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Walden University

College of Social and Behavioral Sciences

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Reginald Olisa Oranye

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Walden University
2020

Abstract

Social Responsibility Perceptions of Community Flood Resilience in Nigeria

by

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M.P.P., Walden University, 2016

M.Phil., Rivers State University of Science and Technology, 2003

B.Tech., Federal University of Technology, Akure, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Policy and Administration

Walden University

November 2020

Abstract

Flooding is a severe threat to livelihoods and socioeconomic development in Ogbaru riverine communities of Anambra State, Nigeria. Limited success in the traditional approach of using predominantly structural measures, such as flood channels, to manage floods makes it imperative to explore nonstructural resilience initiatives that would potentially better protect vulnerable flood-prone communities. This study contributes to addressing the problems of ineffective flood management by developing vital social responsibility (SR) data and information that can enhance community flood resilience through individual and collective responsibilities for resilient action. The purpose of this quantitative correlational study was to explore SR perceptions of flood resilience and their relationships with sociodemographic factors of gender, flood experience, age, and educational attainment. The theoretical frameworks were the protective action decision model and the punctuated equilibrium theory. The snowball sampling method was used to recruit 120 participants who were members of Ogbaru communities and the telephone survey method used for data collection. Statistical analysis indicated that postsecondary and secondary education were the strongest predictors of SR perception, followed by age groups of 35 years and above. The findings imply that demographics that were weak predictors would benefit from targeted flood-related educational programs that will promote resilient-enhancing behaviors. The study will potentially enable the development of integrated and sustainable flood management and may also strengthen institutional capacity for effective flood policies. It will also lead to social change by enhancing the livelihood sustenance and sociocultural well-being of the community members.

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Dedication

I dedicate this dissertation to the loving and evergreen memory of my late son, Chidubem Jesse Oranye, who left us to be with our Lord at the young age of five. It is a humbling experience to have shared five years of my life with a true angel of God, who I know now lives in the Divine presence, as we await the appointed time of our reunion in heaven with beloved family and friends.

Acknowledgments

First and foremost, I would like to thank my Lord Jesus Christ, for giving me the will to start and complete this doctoral journey despite many odds. I have learned that you, Jesus, are all that matters in this life, and so, I will always trust in you.

I would like to acknowledge the love, encouragement, and support of my family throughout this academic journey. To Uloma, my beautiful wife, thank you for your support and patience, particularly for listening to my many talks on research and statistical analyses, even though they may sometimes have sounded gibberish. I thank you, my dear wife, also for your understanding when I appeared overwhelmed with my work, and I failed to address critical family matters promptly. To my son—Ebubechukwu, and my daughters—Ada-Olisa and Emmanuella—thank you for your unconditional love and understanding, especially when I missed our family night events or your school functions on account of my academic work. You are my joy and strength. To my mother, Rose Oranye, my symbol of strength and wisdom, my mentor and inspiration, who continually nudged me to complete this academic journey, I am eternally grateful for your prayers, encouragement, and support. I am also thankful to my siblings—Maureen, Chinedu, Jimmy, Ophelia, and Susan—for the unwavering support and confidence.

To Dr. Gregory Campbell, my committee chairperson, I am profoundly grateful for your invaluable guidance, support, encouragement, and friendship. Your motto, "Where there is a Way, the Will follows," was a critical source of motivation, challenge, and empowerment for my success on this doctoral journey. You showed the way, and in

so doing, I found the will to forge ahead and continually improve on my work. Also, I thank my committee member, Dr. James Scott Frampton, for his constructive feedback, and support through probing questions and attention to detail, which were instrumental in producing this high-quality dissertation. To the University Research Reviewer, Dr. Ian Cole, I appreciate your prompt and valuable edits. To Dr. Monique Allen, peer mentor, and cohort leader, I appreciate your feedback, push, and encouragement, which were crucial ingredients for my success on this journey.

I would also like to acknowledge with gratitude Dr. Robby Soetanto of Loughborough University in Leicestershire, UK, for permission to use his team's modified social responsibility instrument in this study. Finally, to my good friend, Professor Ola Olaleye, whose support, encouragement, and prayers over the years have been invaluable. God bless you all.

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Chapter 1: Introduction to the Study

Introduction

Nigeria is one of the countries projected to experience the most flooding in Africa in terms of frequency, severity, and exposed populations in this century. Serdeczny et al. (2017) reported that an estimated three million people in Nigeria would be affected by increased flooding every year. Alfieri et al. (2017) found the estimated number of people expected to be affected by devastating floods in Nigeria at 10 million per year. In addition to these projections, increased climate change effects in Nigeria would exacerbate flood projections (Adeoye, Ayanlade, & Babatimehin, 2009). Oladokun and Proverbs (2016) observed that despite threats of increasing flood risks, the attendant devastation, and the adverse socioeconomic consequences, there are no adequate, comprehensive, and sustainable flood management measures and policies in Nigeria. The literature is sparse in terms of flooding and its management in Nigeria. Ezeokoli, Okolie, and Aniegbuna (2019) reported a lack of flood data in Nigeria, requiring urgent action, particularly in the riverine communities adjoining the River Niger. This study addressed the absence of sustainable flood management measures and ineffective public policies regarding flooding in Nigeria.

Functions involving formulating and implementing flood policies to reduce the risk of flood disasters in Nigeria are determined by the National Emergency Management Agency (NEMA). The National Disaster Management Framework (NDMF) is a mechanism or blueprint which provides a regulatory guideline for NEMA to perform its functions disaster management in Nigeria. According to the NDMF (2010), the functions

of NEMA include but are not limited to coordinating plans, programs, research, and stakeholder activities for preparation, prevention, mitigation, response, and recovery from disaster events, including flooding, as well as the development of regulations and policies. However, overall flood management and policies currently in place are inadequate and ineffective (Mashi, Oghenejabor, & Inkani, 2019; Oladokun & Proverbs, 2016). According to Oladokun and Proverbs (2016), flood risk management has involved weak flood warning signals and physical measures, which are limited to the construction of structural defenses, canals, and culverts. Therefore, to adequately prepare for increasing flood events, it is vital to incorporate social dimensions of flood risk management, such as individual perceptions of social responsibility (SR), into more effective flood management approaches.

This study explored the public perceptions of social responsibility (SR) concerning flood resilience in a flood-prone riverine community in Nigeria. It also investigated the relationships between these perceptions and sociodemographics in the geographical study area. The results of this study will lead to vital data and information that may enhance the capacity of NEMA to achieve its functional objectives, including the development of a more effective, sustainable, and integrated flood management system in Nigeria and more effective flood policies. Consequently, this research promotes positive social change in the geographical study area as well as other flood-prone Nigerian communities by improving human, social, and economic conditions of the people, enhancing livelihood sustenance, promoting stakeholder engagement, and boosting economic growth.

In this chapter, I provide an overview of the study, starting with a background and historical overview. Next, I present a section on the problem statement, followed by the purpose of the research and how it connects the problem with the study's focus. In the following section, I present research questions as well as associated null and alternative hypotheses. Following this section is a description of the protective action decision model (PADM) and the punctuated equilibrium theory (PET). The nature of the study, definitions of critical terms, assumptions, scope, delimitations, and limitations are outlined in subsequent sections. Following is a discussion of the significance of the research and its contributions to knowledge, informing public policy, and promoting social change. The chapter ends with a summary of the main points and then transitions to Chapter 2.

Background

Flooding, particularly river flooding, has become the most common and recurring disaster in Nigeria with widespread occurrence and devastation in the past eight years (Adelekan & Asiyanbi, 2015; Alfieri et al., 2017; Egbinola, Olaniran, & Amanambu, 2017). These reports suggest that River flooding is a severe threat to the socioeconomic development of Nigeria, but mainly to the flood-prone riverine communities. According to Komolafe et al. (2015), the increasing threats of river flood events in Nigeria, coupled with a lack of coping capacity and high levels of inhabitant vulnerability, continue to put millions of lives and property at risk. Consequently, it is imperative to explore initiatives that would potentially increase the protection of vulnerable communities through enhanced community resilience to flooding.

The traditional approach to managing flood risks in Nigeria has been predominantly through the use of structural flood control measures such as barriers, channelization, and canals. Although past practices have led to limited success, they have become inadequate to address the increasing frequency and severity of flood events (Adelekan, 2016; Butler & Pidgeon, 2011; Mullins & Soetanto, 2011). Therefore, many studies have advocated a paradigm shift from the typical flood defense approach to a flood resilience approach (Driessen et al., 2016; O'Neill, Brereton, Shahumyan, & Clinch, 2016; Mees, Crabbé, & Driessen, 2017; Mees et al., 2016). A flood resilience approach would involve focusing on nonstructural measures, especially the integration of a community's social processes, such as shared responsibilities for flood risk mitigation (Driessen et al., 2016; O'Neill et al., 2016). Shared responsibilities imply a social responsibility of all flood stakeholders, including the inhabitants and other members of flood-prone communities, to reduce flood risks. The US Federal Emergency Management Agency (FEMA, 2006) stated that preparedness for disasters, including flood disasters, begins with individual responsibility. Therefore, exploring these perceptions and integrating them into a flood management approach can promote community flood resilience.

