indicators rather than the line of regression. Furthermore, the plot suggests a positive correlation between social cohesion and disaster resilience within Blekusu.

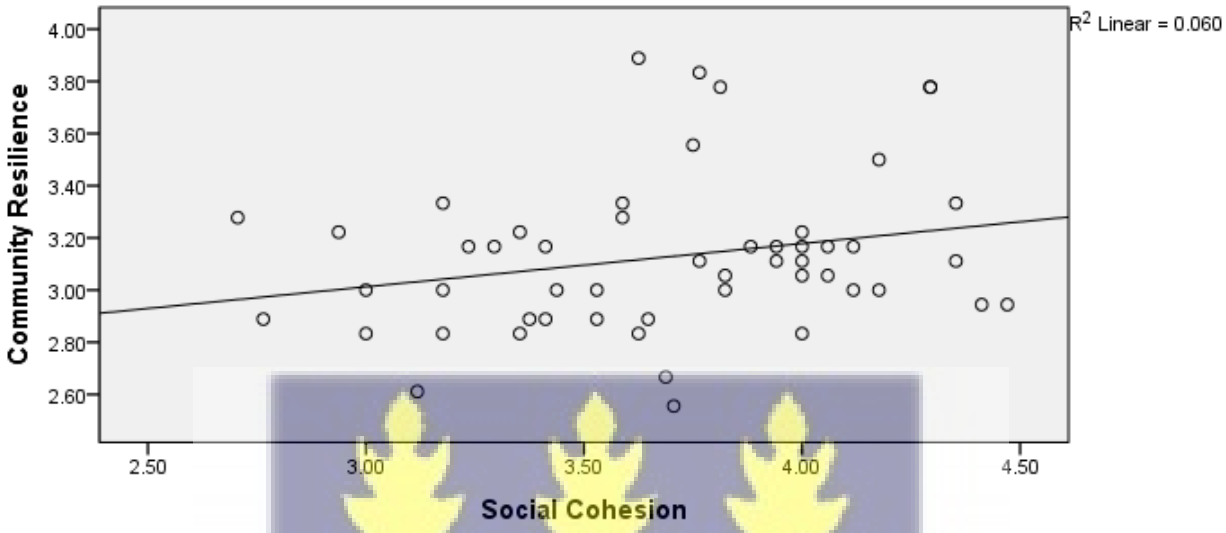


Figure 4.5: Scatter plot of social cohesion and community resilience - Agavedzi

Source: Author's Field Survey, 2021

In figure 4.5 above which represent the Agavedzi community, the coefficient of determination is 0.060. This means that only 0.06% of social cohesion and resilience is determined by the regression line. In other words, about 99.94% of the variation between social cohesion and disaster resilience at Agavedzi was determined by other indicators rather than the line of regression. Meanwhile, the plot suggests a positive correlation between social cohesion and disaster resilience within Agavedzi.

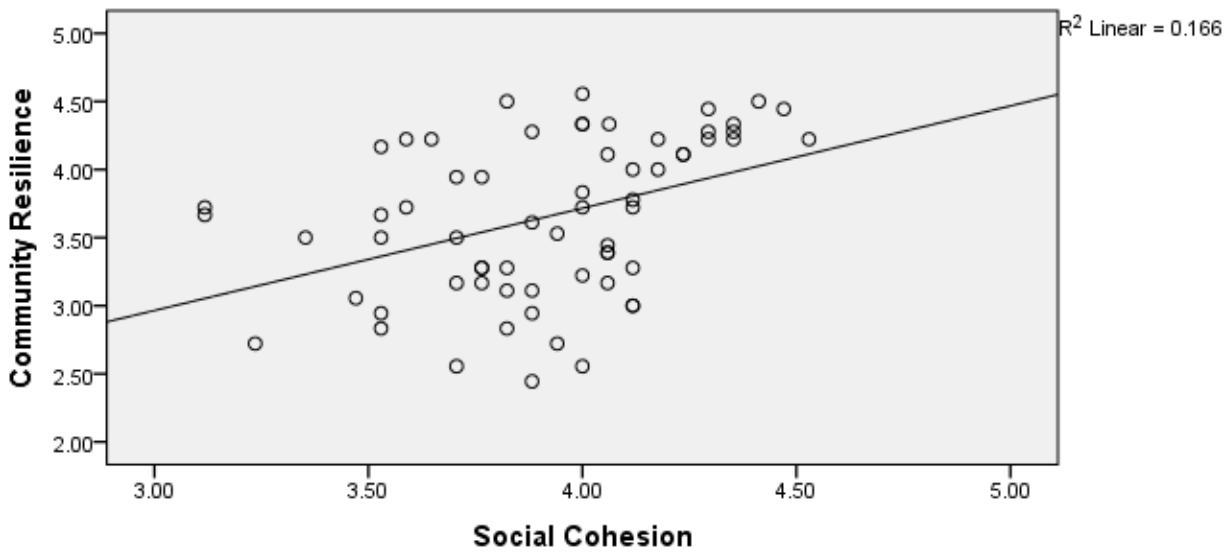


Figure 4.6: Scatter plot of social cohesion and community resilience - Adina

Source: Author's Field Survey, 2021

In figure 4.6 below representing Adina community, the coefficient of determination is 0.166. This means that only 1.66% of social cohesion and resilience is determined by the regression line. In other words, about 98.34% of the variation between social cohesion and disaster resilience at Adina was determined by other indicators rather than the line of regression. Furthermore, the plot suggests a positive correlation between social cohesion and disaster resilience within Adina.

The above is true as Pearson Product Moment Correlation (PPMC) between social cohesion (BIC) and Index of Perceived Community Resilience (IPCR) iterated a significant ($p<0.001$) positive linear relationship. Furthermore, an aggregation of all variables from all the communities also confirmed a positive linear relationship ($r=0.479$, $p<0.001$, $n=250$).

4.7 Similarities and Differences Between Social Cohesion and Resilience.

The table below contains the descriptive statistics of social cohesion (BIC) and community resilience (IPCR) in the various communities with mean scores at 95% confidence level.

Table 4.9: One-way ANOVA of BIC and IPCR scores

				95% Cl Mean		
	n	Minimum	Maximum	Mean	SE Mean	Std. Dev.
BIC						
Adzido/Vordza	67	1.41	4.82	3.6647	.08421	.68926
Blekusu	67	2.76	4.82	3.9034	.05224	.42759
Agavedzi	52	2.71	4.47	3.6892	.06144	.44309
Adina	64	3.12	4.53	3.9137	.03948	.31584
IPCR						
Adzido/Vordza	67	2.33	4.50	3.3043	.05888	.48194
Blekusu	67	2.44	4.78	3.3706	.06334	.51849
Agavedzi	52	2.56	3.89	3.1271	.04165	.30035
Adina	64	2.44	4.56	3.6515	.07271	.58168

Note:
BIC = Buckner's Index of Cohesion
IPCR = Index of Perceived Community Resilience
N=250
Source: Author's Field Survey, 2021