This research focused on members of a group of riverine communities in Anambra State, Nigeria. These communities lie along the adjoining plains of the River Niger, the dominant river in Nigeria, and consequently, they are historically highly vulnerable to flooding. However, in recent years, the flood risk has significantly increased due to the increased frequency and severity of floods. One overarching gap in

the literature that this study addresses is the absence of an integrated, effective, and sustainable flood management system that incorporates communities' SR for flood resilience. Critical flood data and information could strengthen flood management as well as increase resiliency. Therefore, this research is vital in its potential to address this identified gap in knowledge, as well as strengthen public policies that support an integrated flood management system.

According to Soetanto et al. (2017), in any demographic group, a high aggregated SR scores measured on a social responsibility perception survey indicates an inclination for high SR (and thus, more resilience-enhancing) behavior and vice versa. This study strengthens the flood risk management in the study area and enhances flood resilience in communities. The exploration of SR for flood resilience in communities is a new and emerging area of research, particularly in Nigeria. Data and information generated in this study will enable other researchers to build upon it by conducting additional research and analysis.

Problem Statement

Data on links between personal responsibility, flood preparedness behaviors and flood risk management potentially promote flood resilience and also support the development of integrated flood risk management systems. However, there is negligible data to strengthen flood management and supporting policies in Anambra State, Nigeria. Specifically, there is a lack of vital flood data and information regarding the role of individual and community social responsibilities towards building flood resilience in Nigeria. This problem increases the flood vulnerability of inhabitants of communities and

limits the effectiveness of any flood risk management approach in the study area. This study involved examining perceptions of the social responsibilities of inhabitants of the study area to promote community flood resilience. It also investigated the potential relationships between these perceptions and sociodemographic indicators.

Flooding has become the most frequent and widespread natural hazard in Nigeria (Alfieri et al., 2017; Egbinola et al., 2017; Oladokun & Proverbs, 2016) with projected increases in frequency and severity (Adeoye et al., 2009; Serdeczny et al., 2017). River floods are responsible for most of the flood hazards currently experienced in Nigeria, particularly in the riverine communities along the plains adjoining the River Niger (Nkwunonwo, Malcolm, & Brian, 2015). Ezeokoli et al. (2019) reported that in the riverine communities of Ogbaru, flood events had become an extreme and regular phenomenon, causing extensive devastation worth hundreds of millions of dollars annually. Therefore, these yearly flood events, which last for months, severely threaten the livelihoods and socioeconomic development of communities and the country. The destruction affects farmlands, fisheries, and other means of livelihood and community sustenance.

Ezeokoli et al. (2019) argued that worsening flood situations require urgent action to develop a more effective and sustainable flood management approach that would also include developing detailed flood data regarding stakeholders' flood perceptions.

Oladokun and Proverbs (2016) stated that stakeholders' concerns or perceptions of flood risk are essential for the development of an integrated and sustainable flood risk management system. This assertion is also consistent with Wang, Wang, Huang, Kang,

and Han (2018), which stated that a better understanding of flood-related perceptions is critical to developing and implementing an effective flood management approach, as well as supporting flood policies that would likely follow.

This quantitative correlational nonexperimental study addressed these flood problems and bridged a gap in current research regarding the lack of flood resilience data. Addressing these problems may enhance community flood resilience by contributing to the development of an integrated and sustainable flood risk management system as well as strengthening related flood policies.

Purpose of the Study

The purpose of this quantitative, nonexperimental, correlational study was to examine the extent of relationships, if any, between sociodemographic indicators and SR perceptions of flood resilience in Ogbaru riverine communities in Nigeria. Examination of attitudes and behaviors derived from SR perceptions for flood resilience in these communities potentially contributes to the development of integrated, sustainable, and more effective flood management approaches and risk reduction. Additionally, this study also generates new ideas that reframe or redefine flood problems in the geographical study area, and in doing so, may influence the development of a new public policy agenda that supports better flood management. The independent or predictor variables in this study were participants' gender, recent flood experience, age bracket, and educational attainment. The dependent variable was the participants' perceptions of SR.

Research Questions and Hypotheses

One overarching objective of this research was to determine the extent to which a relationship exists between selected sociodemographic indicators and SR perceptions of flood resilience. The study addressed the following research questions:

RQ1: Is there a statistically significant relationship between the gender of respondents and social responsibility perceptions?

H₀₁: No statistically significant relationship exists between the gender of respondents and social responsibility perceptions.

H_{a1}: A statistically significant relationship exists between gender of respondents and social responsibility perceptions.

RQ2: Is there a statistically significant relationship between the experience flooding and social responsibility perceptions?

H₀₂: No statistically significant relationship exists between the experience of flooding and social responsibility perceptions.

H_{a2}: A statistically significant relationship exists between the experience flooding and social responsibility perceptions.

RQ3: Is there a statistically significant relationship between respondents' age bracket and social responsibility perceptions?

H₀₃: No statistically significant relationship exists between respondents' age bracket and social responsibility perceptions.

H_{a3}: A statistically significant relationship exists between respondents' age bracket and social responsibility perceptions.

RQ4: Is there a statistically significant relationship between respondents' educational attainment and social responsibility perceptions?

H₀₄: No statistically significant relationship exists between respondents' educational attainment and social responsibility perceptions.

H_{a4}: A statistically significant relationship exists between respondents' educational attainment and social responsibility perceptions.

RQ5: Do the independent variables—gender, flooding experience, age, and educational attainment—collectively predict social responsibility perceptions?

H₀₅: The independent variables—gender, flooding experience, age, and educational attainment—collectively do not predict social responsibility perceptions.

H_{a5}: The independent variables—gender, flooding experience, age, and educational attainment—collectively predict social responsibility perceptions.

Theoretical Frameworks of the Study

The protective action decision model (PADM) and the punctuated equilibrium theory (PET) were employed as theoretical frameworks to guide this study and achieve its stated purposes.

The Protective Action Decision Model

One of the theoretical frameworks used is the protective action decision model (PADM). According to Lindell and Hwang (2008), the PADM involves perceptions of personal risks and the degree to which hazard adjustments are relatively acceptable. The PADM is a systematic multistage method of explaining citizens' responses to long-term threats of environmental hazards and disasters (Lindell & Perry, 2012). This theoretical

framework was appropriate for this study, given its previous applications in explaining people's preparedness and responses to long-term threats of natural disasters such as flooding based on perceptions of risks.

A combination of social and situational contexts act together to influence perceptions of personal risks and the process by which people take protective action in response to long-term threats and imminent disasters such as floods. Lindell and Perry (2012) stated that the PADM process is moderated or influenced by three core perceptions: threat perceptions, potential action perceptions, and stakeholder perceptions. The decision-making process itself produces three possible behavioral responses: searching for information, taking protective response actions, and developing emotion-focused mechanisms to cope with the threat. Chapter 2 includes a more detailed explanation of the PADM framework.

The PADM framework was appropriate and related to this study and the research questions because it provided a basis to explore and examine respondents' SR perceptions using the framework's core perceptions and behavioral response outputs. It also makes it possible to investigate links and correlations between perceptions and sociodemographic predictors. Cvetkovic et al. (2018) reported significant gender disparities between men and women both in terms of participants' perceptions of flood risks and SR. While men seemed more confident in terms of their ability to cope with flooding, women displayed more considerable sensitivity and knowledge of these flood events (Cvetkovic et al., 2018). This disparity was, in part, attributed to gender power relations. Therefore, while the PADM guided an understanding of the behavioral

responses that promote community flood resilience, a second framework, the PET, was used to guide the possible development of effective public policy on floods.

The Punctuated Equilibrium Theory

The punctuated equilibrium theory (PET) is a prominent public policy theory that guides an understanding of the processes of policy change in complex social systems, such as the field of flood risk management. Although the PET was developed originally by evolutionary biologists Niles Eldredge and Stephen Gould in 1977, it was later modified by Baumgartner and Jones to explain the political agenda in the United States of America and has since become a significant public policy theory. The theoretical propositions and hypotheses support its application in this research.

The primary proposition of the PET policy framework is its characterization of political systems and processes as both stable and dynamic. This characterization implies that policies usually remain the same or stable for extended periods, while others may change quickly or become dynamic. One primary hypothesis of the PET is the general punctuation hypothesis. This hypothesis postulates that policymakers generally are capable of paying attention to only a limited number of policy issues, i.e., the idea of bounded rationality. Chapter 2 includes a more detailed explanation of the PET.

The applicability and relatedness of the PET to this study is due to its potential to provide new information and ideas regarding the flood problem from new perspectives.

Nature of the Study

The design selected for this study was a quantitative nonexperimental correlational survey. According to McNabb (2013), the quantitative method provides

specific and measurable outcomes that must be validly and reliably analyzed. The rationale for the choice of this research design was due to the absence of a random assignment into groups and a lack of manipulation of independent variables (gender, flood experiences, age, and educational attainment). Leedy and Ormrod (2010) stated that quantitative design establishes relationships between two or more variables in the same population or similar variables in different populations. Correlation does not prove causality, and therefore, I exercised caution in inferring cause and effect relationships.

The use of survey questionnaires in this correlational study was appropriate, given the study's focus on exploring perceptions (attitudes and opinions) of a sample population. A variable is a measurable attribute or characteristic that varies in value; it is a quantifiable attribute that holds different values (Burkholder, Cox, & Crawford, 2016). There were four independent variables in this study: gender, experiences involving flooding, age of the respondents, and educational attainment. The dependent variable was the respondents' perceptions of SR to mitigate flood risks.

A 12-item cross-sectional survey questionnaire instrument guided the data collection. The survey instrument is a social responsibility perception questionnaire which comprised of 12 attitudinal survey statements adopted from Soetanto, Mulins, and Achor (2017). This survey instrument required respondents to indicate agreement or otherwise with the statements on a 4-point Likert Scale ranging from strongly agree (4) to strongly disagree (1).

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 25 to perform statistical tests. Analytical tools included the independent samples t-tests,

point-biserial correlation, analysis of variance (ANOVA), Spearman's rank correlation, and multiple linear regression analysis, which established statistical relationships between the independent and dependent variables. The findings will provide critical information that will lead to developing more effective flood public policies that support the development of an integrated and sustainable flood risk management system in Nigeria. Specifically, the study will increase community engagement and provide insights into the roles that individual flood preparedness and preventative actions can play in contributing to collective efforts that enhance community resilience to flooding. Also, the study identifies independent variables that account for relatively low SR perceptions measured on the SR instrument. Such demographics can benefit from targeted strategies to enhance preventative actions and flood resilience.

Definitions of Terms

The following are definitions of critical and conceptual terms that are central to this research:

Flood Resilience: The ability of an urban system or community to tolerate flooding such that the system or society can function during and after flood events (Batika & Gourbesville, 2016).

Flood Risk Management: The management of flood risks across a catchment, including the maintenance or restoration of the catchment's natural processes (Dadson et al., 2017).

Social Responsibility (SR): A generic ethical framework for an individual's responsibility to contribute to collective actions (Soetanto et al., 2017).

Policy Windows (or Windows of Opportunity): Critical moments such as flood events when advocates of new policies have opportunities to initiate attention to their problems or obtain new solutions or policies (Wiering, Liefferink, & Crabbe, 2018).

Assumptions

This study involved examining the extent of relationships between sociodemographic indicators and perceptions of SR. Fundamental assumptions presumed to be correct but not verified, shape the findings and interpretations of this study. One assumption of this study was that participants provided truthful and honest responses. Dishonest answers produce flawed results. I assured participants of ethical considerations involving protection and confidentiality. Another assumption was that the sample population sufficiently represented the target population. This assumption was necessary because of the potential for generalization of the findings to the target population.

Scope and Delimitations

This quantitative correlational study involved the use of a survey questionnaire to examine relationships between perceptions of SR for flood resilience and sociodemographic indicators. The study was confined only to members of the Ogbaru communities, comprising of individuals residing in Ogbaru, as well as indigenes or natives of Ogbaru, who may be residents elsewhere. It excluded nonnatives who do not live within the Ogbaru geographical study area.

Limitations

This research was constrained by some limitations, which were outside my control as the researcher. One major limitation of this study involved the COVID-19

pandemic and associated social distancing and movement restrictions, which made it impossible to recruit participants and administer the survey through a preferred face-to-face approach. A second limitation was the correlational research design, which, according to Burkholder, Cox, and Crawford (2016), does not support cause-and-effect relationships. Consequently, I exercised caution in the use of interpretive language that may infer causal relationships.

Significance

This study has the potential to contribute to the advancement of knowledge involving critical flood data that will promote community flood resilience through the development of a more effective, integrated, and sustainable flood management system in Nigeria. Specifically, the study may increase community stakeholder engagement and provide insights into the roles that individual flood preparedness and preventative actions can play in contributing to collective action that enhances community resilience to flooding. Additionally, this study is significant in terms of its potential to identify specific demographics with relatively lower perceptions of SR and target them for resilience-enhancing programs. This study may also contribute to advancing public policies by equipping policy decision-makers and administrators with new tools to create more effective flood policy interventions.

Another social change implication of this study involves its potential to promote increased awareness and preparedness of flood disasters among inhabitants of vulnerable flood-prone communities in Nigeria. Additionally, this study may contribute to positive social change by improving the social, cultural, and economic wellbeing of members of

the geographical study area of Ogbaru in Nigeria through enhanced livelihood sustenance and boost in economic growth.

Summary

Findings from this quantitative correlational research study will be vital in developing more effective, sustainable, and comprehensive flood risk management strategies as well as stronger and robust flood policies to enhance community resilience to flooding. Envisaged changes to flood management and policies may potentially better protect lives and properties from present and future threats of flooding in the study area, as well as promote livelihood sustenance and economic well-being. By investigating relationships between perceptions of SR and sociodemographic indicators, the study identified those populations with high predictive capacity. Also, those demographics with lower SR perceptions would benefit from targeted resilience-enhancing strategies.

Chapter 2 includes a synthesized review of current research related to the problem statement and research questions, historical perspectives, and relevance, as well as theoretical frameworks.

Chapter 2: Literature Review

Introduction

Links between personal responsibility in terms of taking preventive actions against flood risks, flood preparedness behaviors, and flood risk management have been relatively well-established, particularly in western countries. Data on these links promote flood resilience and also support the development of integrated flood risk management systems. However, there is scant data on critical links to strengthen flood policies in Nigeria. Specifically, there is a problem involving the lack of effective flood management, driven in part by the absence of critical flood data and information regarding perceptions of SR and flood resilience. This problem increases the flood vulnerability of members of the geographical study area—Ogbaru riverine communities in Nigeria. This study promotes community flood resilience by examining SR perceptions of members of this study communities and investigating potential relationships between these perceptions and sociodemographic indicators.

The purpose of this quantitative, nonexperimental, correlational study was to examine the extent of relationships, if any, between sociodemographic indicators and SR perceptions of flood resilience in Ogbaru riverine communities in Nigeria. Exploration and examination of attitudes and behaviors in these communities will potentially contribute to the development of integrated, sustainable, and more effective flood management approaches and risk reduction. Additionally, this study also generates new ideas that reframe or redefine flood problems in the geographical study area, and in doing

so, may influence the development of a new public policy agenda that supports better flood management.

There is evidence in the literature that establishes the relevance of the problem of flooding and the need to generate critical flood data to address it. In the riverine communities of the study area, devastating flood events have become extreme, regular, and an annual occurrence. These yearly flood events, which last for several months, have become a severe threat to livelihoods and socioeconomic development of the communities as flood events destroy farmlands, fisheries, businesses, and other sources of livelihoods.

In Chapter 2, I present an analysis and synthesis of current research related to the problem statement and research questions, historical perspectives, and relevance, as well as theoretical frameworks. The first section includes an outline of strategies employed to search for literature. Following this is a focus on the two theoretical foundations of this study: the PADM and PET. This is followed by a review of literature on flooding from global and regional perspectives, followed by an examination of river flooding in Nigeria and institutional frameworks for flood management and policies. I also include in this section information about SR and flood resilience, as well as the role of perception in flood management. In the next section, I examine the literature related to the research methodology and identify gaps in the literature. Chapter 2 ends with a summary and conclusion, followed by a transition to Chapter 3.

Literature Search Strategy

The literature review included peer-reviewed journal articles, books, dissertations, and professional websites. It also included sources from websites and relevant agencies, including the United States government, the European Union, the United Nations, and the federal government of Nigeria. Access to articles involved linking Google Scholar to Walden University Library databases. Five databases were relevant and appropriate for the focus of this study. The databases were Political Science Complete, Business Source Complete, SAGE Journals, Academic Search Complete, and ProQuest Central. Also, Thoreau was used in identifying the following additional databases: Emerald Management, ScienceDirect, CQ Researcher, ERIC, and Taylor and Francis Online.

Extensive online and database searches conducted used keywords and phrases, including the following: *perception, flood risk perceptions, flood resilience, community resilience, flood policies, social responsibility, flood risk management, punctuated equilibrium, protective action decision, flooding in Nigeria, FEMA, NEMA, demography, flood protection, attitudes and behaviors, the impact of flooding, and flood mitigation*. Also, to widen the scope of the literature, search strategies included an array of terminology variations, phrases, and term combinations. I conducted these systematic searches to look at sources published between 2010 and 2019. Search strategies yielded over 900 scholarly articles, of which 300 were recent publications relevant to the topic and published between 2015 and 2019.

Google Scholar and many of the identified databases are not limited to peer-reviewed journal articles and journals. Therefore, I employed due diligence during the

literature review to ensure that the only articles used were those published in peer-reviewed journals. Ulrich's Periodicals Directory was used to verify that the journals are refereed or peer-reviewed.