The mean score for BIC at Adzido-Vordza and Agavedzi were statistically insignificant as the two communities demonstrate to record the same mean intensity. Similarly, Adina and Blekusu seem to also record the same mean intensity and obtained statistical significance. In other words, Adzido-Vordza and Agavedzi recorded low average score whiles Blekusu and Adina recorded a moderate mean score and demonstrated a universal distribution of social cohesion (BIC) in line with the FEMA model of disaster resilience. Although this seems to simulate the sequence proposed in the FEMA model, the type of social cohesion witness in the mean intensity of Adzido-Vordza and Agavedzi suggested that social cohesion is inherently a correlate to emotional states of the individual not only during disaster events but also the processes that lead to building resilience (Townshend et al., 2015). To elaborate further, social cohesion may be at risk in communities that received external support such as housing and other social goods but suffered unfair distribution of such incentives. Those communities may continue to experienced emotional low even after a disaster occurs over a long time (Adzido-Vordza) and as a result, may indicate same low-level of resilience just as communities that have experienced a fresh disaster (Agavedzi). This reiterates that despite the positive association between social cohesion and community resilience scores been universal, geographic variation is dependent on the intensity of these scores – improving upon lagging resilience indicators through encouragement of best social solidarity practices. This understanding is deductively made when one expected a high average BIC mean score at Adzido-Vordza since the community has experienced disaster for more than 20 years ago before this study, and had received government intervention houses representing 31.3% among residential ownership types of the surveyed sample in the last 18 years before the survey. Vividly, there is therefore a safe condition in terms of the physical environment but a decay in social

cohesion. This was further probed in a semi-structured interview in response to the fourth objective of the study and the same transcribe as such.

Agavedzi also recorded a low average BIC mean score translating into a low level of resilience. This was because the community had experienced disaster barely one month before the survey and had no external support. Relating this to the FEMA model, the Agavedzi community was at the disillusionment phase and regressively, may experience a low level of social cohesion after which they may advance to the one-year honeymoon phase where they may have high social cohesion. Adina community unlike Agavedzi had also experienced a disaster (both erosion and flooding) leading to the collapse of buildings, and the destruction of personal effects in the past 3 years and have received government interventions in the form of constructed groins. At the moment, they are still at the reconstruction stage according to the FEMA model, for a new beginning while working through grief and coming to terms with the setback after the first-anniversary reaction. With the aid of the groin, the process of land reclamation is ongoing and will translate into resilience overtime.

However, contrary to the BIC mean scores, the IPCR mean scores across the communities did not emulate the same pattern. Considering the elapsed time between the disaster and the time of the surveys, one may conceptualize that the type of cohesion realized in each community would have reflected to commensurate resilience with time decay from the disaster event.

Blekusu and Adina having relied solely on their internal support recorded an IPCR average of 3.3706 (33.71) and 3.6515 (36.52) respectively. They were at the reconstruction stage as they work through grief while coming to terms with the setback after the anniversary.

Adzido-Vordza recorded an average mean intensity IPCR score of 3.3043 (33.04) much lower than expected (due to the longer duration after the disaster events – over 20 years) and perhaps inadequate for a community that has advanced into the rebuilding phase. Adzido-Vordza experienced moderate resilience yet could still not improved upon their emotional status after a long period of having experienced a disaster. As a result, could not easily be classified in the FEMA model. Agavedzi recorded an average IPCR score of 3.1271 (31.27). This was adequately expected for a community in the pre-disaster phase. It experienced lowest resilience level and this immolates a community in a disillusionment with emotional lows and low social cohesion and resilience. The low social cohesion may be attributed to the evenness of the tidal-wave impact on every household at the same time.

Agavedzi was noted to be in the pre-disaster phase as the community had just experienced disaster barely a month before the study. Due to its relative distance (far away) from the first anniversary date of the FEMA model, it exhibited an extremely low level of both social cohesion and community resilience. But what is not clear is the extremely low level of resilience experienced in Adzido-Vordza despite having experienced disaster over a long time and had received support from both the local and central government in terms of housing infrastructure and social amenities. This does not relate collaboratively with the FEMA model hence, the need for an additional investigation to understand why this has become so. Meanwhile, for the meantime, the differences that suggest being a deviation from the FEMA model as seen at Adzido-Vordza could be attributed to the differences in communities' unique qualities in terms of administrative practices and people's perceptions.

4.8 Determinants of Resilience or Otherwise in The Various Communities.

The followings are core factors that are common to all the four study communities and have limit the realization of "building back better". they are therefore required to be improved upon to ensure strong community resilience.

a. Poor leadership skill

Leaders in our various communities play a crucial role in the promotion of social cohesion by encouraging inclusiveness and ensuring equity among the people at all level (Ludin et al., 2018a; Marzi et al., 2019). According to Rubin et al (1985), effective and trustworthy community leadership is the one that believe in given priority to disaster resilience activities by setting goals for the future through building network, encouraging community support, accepting opinions from community members among others so that the people can be ready to take initiatives during disasters in other to promote social resilience. But, on the contrary, the study observed that community leaders do not prioritize, and set goals for the future. This is much deficient at Agavedzi but exercise in moderation at the other three communities. The leaders in the various community rarely engage the people to discuss developmental issues and to also plan towards the future needs of their communities.

b. Lack of emergency services during a disaster

The study communities do not have adequate resources to provide emergency services to the people in times of disasters. Relieve items are sometimes not available to supplement the emergency needs of the people in all the study communities. The local agency (National Disaster Management Organization) equally does not have the resources to support disaster

victims during emergency situations. Furthermore, the study communities have no structured services and programs in place to help their people after a disaster event.

c. Inability to develop skills and mobilized resources

The various study communities did not have the vision to develop skills of their members and find resources to solve its problems so as to reach its goals and aspirations.

d. Discrimination and favoritism

The way and manner government intervention projects were unfairly administered/ distributed e.g., some people were allocated to blockhouses roofed with metal sheets, whiles others were given houses build with straw and roofed with thatch. These practices may have led to a break in social trust and lack of social support among community members at Adzido-Vordza and might have accosted the kind of extremely low level of both social cohesion and resilience in the community after so many years of experiencing tidal-wave disasters.

The followings are indexes that shows the level of resilience in each of the study communities and needed to be sustained whiles those in moderation are improved upon.

a. Resource availability and mentality outlook of the individual

All respondents in the study communities except for Adzido-Vordza (moderate) claim to have enough resources that can be put to good use to resolve their communal problems so as to "build back better" and thought that their leaders are moderately effective to lead

them in managing the resources. The resources include money, information, technology, tools, raw materials and services.

b. Community Togetherness,

The people in the various study communities help each other especially during emergency situations. They are also committed to the well-being of the community. But the level of togetherness and commitment to community is in moderation at Adzido-Vordza. Meanwhile, they all have hope that the future will be better than present.

c. Effective communication

The people in the study communities know where to go to get things done and also communicate effectively with leaders who can help improve their common needs. Although, there is moderate communication level at Adzido-Vordza, Blekusu and Adina, Agavedzi recorded the lowest.

d. Availability of community services

The various study communities have moderate assess to social services such as healthcare, basic education, religious worship among others. this has moderately contributed to the moderate level of resilience and needed to be improved upon.

e. Awareness of community problems

There is high level of awareness of community issues that the people may wish to address together. Tidal-waves actions (disasters) remained a household knowledge and a nightmare

to all residents of the study communities. They are issues that they discussed even at household unit. They therefore work together highly at Agavedzi and Adina but moderately at Adzido-Vordza and Blekusu to improve the community in which they live.

Other determinants of community resilience are as follows

a. **A higher number of aged people having access to healthcare.**

A cross-tabulation analysis between the age of respondents and those having Health Insurance in the four study communities revealed a pattern that showcased the awareness of health significance to resilience building by people of all ages. Norris et al (2007) noted that higher degree of psychological wellness coupled with a healthy life-style of individuals, and community well-being are important resilience characteristics. Moreover, health status such as physical and mental health wellness are salient indicators under the social dimension (Alshehri et al., 2015).

In perspective, majority of respondents aged 40 years and above (elderly) subscribed to health insurance scheme and has a valid health insurance card in all the four study communities. However, health insurance card renewal is a problem among people of all ages as a significant proportion of respondents cut across all ages has their health insurance expired. However, the majority of respondents who were below 20 years of age and have played a role of a household head responded in proxy.

In conclusion, the Adzido-Vordza, Blekusu Agavedzi, and Adina communities have a high level of resilience based on the literature of Norris et al., (2007); and Cutter et al., (2010) who noted that a higher degree of psychological wellness coupled with a healthy lifestyle of individuals, and community well-being were important resilience characteristics. The above analysis is presented in the tables that follows.

Table 4.10: Cross-tabulation of Age of respondents and Health Insurance at Adzido-Vordza

		Health insurance			Total	Chi-square	P
		Yes - Valid	Yes - Not Valid	No			
	<20	5	0	2	7		
Age	20-40	19	1	1	21		
	>40	**33**	**3**	**3**	**39**		
Total		57	4	6	67	4.379[a]	.357

Source: Author's Field Survey, 2021

Table 4.11: Cross-tabulation of Age of respondents and Health Insurance at Blekusu

		Health insurance			Total	Chi-square	P
		Yes - Valid	Yes - Not Valid	No			
	<20	2	0	1	3		
Age	20-40	10	0	5	15		
	>40	**38**	**3**	**8**	**49**		
Total		50	3	14	67	3.133[a]	.536

Source: Author's Field Survey, 2021

Table 4.12: Cross-tabulation of Age of respondents and Health Insurance at Agavedzi

		Health insurance			Total	Chi-square	p
		Yes - Valid	Yes - Not Valid	No			
	<20	2	0	0	2		
Age of respondent	20-40	8	2	4	14		
	>40	**24**	**4**	**8**	**36**		
Total		34	6	12	52	1.505[a]	.826

Source: Author's Field Survey, 2021

Table 4.13: Cross-tabulation of Age of respondents and Health Insurance at Adina

		Health insurance			Total	Chi-square	P
		Yes - Valid	Yes - Not Valid	No			
	<20	2	0	0	2		
Age	20-40	7	1	1	9		
	>40	**50**	**2**	**1**	**53**		
Total		59	3	2	64	3.382[a]	.496

Source: Author's Field Survey, 2021

Although, majority of aged people have subscribed to health insurance, this does not indicate that age is a determiner to the acquisition of health insurance hence failed to reject the null hypothesis. In other words, for one to acquire health insurance, s/he does not need to attain any specific age.

b. Attracted to living in the community

According to the study participants in all the four study communities, most of them subscribed to be strongly attracted to their respective communities with only a few individuals disagreeing and expressed their disaffection and non-attraction to the area as follows.

Mama G, a female respondent (proxy) who settled at Agavedzi due to marriage express her non-attractiveness as follows:

> *"Hmmm.....I don't like this place one bit. I'm here because of marriage. Each time the sea becomes aggressive, our rooms become full of water. The whole of the community is taken by water. We have to carry our handy belongings and at the same time rescuing the children. Everything gets destroyed. We sleep on the road until the water subsides. We hardly receive support. The politicians do visit us and make empty promises to which they never redeem".*

Wodaa, a respondent who settled at Adina due to marriage also shared her resentment as follows:

> *"We are always living in fear because the tidal-wave can strike at any time most especially at night without prior notice. There are no warning signs to alert us of any pending danger so that we can be better prepared. Due to this fear, we cannot even sleep at night. Government should come to our aid because we are suffering"*

The responses suggest among many other issues that, those who claimed not to be attracted to the community have ever lived elsewhere but were relocated to the coastal communities for some peculiar reasons. Primarily some of these reasons were marriage, postings and transfers. They appear to have low or no adaptive capacity, no coping strategies and may not be able to build resilience. They therefore expressed their disaffection whiles willing to relocate on a condition that their husbands will be willing too.

c. The relocation of affected people from hazard-prone areas.

The relocation of people from their current environment was not a piece of welcome news to most natives in the respective communities. This pattern trend across all the communities with paired similarity in the margin indicating that most of the people were inconsiderate of the hazards and will prefer to remain settled in a fragile environment where they are exposed to the dangers associated with tidal wave hazards. This subset of response appears to have originated predominantly among natives putting non- natives who were renting and squatting willing to ascender.

A feared resistance was observed with over 78 percent of respondents unanimously declining to be relocated in Blekusu and Adina. Apparently, this might be attributed to low disaster intensity, slow pace of coastal erosion, and perhaps the insertion of water-breaks (groins) for land reclamation at Horvi – an asymmetry advantage suburb of Blekusu. At Adzido-Vordza and Agavedzi, although majority of the people expressed their unwillingness to relocate, a significant proportion of the respondents representing about percentage quintile expressed their willingness to relocate if given the opportunity. In order to understand the underlying causes that necessitated

their willingness or unwillingness to relocate, the following responses were obtained during an in-depth interview and appears to be rhetoric and unanimous across all the four study communities.

Efo, a household head at Blekusu expressed his unwillingness to relocate as follows;

"Have you ever seen a fish lived in the forest?"

He asked rhetorically. According to him, the weather condition may not be favorable to them and as a result they cannot survive in any other environment up-land rather than coastal areas. This assertion is in line with the concept of environmentalism where species become addicted to the environment within which they lived (Wilson & Fisher, 2016).

S.K, a fisherman and household head at Adina also expressed his unwillingness to relocate as follows:

"We cannot hold a hoe, we cannot weed, and I mean we cannot farm. Our great grandparents were here after our fathers. The sea is our inheritance. Fishing is our profession. It is what we know and can do best".

According to him, the sea is what has been passed over to them by their ancestors and it serves as their main source of income, and economic livelihood. Because of these, they are very much

knowledgeable in fishing and do engage much in fishing activities for survival. He feels that they don't have knowledge in how to engage in up-land farming activities except for fishing.

Torgbui, a clan and household head also commented as follows:

> *"This place is our home…. Our ancestors were here, we cannot go anywhere and leave them behind…aahh; they won't even forgive us"*

The refusal of Torgbui appears to be based on the community ancestral connections and beliefs. To him, the dead are still living in harmony with the living and as a result, there is a cultural and spiritual link that needed not to be detached. Relocating to new places without taking their dead ones along will result to a break in such tides and may suggest that they have abandoned their ancestors and will be punish in consequence.

Dumega, a student journalist who responded in proxy as a household head at Agavedzi in a simple statement expressed his displeasure not to relocate as follows:

> *"Waking up without the sight of the sea will make me insane; the sight of the sea is refreshing, and nourishing. The sea serves as our source of healing to several ailment and restore us after our affliction".*

There are many schools of thoughts that posit that, the natural environment has the capacity to provide healing mechanism to man when left undisturbed (Wilson & Fisher, 2016). Based on this, Dumega believe that the sea is of great benefit to man as he derived healing through the sight of the sea.