Theoretical Foundations

Perceptions of individuals and community SR involving flood resilience can help address flood risk management, particularly in developing countries. To better understand potential correlations between perceptions and demographic indicators, as well as the impact on public policy, two theories were used as foundations to guide this study: the PADM and PET.

The PADM Theory

The PADM is a behavioral theoretical framework used to explain people's preparedness and response to long-term threats of natural disasters such as flooding based on perceptions of risks. According to Lindell and Hwang (2008), the basis of the PADM is the perception of personal risks and the degree to which hazard adjustments are relatively acceptable. The PADM is a systematic multistage method of explaining citizens' responses to long-term threats of environmental hazards and disasters.

The PADM explains the responses to imminent threats of disasters such as floods, through social context conditions including the closeness of the hazard, social information about the hazard, and environmental cues including sights and sounds. These conditions act together to influence perceptions of personal risks and processes by which people take protective action decisions. According to Lindell and Perry (2012), threat perceptions, potential-action perceptions, and stakeholder perceptions moderate the

protective action decision-making process, which produces potential behavioral responses.

PADM Applications

There have been several applications of the protective action decision model framework to flood risk. Cvetkovic et al. (2017) reported significant gender disparity between men and women both in the perception of flood risks and the preparedness for protective action. While men seemed more confident in the ability to cope with flooding, women displayed more considerable sensitivity and knowledge of these flood events. This disparity was, in part, attributed to gender power relations, such as living conditions and economic attributes. However, in another study, Soetanto et al. (2017) reported no significant gender disparity between men and women.

The protective action decision model was used to establish interrelationships between perceived flood risks and behavioral responses. For instance, Terpstra and Lindell (2012) used this framework to explain citizen's flood preparedness behavior concerning flood risk. According to Terpstra and Lindell (2012), flood risk perception correlated positively with flood preparation intentions. Other studies have also established a strong correlation between perceived flood risk and protective flood behavioral responses (Heath, Lee, Palenchar & Lemon, 2018; Osberghaus, 2015; Wei, Wang & Lindell, 2015;). However, Thistlethwaite, Henstra, Brown, and Scott (2018) reported a weak correlation between flood risk perception and behavioral response among respondents, thereby indicating that improving risk perception would represent an essential first step in improving flood risk management.

The perceptions of stakeholders are critical factors in determining responses to disasters. In applying the protective action decision model to describe the process of information flow during emergencies, Wei, Wang, and Lindell (2015) found that stakeholder perceptions may change with time, increasingly sharply immediately after disaster onset. Wei et al. (2015) also reported that the evolution of these stakeholder perceptions with time is influenced by what the authors described as delayed effects, stagnation effect, and cumulative effects. Also, Zeng, Wei, Zhu, Zhao, and Lin (2019) applied the protective action decision model to explain the attitudes and behaviors to threats from a nuclear power plant. Zeng et al. (2019) reiterated the potential of the protective action decision model to enhance our understanding of the perceptions of flood risks and SR as well as the contributions of these perceptions to the public policy process. These elements are critical to implementing effective flood management and in developing effective policies on flood risk reduction. The application of the PADM in this study rests on a sound rationale.

PADM Rationale

The choice of the protective action decision model as a theoretical foundation for this study was predicated on its potential to enhance the understanding of people's response to long-term threats and imminent disasters such as floods. The PADM had been used to examine the influence of social and environmental conditions on perceptions about a problem, and how these perceptions may trigger behavioral intentions and protective actions (Heath, Lee, Palenchar & Lemon, 2018; Lindell & Perry, 2012; Terpstra & Lindell, 2013; Thistlethwaite, Henstra, Brown & Scott, 2018). Similarly, this

study also explored the influence of social and environmental conditions on perceptions of flood resilience problems and protective actions. Therefore, this study derived benefit from the guidance of the protective action decision model in improving the understanding of the dynamics between perceptions and protective behavior action. Another rationale for the choice of the protective action decision model framework was its potential to interrogate the possible interlinkages between SR and vital demographic indicators. Finally, the protective action decision model's potential to promote effective policies by generating data on attitudes, behaviors, and perspectives of critical stakeholders was also a significant factor responsible for its selection as a framework to guide this study.

PADM Links to Present Study and Nigerian Flood Policy

The protective action decision model was appropriate for this study because of its potential to guide the study using the framework's core perceptions and the behavioral response outputs. SR perceptions equate to the three core perceptions in the framework, which drive a process of protective decision, resulting in behavioral responses (see Figure 1). The behavioral responses equate to measures of socially responsible (or resilient enhancing) protective behaviors.

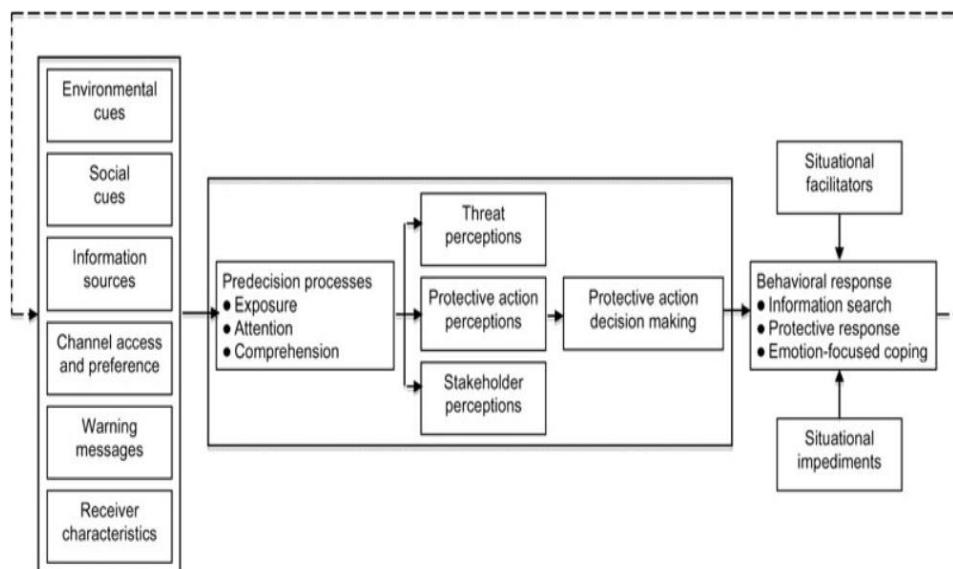


Figure 1. The PADM. (Source: Adapted from Lindel and Perry, 2004).

The PET

The PET model of policy change is another theoretical framework that guided this study. The punctuated equilibrium theory was initially developed by Baumgartner and Jones (1993) as a political agenda-setting theory with a focus on explaining the political agenda primarily in a United States' context. This theory was inspired by the evolutionary biologists Niles Eldredge and Stephen Gould, who in 1977 applied it to explain both the relative stability (or stasis) and the punctuation of this stability by significant but infrequent changes in evolutionary speciation. The work of Baumgartner and Jones (1993) on punctuated equilibrium theory started as a means of explaining the exercise of political power by certain groups or actors, both by the monopolization of access to decision-makers but also by the ability to frame policy problems in specific situations and case studies (Cairney, 2012). While it remains an agenda-setting theory,

the punctuated equilibrium theory has evolved into one of the most prominent general public policy theories (Green-Pedersen & Princen, 2016; Wiering, Liefferink & Crabbe, 2018).

The primary proposition of the punctuated equilibrium theory policy framework is its characterization of political systems and processes as both stable and dynamic. This characterization results in most policies remaining the same, or stable for long periods, while others may change quickly or become dynamic (Cairney, 2012; Meijerink, 2005; True, Jones & Baumgartner, 1999). According to Cairney (2012), this proposition holds that intense but short (significant, but less frequent) periods of radical policy change may punctuate long periods of policy stability or incremental change. Therefore, institutional structures and the processing of issues within these institutions serve to reinforce policy stability (Penning-Rowsell, Johnson & Tunstall, 2017; True et al., 1999; Wiering, Liefferink, & Crabbé, 2018). Cairney (2012) argued further that stability also depends on the ability of policy communities to maintain control over definitions of the policy problem in a way that excludes other actors. The exertion of power and exclusion of different policy actors results in the retention of policy monopoly and resource allocation.

A change in the way a problem is perceived or framed is critical in breaking the policy monopoly and, therefore, can potentially trigger a change in policy. True et al. (1999) asserted that these regulated policy monopolies resist pressures for policy change. However, breaking policy monopolies for policy change can result from a successful challenge to either the way a problem is defined, perceived, or framed (Penning-Rowsell et al., 2017; Cairney, 2012) or by new policy images or dimensions introduced to the

current policy (Wiering et al., 2018). Both means of policy change involve the incorporation of previously excluded and influential actors and audiences, i.e. groups and communities, respectively. Although the predominant element of a policy process is policy stability, however, it can give way to policy change depending on certain conditions. Therefore, stability and change are two critical elements of the policy process.