The above information's suggest that although the people refused to be relocated from such fragile environment, they were much aware of the dangers associated with it and has their own adaptation strategies to mitigate disasters related to tidal-wave actions.

On the contrary, a section of study participants who formed the minority in all the four study communities and willing to relocate express their displeasure as follows:

Midawo, a household head at Agavedzi was willing to relocate and expressed his displeasure by saying that;

> *"This place used to be a large field with coconut grooves. A playground for our children. A vast land that used to house our fathers…. hmmm… all is gone. I lost everything that I have toiled for all my life. My house, and that of my parents are far gone into the sea… I am homeless"* (He lamented),

He continued;

> *"Look at me, I live on the street with my family, cook, bath, and sleep on the street for now awaiting where help could come from. I have nothing left so if I get the opportunity, I shall leave here at once".*

This type of response was unanimous among all respondents that had experienced disaster recently and were at the pre-disaster phase. They demonstrate no coping capacity and are believed to be much more affected by the disaster event to which there is no hope for resilience anytime soon.

The table 4.14 below display the various opinions on the willingness of respondents to relocate or otherwise as agreed.

Table 4.14: Relocation to safe places

		Adzido-Vordza	Blekusu	Agavedzi	Adina
		Percent	Percent	Percent	Percent
Valid	Strongly Disagree	40.3	25.4	40.4	29.7
	Disagree	13.4	46.3	25.0	43.8
	Agree	23.9	7.5	13.5	4.7
	Neither agree nor disagree	0	16.4	0	17.2
	Strongly Agree	22.4	4.5	21.2	4.7
	Total	100.0	100.0	100.0	100.0

Source: Author's Field Survey, 2021

d. Solidarity in social trust and support

Social trust is a components of social cohesion (Leykin et al., 2016). Trust among members of the community and other neighboring communities' helps to facilitate positive coordination and cooperation for effective disaster responses. It also provide access to resources (Ainuddin et al., 2012).

Most people in the various study communities do visit other people who lived in their neighborhood. This practice is more prevalent among the aged class as compared to respondents who were a little younger below 20 years and those within the middle-aged group. The figures below present a visual expression of the information above on all the four study communities.

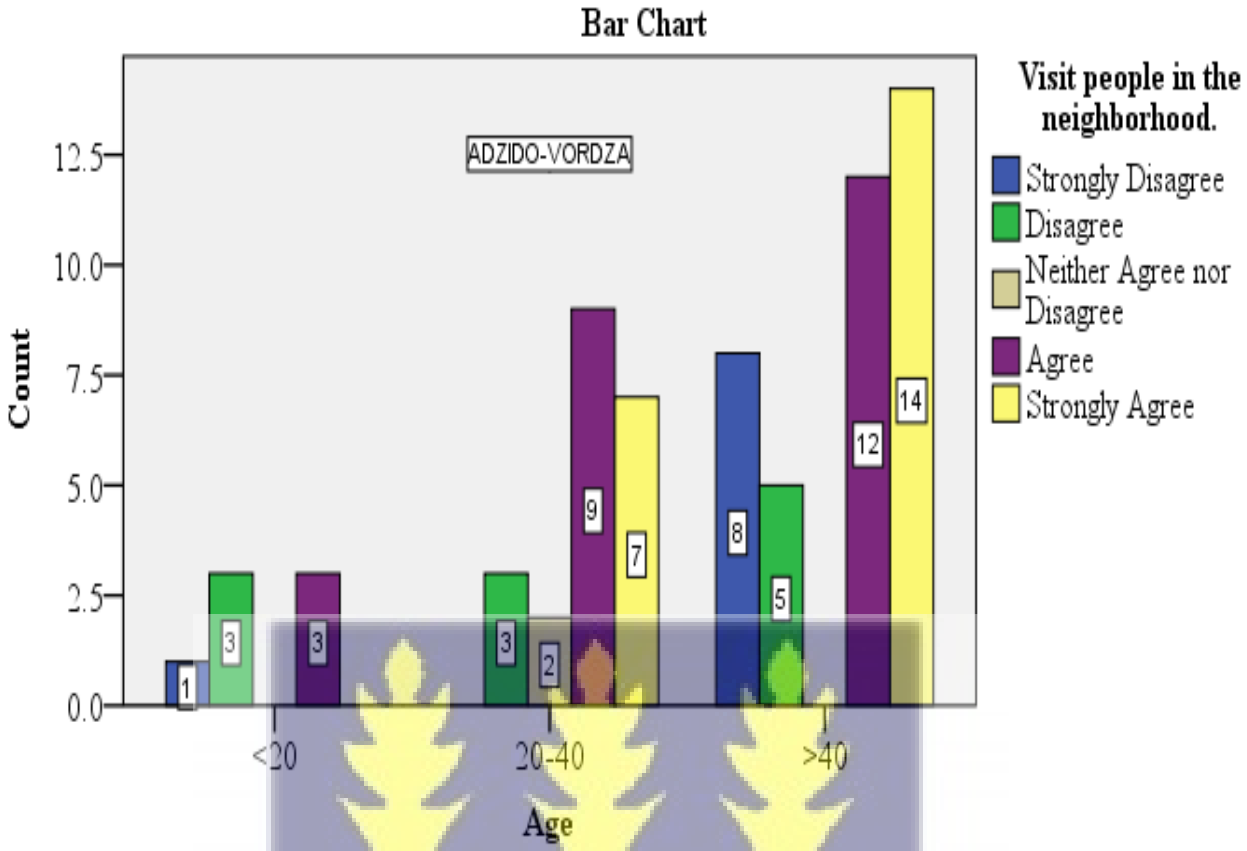


Figure 4.7: Cross-tabulation details of respondents' age and visit to their neighborhood at Adzido-Vordza

Source: Author's Field Survey, 2021

At Adzido-Vordza community, fourteen (14) respondents aged 40 and above strongly affirmed their strong tides and connection to their neighbors. This was expressed through their frequent visit to each other. This response remained the highest as compare to those who felt for no need visiting friends in the neighborhood. In figure 4.8, it's obvious that neighborliness fosters and help improved sense of communalism at Adzido-Vordza.

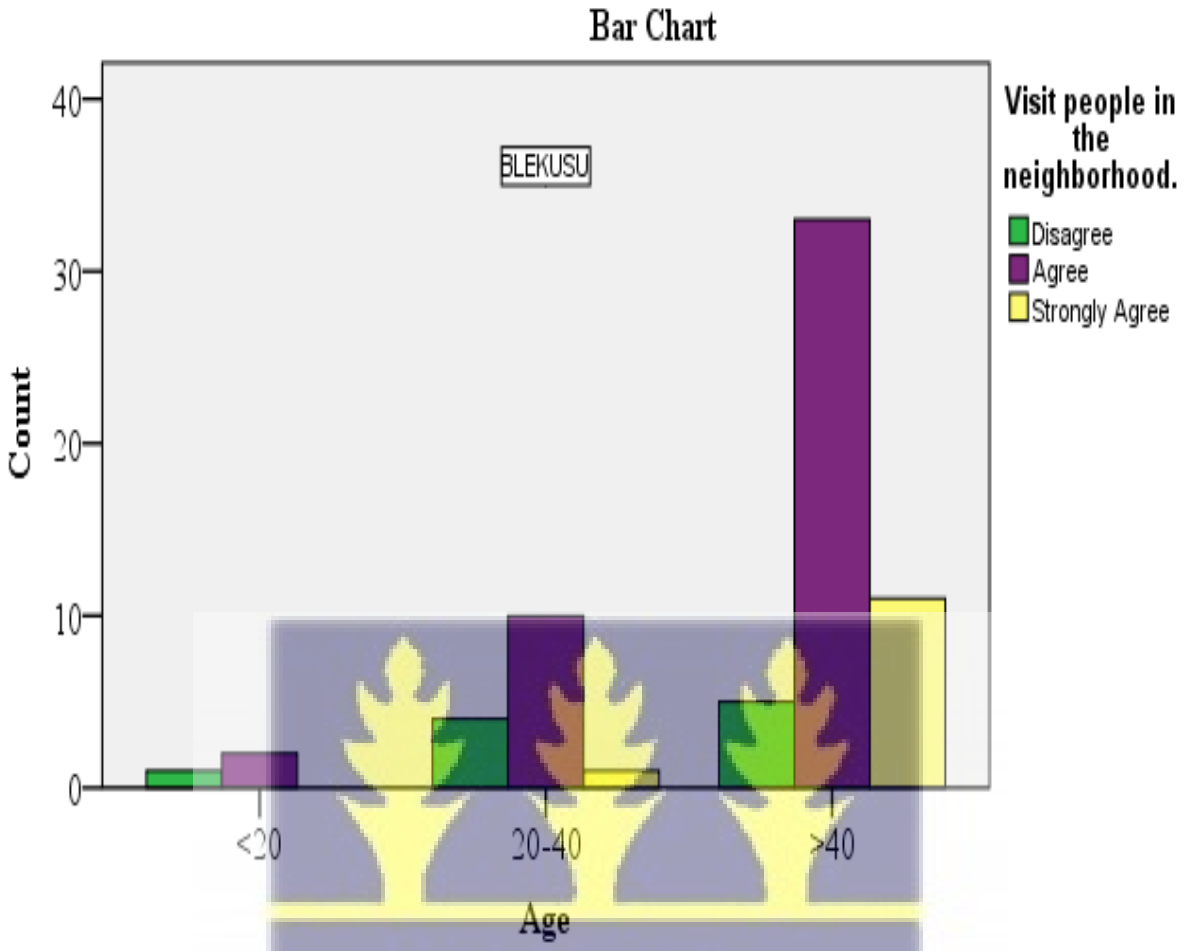


Figure 4.8: Cross-tabulation details of respondents' age and visit to their neighborhood at Blekusu

Source: Author's Field Survey, 2021

At Blekusu community, aged respondents predominantly agree and strongly affirmed their strong tides or connection to each other contrary to those below the age twenty (20). They expressed connectivity through their frequent visit to each other. From figure 4.9 above, it's obvious that neighborliness fosters and help improved sense of communalism at Blekusu.

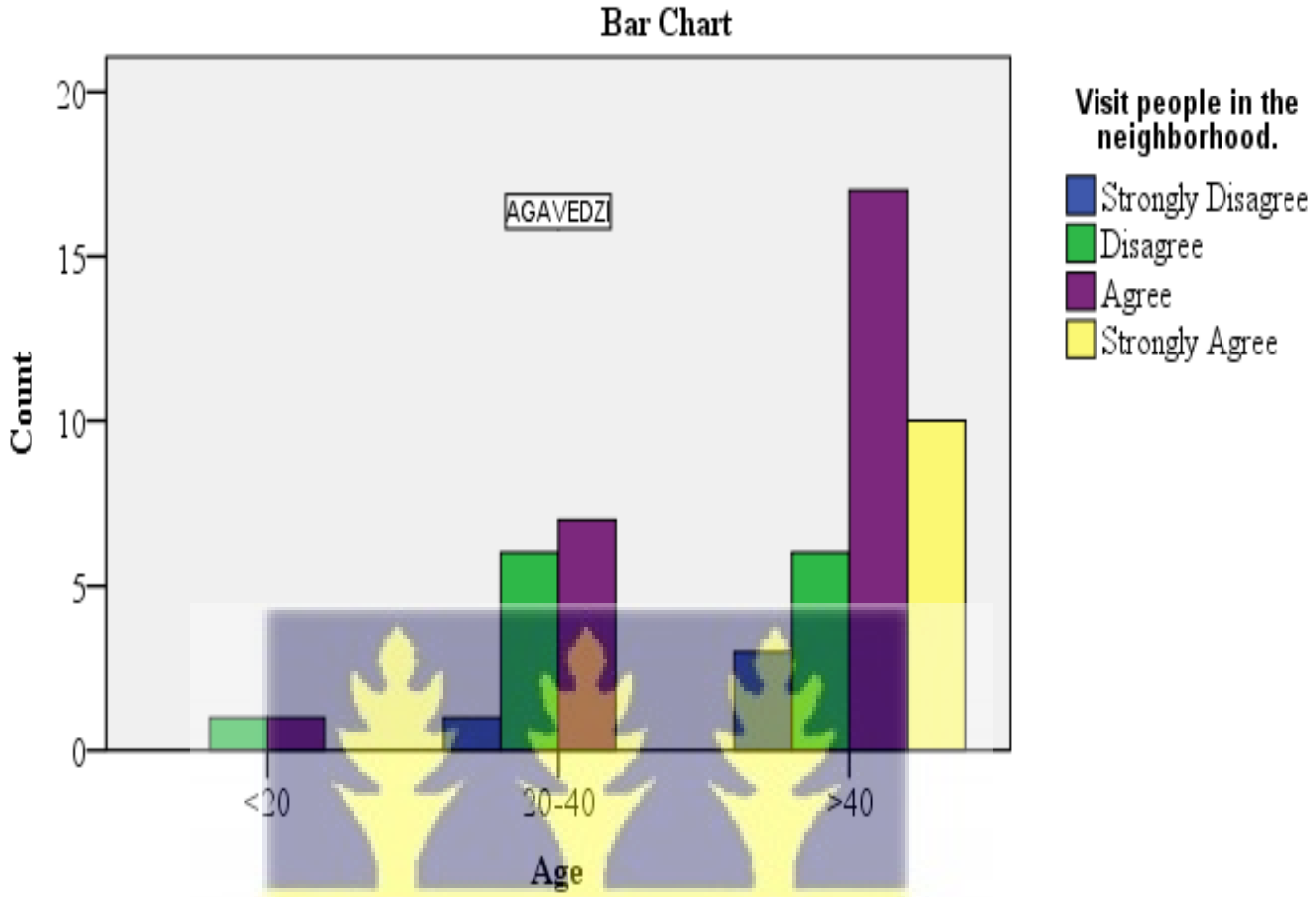


Figure 4.9: Cross-tabulation details of respondents' age and visit to their neighborhood at *Agavedzi*

Source: Author's Field Survey, 2021

At Agavedzi community, aged respondents predominantly agree and strongly affirmed their strong tides or connection to each other contrary to those below the age twenty (20). They also expressed their connectivity through frequent visit to each other. From figure 4.9 above, it's obvious that neighborliness fosters and help improved sense of communalism at Agavedzi