One primary hypothesis of the punctuated equilibrium theory is the general punctuation hypothesis developed by Jones and Baumgartner (2005). This hypothesis focuses on the human decision-making process and postulates that policymakers generally are capable of processing information and paying attention only to a limited number of policy issues. This hypothesis enhances the potential for the applicability or generalizability of the punctuated equilibrium theory to all policy areas. As a policy agenda-setting theory, one of the primary assumptions upon which the punctuated equilibrium theory rests is the rationality of decision making, otherwise known as bounded rationality. According to Sabatier and Weible (2014), the bounded rationality of the punctuated equilibrium theory is the idea that decision-makers are subject to cognitive limitations in making choices. Cairney and Weible (2017) also stated that in making choices, policy actors exert limited control. In other words, policymakers, whether in government or organizations, cannot attend to all problems or policy issues; only a few policy issues may attain the top of the policy agenda where they receive disproportionate attention. This assumption holds that changes or punctuations in policy result from a shift in human preferences or attentiveness, and the processing of the information received.

PET Applications

In recent years, a wide range of policy studies has applied the punctuated equilibrium theory in various fields. For instance, Kuhlmann and Van der Heijden (2018) used the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA), which is an emerging approach that is gaining traction in policy studies, to review and analyze 86 articles on the punctuated equilibrium theory policy processes from 1996 to 2016. The PRISMA approach systematically guides literature reviews in a way that overcomes the typical problem of selection biases (Carey & Crammond, 2015; Van der Heijden & Kuhlmann 2018). According to Kuhlmann and Van der Heijden (2018), the field of environmental (and energy) policy accounted for 27% of the articles analyzed, the areas of budget policy, 22%, health policy 9%, tobacco policy accounted for 7%, and the field of education policy accounted for 6%. These findings suggested that the most dominant policy area to apply the punctuated equilibrium theory is the environmental (and energy) policy field, and this shows a strong relatedness with this study on flood (or environmental) policy. Therefore, the use of this theoretical framework in this study is justified. Also, the work of Kuhlmann and Van der Heijden (2018) found a connection with this study given its report of a limited application of the punctuated equilibrium theory within the African policy context, and mainly, the complete absence of its application in Nigeria's public policy.

While the punctuated equilibrium theory was initially developed by scholars in the United States specifically for analyzing US politics, it has been applied extensively to other parts of the world outside the United States (Eissler, Russel & Jones, 2016; Green-

Pedersen & Princen, 2016). Kuhlmann and Van der Heijden (2018) reported that although the US remains the country most analyzed in empirical studies, there has been an increasing number of policy applications of this theory across the world. Of the 29 countries with articles on the punctuated equilibrium theory, only two were from the entire African continent—Ghana and South Africa (Kuhlmann & Van der Heijden, 2018). Therefore, in using the punctuated equilibrium theory to explain a potential change in flood policy in Nigeria, this study advanced the review of the work of Kuhlmann and van der Heijden.

Several disaster-related studies that have applied the punctuated equilibrium theory bears some relatedness to this study. For instance, in a recent study following the Sewol Ferry Disaster in South Korea, Cho and Jung (2019) used the punctuated equilibrium theory to illustrate how a political system reacts in response to a disaster, and how significant changes in policy may result. The work of Cho and Jung (2019) is related to this study because it elucidates the concepts of punctuated events, stability, and change. The relative flood stability in Nigeria in the past decades and the recent trend of increasing frequency and severity of flood events may suggest punctuation of that stability with the potential to cause a significant change in policy.

Another related study that applied the punctuated equilibrium theory in analyzing stability and change in flood governance and policies is Wiering, Liefferink, and Crabbe (2017), which scrutinized the role of traditional policy monopoly and how it reinforces policy stability. Consistent with True et al. (1999), Wiering et al. (2017) stated that for policy change to occur, the opponents of the existing policy must fashion out not only

new policy images or new perceptions that reframe the problems but also secure support for the new ideas. Also, Wiering et al. (2017) argued that policy change inspired by the punctuated equilibrium theory might take the form of a continuum, which ranges from highly stable to abrupt radical change. The work of Wiering et al. (2017) is related to this study because this study has generated data that introduces new perceptions to the flood problems, thereby redefining or reframing the flood problems. Although there are some other theoretical frameworks similar to the punctuated equilibrium theory in addressing the issues of stability and change, an understanding of the rationale for the choice of the punctuated equilibrium theory is essential.

PET Rationale

One rationale for the choice of the punctuation equilibrium theory to guide this study was its potential to address both the elements of relative flood stability and change. According to Sabatier and Weible (2014), stability and change are essential components of the policy process. While most policy models, for instance, the advocacy coalition framework (ACF) and the multiple streams analysis (MSA), are designed to explain only one of these components, only the punctuated equilibrium theory encompasses both elements of stability and change. The PET explains the long periods of policy stability punctuated by short periods of change (Cairney, 2012; Sabatier & Weible, 2014). According to Penning-Rowsell, Johnson, and Tunstall (2017), “this punctuation is brought about by flood events which if national in nature and scale, offer a window of opportunity to increase the rate at which policy changes, the range of actors involved, and the number of issues negotiated” (p. 16). These negotiated issues arise from a redefinition

or reframing in the flood problem domain, which would potentially translate into a change in policy. By exploring flood resilience from the perceptions of social responsibilities, this study redefined and reframed the flood problems.

Another reason for the choice of the punctuated equilibrium theory as a guiding framework for this study was its capacity to explain information flows or signals from a problem domain into a policy-making system. The information flows from the problem domain into the policy domain may then act to alleviate the problem (Sabatier & Weible, 2014; Penning-Rowsell et al., 2017). The punctuated equilibrium theory explains how redefining, reframing, and renegotiating a problem could result in the resetting of policy agenda, which could potentially trigger either an incremental or a catalytic change in the policy that addresses the problem. According to Penning-Rowsell et al. (2017), the punctuated equilibrium theory recognizes that individual and group interests are vital in defining policy issues and setting policy agendas. The prospect of reframing the flood problems in this study as a result of introducing new perceptions of new policy actors or entrepreneurs, i.e., the people themselves, could potentially trigger changes in policy through problem renegotiations involving the institutions responsible for flood policies.

A third rationale for the choice of this theoretical framework was its explicit recognition that a change in the problem definition and negotiation could potentially result in a change in the capacity of the institution or agency responsible for developing national flood policies. According to Penning-Rowsell et al. (2017), under an incremental policy change, an institution might not fundamentally change, whereas, under a catalytic or radical change in which there is a large scale departure from the past or punctuation of

a preexisting equilibrium, the institution could experience a significant change in its capacity. The implication is that this study's redefinition and reframing of the flood problems may provide some of the elements required to trigger a change in the institutional capacity of NEMA and its sister agencies in the states.

PET Links to Present Study and Nigerian Flood Policy

The problem of flooding in Nigeria has been well-known for over 40 years, and fairly-well managed during most of this period. However, recent increases in the severity of flooding in the country, particularly in riverine communities adjoining the River Niger, coupled with future projections of more catastrophic flooding, seem to reflect punctuation of a preexisting equilibrium or large scale departure from the previously relatively stable flooding problem. These flood event shocks, if properly redefined, may support changes in flood policies. Therefore, the punctuated equilibrium theory is appropriate and related to the present study, given its potential to characterize and explain the current punctuation of flood stability.

The generation of new information and ideas on the flood problem from new perspectives also establishes the relatedness of the PET with this study. These new perspectives reframe and redefine the flood problem from the unique perspectives of previously excluded policy actors. Therefore, the punctuated equilibrium theory can guide the transformation of the redefined perspectives of the flood problem into changes in flood policy by provoking policy negotiations and agenda setting at NEMA. Finally, it will guide the potential exploration of whether there is currently a window of opportunity

to punctuate the relative flood policy stability and trigger a radical or catalytic policy change (see Figure 2).

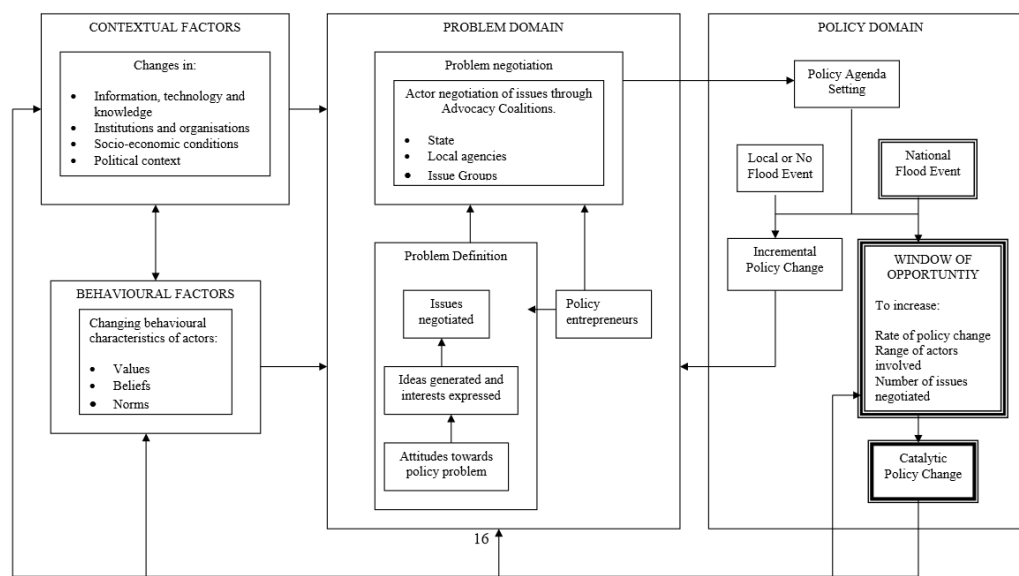


Figure 2. PET model of an incremental and catalytic policy change.