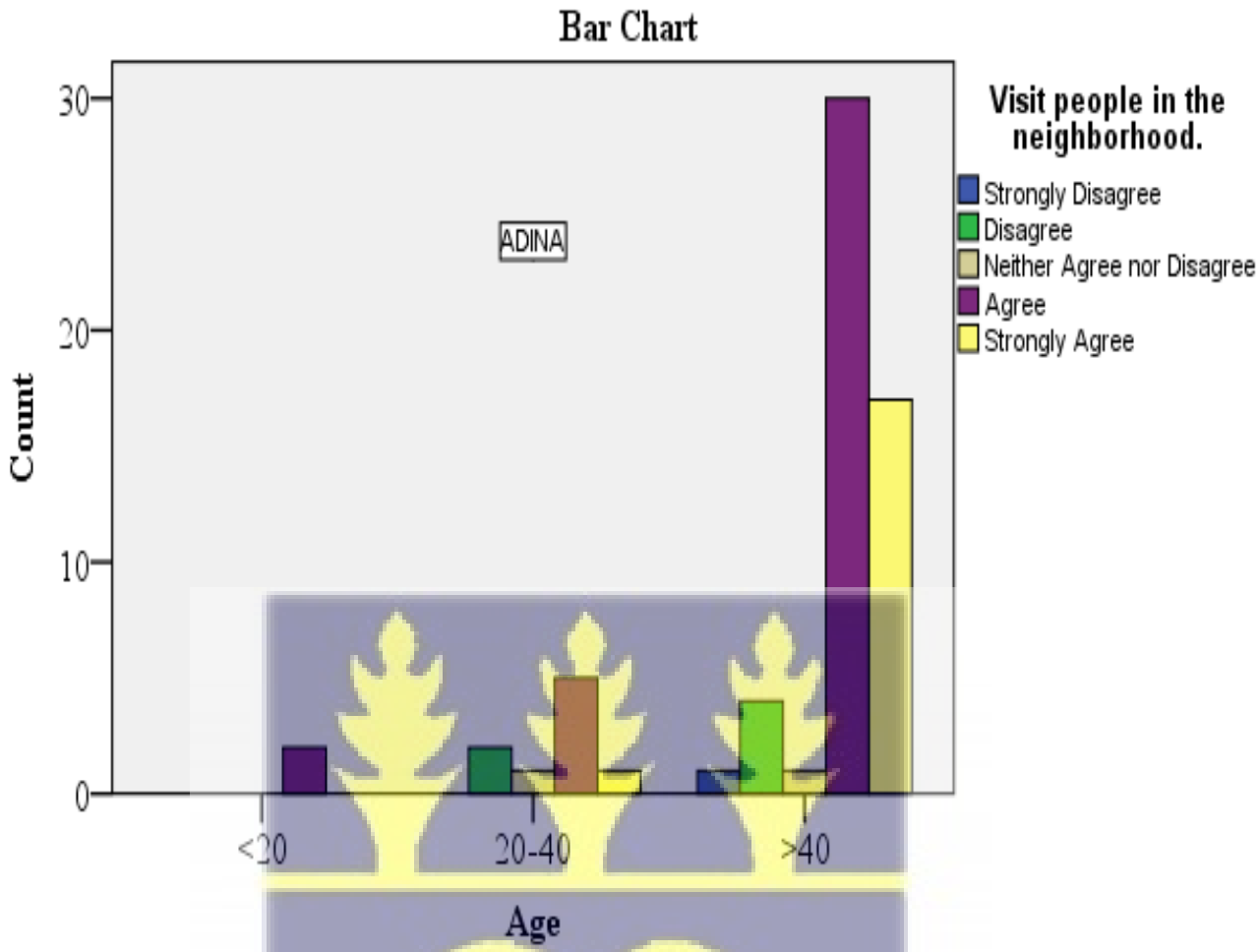


Figure 4.10: Cross-tabulation details of respondents' age and visit to their neighborhood at Adina.

Source: Author's Field Survey, 2021

At Adina community, aged respondents predominantly agree and strongly affirmed their strong tides or connection to each other contrary to those below the age twenty (20). They expressed connectivity through their frequent visit to each other. From figure 4.10 above, it's obvious that neighborliness fosters and help improved sense of communalism at Adina

Analysis of Other Variances

In the analysis of other variance effects, social solidarity has become a common tool in all the four study communities for resilience and most especially among the aged. This was noted when most respondents accepted that *other friends and associates living in the community meant a lot to them*. This assertion was evidence as majority of respondents subscribed to the notion that they *believed their neighbors will help them during an emergency.*

Despite the evidence of higher-level social solidarity, there was a dichotomous view at Adzido-Vordza with regards to *seeking advice from neighbors*. The difference is not statistically significant in comparative terms at the other three study communities. An equal subset of respondents thought not to seek advice from neighbors as against those who wish otherwise, yet, a collective response with just a little margin affirmed their interest in positivity.

Again, there is a higher level of *sense of community belongingness* in all the communities as most of the respondents affirmed and often expressed this sense of belonging even outside the community through exchange of pleasantry whenever they meet their people elsewhere in transit or otherwise. Furthermore, the people collectively *pledge loyalty to each other* as most respondents thought of themselves as being *similar to other people who lived in their neighborhood* and were willing to *invite their neighbors' home* but interestingly, the majority of respondents in all the four communities neither were ready to *borrow things nor exchange favor in intra-communal level.* This was in sharp contrast with the confirmed higher level of social solidarity among study participants at Adzido-Vordza, Blekusu, Agavedzi, and Adina and might have affected negatively among indicators that should have exhibited strong resilience in the various communities.

CHAPTER FIVE

KEY FINDINGS, RECOMMENDATIONS, AND CONCLUSION

5.0 Introduction

This chapter is a summary of an observations made from the study. It inured to outline briefly the major findings of each study objective and to test the hypothesis that accompanied it. The chapter also takes into account, recommendations based on the findings and ended up in conclusion.

5.1 Key Findings

The study sought to evaluate the social cohesion and its association with disaster resilience in selected study communities. The key finding to this objective is as follows

- There is a significant positive correlation between social cohesion and resilience in all the study communities. Social cohesion is therefore seen as a correlate or predictor to community disaster resilience in the resilience feedback loops.

The second objective however obtained that;

- The strength of association between social cohesion and community resilience varies from one community to the other indicating some intrinsic variation in both community management and social behaviors among individuals. In aggregation, however, the data obtained for the study posit that social cohesion accounted for 24.5% to 63.5% in resilience variation and was responsible for 47.9% when the data is aggregated from the four communities indicating weak positive resilience.

Meanwhile, similarities and difference observed between social cohesion and community disaster resilience in accordance with the FEMA model posit that;

- The study observed that there were significant differences in social cohesion and community resilience in communities at different places. Meanwhile, there are similarities in social capital assets such as social trust, community led leadership, and connection between groups and social systems among people in the various study communities.

- Social cohesion among all the four study communities explains an average of the total variance in resilience scores which suggests a common linkage among all the communities and further suggests the absence of spatial variation in the direction of social cohesion and disaster resilience across all study sites.

- The mean intensity of social cohesion and community resilience portray the kind of temporal pattern of recovery enshrined in the FEMA model in some communities. However, contrary to the BIC mean scores, the IPCR mean scores across the communities did not emulate the same pattern. Considering the elapsed time between the disaster and the time of the studies, one may conceptualize that the type of cohesion realized in each community would have commensurate the type of resilience experienced with time decay from the disaster event.

5.2 CONCLUSION

6 To evaluate community social cohesion and establish its relationship with disaster resilience.

7 To assess similarities and differences that exist between social cohesion and resilience at different places.

8 To examine the determinants of disaster resilience in the various communities.

Social cohesion emerges as a solid foundation to operationalized resilience in the study communities, but there were observable traits that limit its operability. These included non-performing leadership, lack of individual interest to participate in things that affect the development of the community, lack of cooperation among traditional and new local governing bodies, creation of factions in the various suburbs that constituted the community and several other social litigations and violence.

Even though, there is a positive relationship between social cohesion and community disaster resilience in each of the study community, the strength of social cohesion in selected communities for disaster resilience varies from one community to the other. The relationship is generally weak ranging from very weak to moderate weakness.

Again, although the study is geographic-specific, the spatial-temporal analysis indicated that the identified indicators for building community resilience can be replicated in other places of interest that exhibit certain common characteristics or traits as there are no significant differences in mean intensity across communities at different geographical locations.

This study will equip individuals, community leaders, local government, central disaster planning agencies to identify the unique indicators and best approaches that recognizes the significant positive association between cohesion and resilience so as to improved resilience in the various study communities.

Finally, the model applied for interpretation of health status of families was westernized and appeared to be useful in developed countries where health is tag on health insurance and used to meet all aspect of health needs unlike developing countries such as Ghana where insurance is use to access only some restrictive ailments and seems to provoked the lack of interest among beneficiaries.

8.1 LIMITATIONS

Although the study chopped a lot of successes, there were few challenges during the process. The issue of obtaining data on records of disaster events and the exact date of their occurrences, the number of people who were affected, and duration of evacuation was not handy at both the assembly level and local NADMO office.

Also, there was limited studies on disaster resilience in the study communities and within the administrative regions of the two municipalities. These made it extremely difficult to relate the concepts vividly with the known.

There was also time constraint as the study was time bound to meet several presentation deadlines.

Lastly the distance between the communities required mobilization of resources, traveling and camping of research assistants. These activities were capital intensive hence affect the data collection process since the project is self-funding.

Meanwhile, in the midst of these uncertainties, the research project garnered the best logistics and resources which made it possible to obtained adequate data representative enough to meet the study objectives.

8.2 RECOMMENDATIONS

- Local authorities and social groups in these communities should work to sustain the togetherness of community members in other to increase their capacity to manage with future disasters.

- In other to use research as a tool to ensure community resilience, there is the need for researchers to undertake several studies within a particular locality for a period of time to enable disaster management agencies identify appropriate dimensions, best indicators, and favorable variables that best justify high-level resilience whiles encouraging best practices that focus on the lows so as to shorten recovery periods and reduce emotional highs associated with the impact of disasters.

- There is the need for both individual community members and leaders to adopt best sustainable practices that will focus on the use of available local resources for collective communal effort to mitigate adapt, and build resilience when the unforeseen catastrophic event occurs. One of such resources is the community cohesion, which was expressed in this study through people's attraction to their community and environment, high neighborliness, high community-identity among members, sense of belonging, and feeling of fellowship. Others includes participatory decision making, loyalty, willingness to seek advice from neighbors, availing oneself for communal labor as well as to rescue others during an emergency. These unique characteristics serve as positive indicators upon which community disaster resilience can be championed.

- Also, policymakers should incorporate research findings in policy formulation for disaster risk management and local authorities and disaster management organizations and agencies should ensure the implementation of those policies whiles encouraging compliance at the community level.

- Moreover, planning for resilience at the community level should be in the wake of social cohesion and such plans and programs should assume a caudal-cephalous (bottom-up) approach. This means that the local people should be involved in the planning process whiles observing the best theoretical and conceptual frameworks that define collaboratively place specific.

- It is recommended that the National Disaster Management Organization and the local Municipal Assembly should pay much attention to gender differences (women), age (old people and children), and people with disability so that they can meet their social needs to foster among them the necessary social cohesion for disaster resilience.

- There is the need for the local government to initiate sustainable programs that will encourage education at higher level among residents in the study areas so as to help increase not only their knowledge in disaster management but also create alternative income sources that will help them build a strong resilience through diversification of resources, investment, and savings.

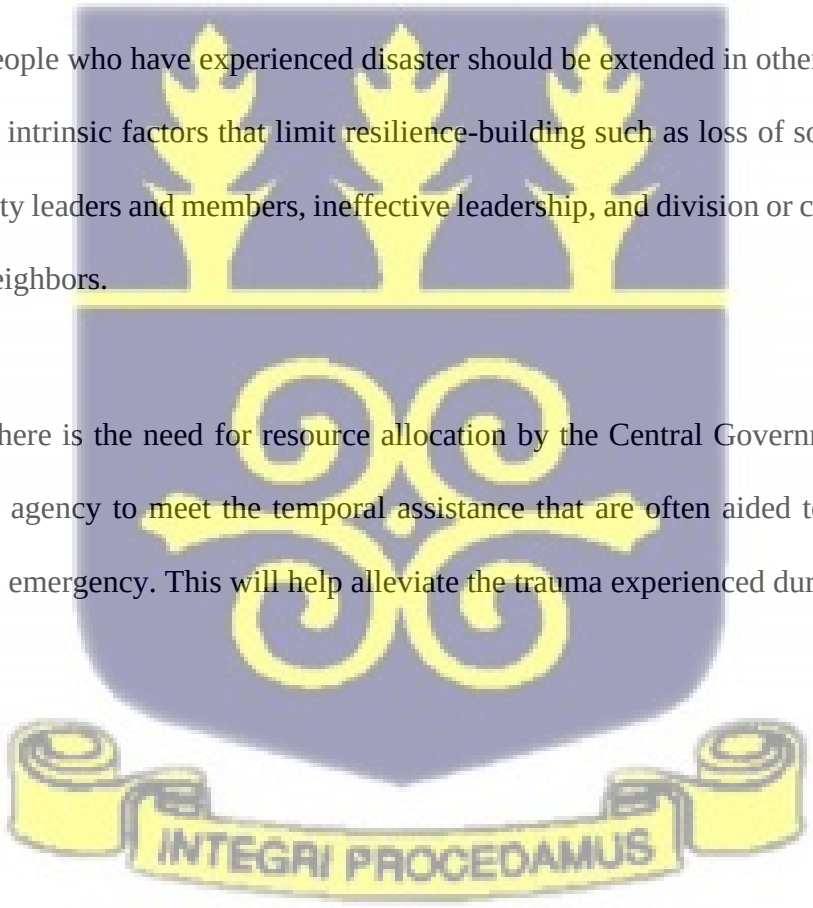
- In addition, community leaders especially Assemblymen and women and Members of Parliament should regularly be in constant connection with their people to deliberate on

issues that affect the community and most especially plan for sustainable programs that ensure appropriate response to emergency situations, help mitigate disasters, and focus on building back better.

- Again, in such disaster emergencies, the local authority should be fair to ensure equitable distribution of relief items, and meaningful administration of government intervention projects so as not to prolong recovery periods in disaster affected communities.

- The time frame for resilience in the FEMA model that deals with emotional low and high among people who have experienced disaster should be extended in other to include other unknown intrinsic factors that limit resilience-building such as loss of social trust among community leaders and members, ineffective leadership, and division or creation of faction among neighbors.