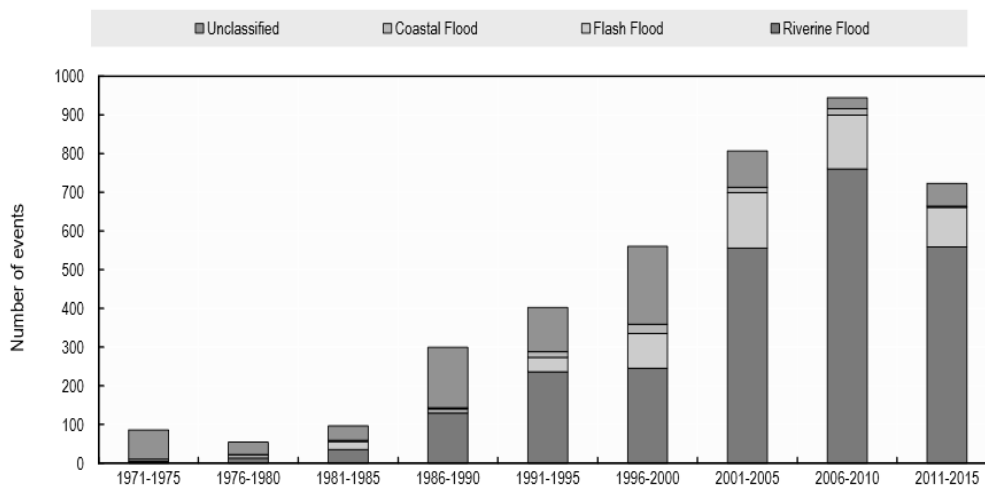
Review of Literature Related to Key Variables and Concepts

Flooding and Flood Hazards

Flooding has emerged in recent years as one of the most widespread, unprecedented, and devastating natural hazards globally, impacting millions of people and affecting the socioeconomic and ecological systems in both the developed and developing countries. According to the Emergency Events Database (EM-DAT, n.d.), an international disaster database containing data on global historical disaster events, flood disasters have resulted in the deaths of hundreds of thousands of persons worldwide in the last decade of the 20th century alone and affected over 1.4 billion people. The EM-

DAT (n.d.) also recorded that over 62% of all flood disasters recorded since 1970 occurred from the year 2000. According to Nkwunonwo, Whitworth, and Baily (2016), the unprecedented rate of flood occurrence has resulted in a yearly global exposure of 70 million people, with 800 million people living in flood-prone areas. Also, flooding accounts for a worldwide economic impact of billions of US dollars (Nkwunonwo et al., 2016), implying that it has become a serious global problem in need of urgent attention. An understanding of the types of flooding and the geographical spread of flood disasters around the world is vital.

The Organization for Economic Cooperation and Development (OECD, 2016) noted that 73% of the recorded flood disasters from the year 2000 result from river floods alone, while flash floods and coastal floods account for only 16% and 2%, respectively (see Figure 3). The remaining 9% of the floods were not classified because some flood events result from more than one type of flooding (OECD, 2016). These reports highlight river floods as the dominant type of flood that is responsible for the extensively adverse effects. Therefore, research on river flooding is critical.



Source: EM-DAT.

Figure 3. Number of flood events by type: 1971—015.

The global increase in flood disasters appears to be more prevalent among weak countries with little economic and institutional capacity to contend with the associated problems. The OECD reported that low-income or lower-middle-income countries account for over 60% of people affected by flood disasters, while about 79% percent of the total damages from these flood disasters occur in these relatively developing countries (See Figure 4). This report is consistent with findings in other studies (Jongman et al., 2015), which reported that the most significant relative increase in exposed population to river flooding is to occur in sub-Sahara Africa. Also, Barnett (2006) argued that most climate-insecure people are those in sub-Sahara Africa countries, who would also find it challenging to cope with climate-induced natural hazards such as flooding in communities. This difficulty will potentially undermine economic livelihoods, reduce the

availability of water and food, exacerbate inequalities between peoples, and threaten human security.



Source: EM-DAT. The categorisation of countries by income level was undertaken based on the World Bank FY2016 country and lending groups.

Figure 4. Flood events, deaths, affected people, and damage by income classification.

In another study on Global drivers of future river flood risks, Winsemius et al. (2016) found that the significant increase in future flood risks projected to occur in parts of Africa will mainly result from two major rivers- Rivers Nile and Niger. According to Winsemius et al. (2016), the projected increase in frequency and severity of floods from these rivers will occur mostly in those countries located above the equator. Winsemius et al. (2016) further argued that the resultant flood induced damages mean that growing assets are subject to extensive exposures from flood risks. The River Niger is one of the principal rivers in Nigeria, and also, Nigeria is above the equator. Therefore, these projections warrant an analysis of the effects of river floods in Nigeria.

River Flooding, and its Effects in Nigeria

Flooding in Nigeria, particularly, river flooding has become widespread with a significant impact on society. Historically, flooding in the country dates back to the early 1950s, and it has been predominantly fluvial, i.e., river floods (Nkeki, Henah, & Ojeh, 2013; Nkwunonwo, Malcolm & Brian, 2015). Nkwunonwo et al. (2015) found that just as previously projected, river floods currently account for the majority of the flood hazards experienced in many Nigerian communities, particularly riverine communities. While Serdeczny et al. (2017) projected that an estimated three million people per annum in Nigeria alone would soon be affected by increased devastation from flooding, Alfieri et al. (2017) found the projected figure to be an alarming ten million per year. According to Ezeokoli et al. (2019), over 20% of the Nigerian population is currently at risk from flooding, with most riverine communities highly vulnerable and experiencing increasingly devastating flood events during the yearly rainy season. These reports suggest a severe threat to the socioeconomic development of Nigeria, particularly to the flood-prone riverine communities.

Recurring floods have become the most common disaster in Nigeria. Several studies support this assertion (Adelekan & Asiyambi, 2015; Alfieri et al., 2017; Egbinola et al., 2017; Komolafe et al., 2015). The reports from these studies are consistent with earlier findings on the subject (Adeoye et al., 2009), which had warned that the frequency, severity, and dimensions of flood events from the River Niger had more than doubled, and the associated problems would require urgent attention to ensure sustainable urban environment. In recent years since that study, there has been, as previously

projected, yearly devastating river flood events in Nigeria as a whole, and particularly in the riverine communities of this study area along the plains of the River Niger. Therefore, one rationale for selecting river flooding as a concept in this study is the increasing threats of river flood events, coupled with a lack of coping capacity and high levels of vulnerability. According to Komolafe et al. (2015), the increasing flood vulnerability continues to put many lives and properties at risk, while also putting pressure on the institutions that tackle flood management in the country.

Institutional Framework for Flood Management and Policies

There is a link between the history of the organized institutional framework for disaster management in Nigeria and the country's national development plans. Nkwunonwo, Whitworth, and Baily (2016) reported that Nigeria's first, second, and third National Development Plans of 1962–1968, 1970–1974, and 1975–1980 all included a framework for the management of all disasters, including flooding. According to the National Disaster Management Framework (2010), in 1976, the federal government, in response to a devastating drought, created a relief agency—the National Emergency Relief Agency (NERA) specifically to address drought issues in the country. The NDMF stated that following the United Nations declaration of the International Decade for Natural Disaster Reductions in 1990, the Nigerian government expanded the drought reduction scope of NERA to include all types of disasters, including flooding. Also, in a bid to transit from the mere emergency relief mandate of NERA to a broader objective of emergency management, the federal government in 1999 created NEMA. According to Sadiq (2012), the establishment of NEMA was to lead the management of all disasters in

Nigeria through six zonal offices spread across the country. The NEMA act also mandated the establishment of the State Emergency Management Agency (SEMA) in each state of the federation, and Local Emergency Management Agency (LEMA) at local community levels, all of which are under the coordination of NEMA (NEMA, 2011; Sadiq, 2012).

As the lead agency for disaster management in the country, NEMA works closely with other national and state agencies in discharging its statutory obligations. According to NEMA (2011), these functions include the responsibility to formulate national flood management policies, engage in related activities, coordinate the activities of all relevant stakeholders involved in flood (disaster) management, such as the military, police, and civil society groups. The functions also include liaising with SEMA and LEMA in each of the states for all flood-related issues, including the rehabilitation of individuals adversely affected by flood events (NEMA, 2011). According to Nkwunonwo et al. (2016), NEMA collaborates with the Nigeria Hydrological Services Agency (NIHSA), which issues flood warnings; the National Orientation Agency (NOA), which provides general flood awareness; and the Nigerian Meteorological Agency (NIMET), which administers climate-related forecasts. The collaboration between NEMA and other agencies has the potential to enhance flood preparedness and response.