- Finally, there is the need for resource allocation by the Central Government to the local NADMO agency to meet the temporal assistance that are often aided to the individuals during an emergency. This will help alleviate the trauma experienced during disasters.



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APPENDIX 1

ASSESSING SOCIAL COHESION AND RESILIENCE OF COASTAL COMMUNITIES AFFECTED BY TIDAL WAVE RELATED DISASTERS IN THE VOLTA REGION

Questionnaire

District/ Municipality: ……

Village ……

Household Number: ……

Respondent's Name: ……

A. Socio-demographic characteristics of respondents

1. Gender

Male ☐

Female ☐

2. Age:

a. >20 years ☐ b. 20-40 years ☐ c. <40 years ☐

1. Religion?

a. Christianity ☐ b. Islamic ☐ Traditional ☐ Others ☐

2. Marital status

a. Married ☐ c. Single ☐ c. Divorced ☐ d. Cohabitation ☐

3. Average monthly income

a. >100Ghc☐ b. 101-300Ghc ☐ c. 301- 500Ghc ☐ d. <500Ghc ☐

4. Level of education

a. Primary ☐ b. Middle/JSS/JHS ☐ c. O'Level/Secondary ☐ d. Tertiary ☐

e. No Education ☐

5. Residential type

a. Own ☐ b. Rent ☐ c. Squat ☐ d. Government ☐

6. Primary source of income

a. Private business ☐ b. Public employment ☐ c. Casual work ☐ d. Remittances ☐

7. Duration in community

a. >10 ☐ b. 11-20 ☐ c. 21-30 ☐ d. 31+ ☐

8. Years in current residence

a. >10 ☐ b. 11-20 ☐ c. 21-30 ☐ d. 31+ ☐

9. Mode of transportation

a. Private ☐ b. Public ☐ c. Others ☐

B: Assessment of social cohesion

How much do you agree with the followings?

Tick if appropriate

Community Social cohesion evaluation parameters	**Strongly disagree**	**Disagree**	**Neither agree/disagree**	**Agree**	**Strongly Agree**
Social trust					
1. Do you think you feel loyal to the people in the community?					
2. Do you invite neighbors over to your house to pay you a visit?					
3. Do you have the feeling of fellowship that runs deep between you and other people in the community?					
Connection between groups and social system					
4. Are you very much attracted to living in the community?					
5. Do you pay a visit to your neighbors in their homes?					
6. Does your friends and associates in the area mean a lot to you?					
7. Do you think of yourself as similar to other people who live in your neighborhood?					

8. Will you like to remain a resident of the area for a number of years?					
Social support					
9. Do you seek advice from your neighbors?					
10. Do you think your neighbors would help you during an emergency?					
11. Do you borrow things and exchange favor with your neighbors?					
Shared asset and collective responsibility					
12. If the people in the community were planning something, do you think of it as something "we" were doing rather than what "they" were doing?					
13. Do you think you will agree with most people in the community about what is important in life?					
14. Do you regularly stop and chat with people in my community?					
External support system					
15. If given the opportunity, would you move out of your community?					
Volunteerism					

16. Will you work together with others on something to improve communal resilience?					
17. Does living in the community gives you sense of communalism					

B. Community Resilience Advancing Toolkit (CART) Survey (Pfefferbaum et al., 2013) or Indicators of Perceived Community Resilience (IPCR)

How much do you agree with the following statements about your neighborhood?

Tick if appropriate

Statement of indication	**Strongly disagree**	**Disagree**	**Neither agree/disagree**	**Agree**	**Strongly agree**
Community shared values and attitudes					
Place of attachment and shared values					
1. People in my community are committed to the well-being of the community					
2. People in my community know where to go to get things done					
Shared beliefs and values					

3. People in my community have hope about the future					
Community processes					
Planning (community plans)					
4. My community actively prepares for future disasters					
Collaboration frameworks					
5. My community has services and programs to help people after a disaster					
Collaboration problem solving and decision making					
6. My community has effective leaders					
Community competence					
Knowledge of local risk or perceptions					
7. People in my community are aware of community issues that					
Past experiences with disasters (recovery / learning from the past)					
8. My community looks at its successes and failures so it can learn from the past.					
Information and communication					
9. People in my community communicate with leaders who can help improve the community					
Social equity and diversity					

Resources					
10. People in my community are able to get the services they need					
11. My community develops skills and finds resources to solve its problems and reach its goals					
12. My community have the resources it needs to take care of community needs problem (money, information, technology, tools, raw materials and services)					
Community engagement					
Community engagement strategy					
13. People in my community discuss issues so they can improve the community					
Public political participation					
14. People in my community actively take part in elections of leaders					
Involvement in public affairs					
15. People in my community work together to improve the community					
Community goals and efficacy					
Strategic goals and priorities					

16. My community has priorities and sets goals for the future					
Collective efficacy					
17. People in my community help each other					
Community perception					
18. My community can provide emergency services during disasters					

C. In-depth Interview Guide.

1. What is the common type of disaster in the community?
2. In which year do you record the last disaster event in the selected communities?
3. How many people affected during the disaster in each of the study community?
4. How long did it take the Municipal assembly or NADMO to evacuate the victims?
5. What are the common assets that were loss during the event of disaster?

APPENDIX 2

Buckner Index of Cohesion (BIC) (Buckner, 1988)

Item	Statements
1.	Are you very much attracted to living in the community?
2.	Do you pay a visit to your neighbors in their homes?
3.	Does your friends and associates in the area mean a lot to you?
4.	If given the opportunity, would you move out of your community?
5.	If the people in the community were planning something, do you think of it as something "we" were doing rather than what "they" were doing?
6.	Do you seek advice from your neighbors?
7.	Do you think you will agree with most people in the community about what is important in life?
8.	Do you think your neighbors would help you during an emergency?
9.	Do you think you feel loyal to the people in the community?
10.	Do you borrow things and exchange favor with your neighbors?
11.	Do you think of yourself as similar to other people who live in in your neighborhood?
12.	Do you do invites neighbors over to your house to pay you a visit?
13.	Do you regularly stop and talk with people in your community?
14.	Does living in the Keta district gives you a sense of community?
15.	Do you have the feeling of fellowship that runs deep between you and other people in the community?
16.	Will you work together with others on something to improve communal resilience?

17. Will you like to remain a resident of the area for a number of years?

APPENDIX 3

Index of Perceived Community Resilience (Pfefferbaum et al., 2013)

Item	Statements
1.	People in my community are committed to the well-being of the community
2.	People in my community have hope about the future
3.	People in my community help each other
4.	My community has the resources it needs to take care of community problems (resources include: money, information, technology, tools, raw materials, and services)
5.	My community has effective leaders
6.	People in my community are able to get the services they need
7.	People in my community know where to go to get things done
8.	People in my community communicate with leaders who can help improve the community
9.	People in my community are aware of community issues that they might want to address together
10.	People in my community discuss issues so they can improve the community.
11.	People in my community work together to improve the community
12.	My community looks at its successes and failures so it can learn from the past.
13.	My community develops skills and finds resources to solve its problems and reach its goals
14.	My community has priorities and sets goals for the future
15.	My community tries to prevent disasters
16.	My community actively prepares for future disasters

17. My community can provide emergency services during a disaster

18. My community has services and programs to help people after a disaster

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