The existing multiagency institutional structure to address flood challenges is consistent with current global practices for flood risk management. According to Doorn (2016), governance of flood management requires the collaboration of a central government with regional and local bodies as well as private parties. However, several

studies have observed that despite the initiatives to address flood challenges, there are substantial weaknesses with the current institutional approach to flood management in Nigeria (Nkwunonwo, Malcolm & Brian, 2015; Obeta, 2014). Weaknesses in the functioning of the institutional flood management architecture appear to constrict its capacity to provide an effective, integrated, and sustainable flood management system.

One limitation or weakness is the lack of clarity concerning responsibilities among collaborating agencies. For instance, the roles of the agencies are not clearly defined (Adelekan, 2015; Nkwunonwo et al., 2015). When many people, groups, and organizations are involved, the question of how to distribute responsibilities among these actors becomes an issue (Doorn, 2016). This problem of incomplete distribution of responsibilities, known as the problem of many hands, results in institutional ineffectiveness and inefficiency (Doorn, 2016), and according to Thompson (2014), it may also cause the failure of governments. According to Doorn (2016), to prevent this problem, government policy can be achieved by guiding the conduct of the actors or stakeholders, including the citizens. Such policy guidance aimed at shaping citizen's conduct and protective behavior concerning flood preparation is lacking. Specifically, there is no effort to guide the SR, conduct, or behavior of the citizens or inhabitants of the flood-prone communities towards flood resilience. Therefore, without the incorporation of these human behavior dynamics and social dimensions into flood risk assessments, the development and implementation of government flood policies are limited.

In a recent study to ascertain the effectiveness and efficiency of NEMA in flood management in the country, Mashi, Oghenejabor, and Inkani (2019) argued that although

the NEMA act focusses on the functioning of the agency, it lacks a proper framework for the development of action plans to mitigate, prevent, or minimize flood risks. Mashi et al. (2019) also reported that the NEMA act does not have a clear means for stakeholders to mobilize resources during a flood emergency, and NEMA lacks the powers to compel the stakeholders to incorporate flood risk reduction measures in the stakeholder's operations. Mashi et al. (2019) argued for a review of the NEMA Act to guarantee mitigation action plans but also to promote the idea of shared responsibilities of all stakeholders, which would include persons in flood-prone communities. One rationale for the inclusion of the institutional framework for flood management in this study is the potential for the study to enhance the agency's institutional capacity to promote flood stakeholder engagement. Also, the study could potentially contribute to the agency's development of flood policies directed at community social responsibilities towards flood resilience, as well as policies to strengthen flood management in the study area and Nigeria.

Concepts of SR and Flood Resilience

The foundations of the term social responsibility derive from its initial use as corporate social responsibility within the context of corporate business. Expectedly, organizations have been the focus of an overwhelming majority of the existing literature on social responsibility (Crane, Matten, & Spence, 2019; Hahn, 2012; Wang, Tong, Takeuchi, & George, 2016). Starting from the early twentieth century, when the idea of CSR took root in the United States, and through several decades of evolution, Frederick (2018) described CSR as occurring when a business firm deliberately takes action to promote the social well-being of the community or society. Therefore, through corporate

behavior, social responsibility entails the voluntary integration of an organization's economic operations with the four elements of environment, community, social systems, and institutions to achieve a balance between them.

As with the corporate or organized business sector, social responsibility in a broader context confers an ethical requirement for an entity—individual or group—to act for the benefit of the community. The selection of the concept of social responsibility in this study is justified because of its relevance and value as a research field for investigating contemporary societal issues (Mullins & Soetanto, 2011; Wang et al., 2016). The SR concept has been applied in the areas of education (Jorge & Peña, 2017), sustainable development (Korze & Krajnc, 2014), and in oil and gas (Kidd, 2014). The SR concept has also been applied in the fields of natural disasters (Dranseika, 2016), climate change (Christoplos, Ngoan, Sen, Huong, & Lindegaard, 2017), and particularly in the field of flooding (Box, Bird, Haynes, & King, 2016; Mullins & Soetanto, 2011; Soetanto et al., 2017). These studies showed the critical role of personal responsibility as a function of social responsibility to engage in protective action behavior, and this justifies the application of the social responsibility concept in this study.

Increased personal responsibility for protective action behavior ultimately leads to increased community responsibility for flood risk reduction. FEMA (2006) emphasized the importance of individual or personal responsibility as a factor in driving social responsibility for flood safety. Because individuals make up communities, these efforts must be concerted and collective to build flood resilience in communities (Box et al., 2016; Imperiale & Vanclay, 2016;). Therefore, exploring collective attitudes and

behaviors for social responsibility perceptions, as in this study, is a robust platform to enhance community flood resilience.

The concept of resilience is broad and open to interpretations, and this reflects both a weakness and strength for researchers. It was initially applied primarily within the ecological context, in which it was defined by Holling (1973) as the amount of disturbance an ecosystem can withstand without changing its ecological processes and structures. According to Holling (1973), resilience is a measure of the ability of a system to persist after bouncing back from or absorbing changes in variables and parameters. In recent years, the application of the term resilience to the functioning of human societies has increased. Despite the increased attention in this context, it has been challenging to define and conceptualize. This difficulty has arisen because resilience is a complex, multidisciplinary, and multifaceted concept with both research and policy perspectives (Oladokun & Montz, 2019). However, in what has become one of the widely used definitions of resilience, the United Nations Office for Disaster Risk Reduction (UNISDR) described resilience as:

The ability of a system, community, or society exposed to hazards to resist, absorb, accommodate, 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, 2009, p. 24)

The resilience of a community to flood hazards may generally refer to the adaptive dynamics that allow systems to respond to disturbance and change (Darnhofer, Lamine, Strauss, & Navarrete, 2016; Imperiale & Vanclay, 2016), and also within a

reasonable time (Adebimpe, Oladokun, Odedairo & Oladokun, 2018). An understanding of how individuals and communities prepare to cope with and recover from flood disasters is vital to understand the concept of community flood resilience. Therefore, the selection of the concept of resilience in this study was justified because it sought to explore additional ways the community can prepare for, live with, and adapt to the threat of flooding.

Flood Defense and Flood Resilience

The growing widespread incidences and severity of flood events both globally and in the study area of Nigeria, coupled with climate change effects, has led to the increasing demands from flood-prone communities for more effective protection, mainly through enhanced resilience of the communities to flood. Traditionally, governments have been responsible for providing flood protection to communities, typically through flood control (or defense) measures (Mees et al., 2016). These measures consist of physical barriers, channelization, dikes, and shoreline protection (Nkwunonwo et al., 2016; Oladokun & Proverbs, 2016). However, the demands for better flood protection raise questions on the continued effectiveness of the current traditional flood risk management, given the approach's failure to recognize the value of individual flood resilient protective behaviors in promoting community flood resilience.

Over the years, the multiagency institutional architecture of flood control or defense has been relatively effective in managing flood risks in many countries. However, several researchers have observed that given the increasing flood threats, this traditional approach alone is inadequate by itself to cope with the current and projected

flood events (Butler & Pidgeon, 2011; Liao, 2012; Mullins & Soetanto, 2011). The findings are consistent with recent reports (Driessen et al., 2016; Mees et al., 2016; Mees, Crabbé, & Driessen, 2017; O'Neill, Brereton, Shahumyan, & Clinch, 2016), which suggest a paradigm shift in flood policy from the typical flood defense policy approach to an approach based on flood resilience. Therefore, factoring in a community's social processes such as identifying and promoting the socially responsible and resilience-enhancing behaviors of residents will complement the flood defense approach and encourage community flood resilience.

The new paradigm of community flood resilience pays attention to nonstructural measures such as adequate flood warnings, increased awareness, risk assessment, and emergency management (O'Neill et al., 2016). It also focuses on social processes such as the people's protective actions or behaviors for flood preparedness (Driessen et al., 2016; O'Neill et al., 2016). My study explained this element of the people's resilience-enhancing protective action or behaviors using the PADM as a theoretical framework. It also explained the potential for a change in existing flood policies using the PET. This paradigm of flood resilience is a function of the SR perceptions of the flood protection actors, particularly the inhabitants of the communities.

Increased responsibility of members of the flood-prone communities is crucial to community flood resilience by its potential to enhance and strengthen the flood management approach. To achieve an integrated, sustainable, and effective flood management approach, all stakeholders, particularly members of flood-prone communities, must demonstrate greater responsibility to flood risk reduction (Bubeck,

Botzen, Aerts, 2012). Therefore, individual citizens must be socially responsible for their preparedness and protection (Kreibich, Bubeck, Van Vliet, & De Moel, 2015; Ueberham, Kabisch, & Kuhlicke, 2016). Kriebich et al. (2015) argued that by taking personal protective and preparedness measures, citizens of flood-prone communities could reduce flood related damages and, in so doing, increase the community flood resilience.

Therefore, this study is justified by its potential to promote flood risk reduction and flood resilience among the various sociodemographic variables.

Influence of the Independent Variables on SR Perceptions

The effects of the sociodemographic variables on flood related perceptions, such as the perceptions of flood risks, and social responsibilities to take preventive action in response to those risks, are varied. This variation in perceptions of any given demography from one population to another is primarily because, as Costache, Comănescu, and Nedelea (2017) observed, human perceptions of the natural environment are shaped by the social and cultural context, as well as the collective history of the people.

Consequently, demographic factors offer mixed evidence about disaster resilience (Lindell & Perry, 2000). Lindell and Perry (2000) also stated that demographic factors could account for differences in perceptions, and may, therefore, influence protective or resilient behaviors. For instance, higher perceptions of SR have been associated with increased resilient behavior, while, conversely, lower perceptions of SR are also associated with a relative lack of resilient behavior (Mullins & Soetanto, 2011; Soetanto et al., 2017).

The rationale for the selection of the independent demographic variables of age, gender, educational attainment, and previous experience to flooding was that it helps our understanding of the perceptions of SR for flood resilience within each of these groups. The justification of this rationale was the fact that demographic groups identified with lower SR perceptions could benefit from targeted strategies to induce or enhance resilient behavior, thereby promoting overall community flood resilience.

Gender. Gender dynamics in the context of flood disasters is a crucial tool for promoting flood resilience in any community. In the investigations of gender disparities in flood risk perceptions, preparedness, and response behaviors in Serbia, Cvetković et al. (2018) found that men perceived significantly more confidence than women in the abilities to cope with flooding, and therefore more willing to get involved in community activities. Cvetković et al. (2018) observed that women exhibited a deeper understanding of flood events and more significant caring attitudes and behaviors, including an inclination to report flood victims to emergency managers. According to Cvetković et al. (2018), this pattern can be explained in part by the community's gender-specific roles, which provide women with fewer opportunities to effectively connect with active social networks in the community, potentially resulting in their being less informed. The inadequate information reaching women also exposed gender gaps in risk communications.

Despite these limitations, it would seem that women engage in more flood resilient behaviors than men. These findings are consistent with other studies (Gonzalez-Torres & Artuch-Garde, 2014; Ludin, 2018). Adelekan and Asiyambi (2016) reported

that there was no significant association between gender and perception of flood risk or vulnerability. This finding was consistent with Armas, Ionescu, and Posner (2015), which also reported an absence of statistically significant gender differences in flood risk perceptions. Given these contradictory findings of gender influences on perceptions of various aspects of flood risks, it was essential to determine the role of gender, if any, in the SR perceptions to flood risks, which is a crucial objective of this study population.

Experience of flooding. The experience of flooding may affect flood SR in a variety of ways. Previous experience of flooding significantly increases the willingness to perform protective action behaviors (Bubeck, Botzen, & Aerts, 2012; Osberghaus, 2015). Soetanto et al. (2017) suggested that the tendency to engage in protective action behavior against flooding and flood risk by people with previous flooding experience implies that this demographic may show higher perceptions of SR than those without flood experience. These findings are consistent with Thistlethwaite et al. (2018), who attributed the inclination for flood protection of personal properties to an increased concern about future flood risks. However, previous experience may not always positively influence flood risk awareness and preparedness. According to Begg, Ueberham, Masson, and Kuhlicke (2017), citizens who experienced severe consequences from flooding may be insufficiently motivated to take personal responsibility or measures in the future. Therefore, it was essential to establish whether citizen's experience of flooding in the study communities is enough to instigate behavioral changes by altering perceptions of social responsibilities

Age of the respondents. Berkowitz and Lutterman (1968) reported a significant association between respondents' age with SR score. This association indicated that the older respondents tended to have lower SR scores than the younger ones, implying that the older populations were more conservative than the younger ones, and thus, more accepting of the American traditional societal values. Berkowitz and Lutterman's finding is consistent with later studies such as Cvetković, Milašinović, and Gostimirović (2016), which reported that older respondents above the age of 48 in Serbia were less likely than the younger ones to take preventive, protective action against flood disasters. These findings indicated that increasing age was associated with a lower inclination to take protective behavior. Cvetković et al. (2016) suggested that the older members of a community are less likely than the younger ones to be socially responsible and, therefore, less likely to be engaged in protective or flood resilient behavior.

However, there is no unanimity or consensus amongst researchers on this view. Soetanto et al. (2017) reported that the older population recorded higher SR scores indicating a greater inclination to take protective action behaviors. This finding is supported by previous research (Cvetkovic, Ivanov & Sadiyeh 2015; Lindell & Whitney, 2000; Takahashi & Selfa, 2015), which also found that increasing age was associated with higher environmentally responsible behaviors when faced with disaster risk. Senior citizens are better prepared to respond to flood disasters, better engaged in resilient behaviors, and are therefore more socially responsible. One possible explanation could be that after a certain age, people may become more perceptive to risk, more vulnerable, and therefore more inclined to become socially responsible and take protective action.

Educational attainment. As with other demographic factors, the effects of education levels on resilience can vary significantly from one population to another. The effects can also vary within the same population when there is statistical control of other factors. For instance, in assessing flood resilience in flood-prone communities in Malaysia, Ludin (2018) reported that education levels were significantly related to flood disaster resilience, suggesting that respondents with higher education were more inclined to greater levels of resilience. However, when there is statistical control of other demographic factors such as previous exposure to floods, education levels were found to be inversely proportional to flood resilience (Ludin, 2018), i.e., higher education levels seemed to impede resilience. Adelekan and Asiyani (2016) found that respondents with higher educational levels were more concerned about flood risks suggesting a higher perception of flood risk with increased educational attainment.

Review of Literature Related to Research Methodology and Instrumentation

This quantitative correlational survey study utilized a 12-item cross-sectional SR survey questionnaire instrument for data collection. The instrument, adapted from Soetanto et al. (2017), contains 12-item attitudinal survey statements. This survey instrument required respondents to indicate agreement or otherwise with the attitudinal statements on a 4-point Likert scale ranging from 'strongly agree' (4) to 'strongly disagree' (1). The instrument was developed originally by Berkowitz and Lutterman (1968), who explored socially responsible personalities using attitudinal and behavioral correlates of a SR scale. Soetanto et al. (2017) had modified and adapted the original Berkowitz and Lutterman's (1968) SR perception scale and applied the modified instrument to explore

perceptions of SR to community flood resilience in four flood-prone communities in the United Kingdom.

Berkowitz and Lutterman's (1968) study aimed at determining whether readiness to behave in a socially responsible manner was related to certain individual attitudes and behaviors. The original instrument consisted of an 8-item survey questionnaire administered to 766 Wisconsin adults by trained interviewers. Analyses of the findings indicated a very high internal consistency (reliability) and high validity for the instrument (Berkowitz & Lutterman, 1968). According to Soetanto et al. (2017), this original SR questionnaire has, over the years, provided a valid and reliable basis for researching social responsibility in various fields. Consequently, several studies have employed the use of the original instrument or a slightly modified version of the instrument to collate SR perception scores.

Several studies in the fields of education (Reed, Jernstedt, Hawley, Reber, and DuBois, 2005) and health (Chacon, Menard, Sanz, and Vecina, 1998) have employed the use of modified versions of the Berkowitz and Lutterman instrument to collate social responsibility perceptions. Reed et al. (2005) used a slightly modified version of the Berkowitz and Lutterman instrument of SR to explore whether there were measurable impacts on the character development of a small group of 34 students in a service-learning experience. Reed et al. (2005) predicted that students who participated in the experiment would be more socially responsible, a hypothesis that was supported by the findings. The study by Chacon et al. (1998) also utilized the Berkowitz and Lutterman SR instrument to assess Helping Personality by evaluating psychosocial factors that influence

the service of AIDS volunteers in Spain. The use of this instrument to measure SR in various fields indicates broad applicability and further confirms instrument reliability.

The design of the original Berkowitz and Lutterman SR instrument did not specifically include the collation of flood-related SR perceptions. Therefore, Soetanto et al. (2017) modified the Berkowitz and Lutterman's original 8-item SR questionnaire to a 12-item questionnaire, accommodating specific references to flooding, climate change, community, and protection against floods, thereby making the questionnaire suitable for the collation of SR perception scores related to flooding. According to Soetanto et al. (2017), higher aggregated SR scores in any demographic group suggests an inclination for higher SR behavior and vice versa. Therefore, the adoption of the modified 12-item flood-focussed SR survey instrument is perfect for this study, and consequently, justified its use in this study.

Gaps in the Literature

The review of the current literature on topics related to the subject of this study revealed the presence of several gaps. First, there is a general absence of adequate flood data in Nigeria. In particular, there is a dearth of critical flood data and information that deals specifically with the community's social participation in promoting flood resilience (Adelekan, 2016). Next and related to the gap is the absence of studies that identify and develop a database of climate-hazard information for stakeholders. Addressing these gaps will contribute to the development of an integrated, sustainable, robust, and more effective flood management approach.

A more effective flood management approach relies mainly on strong public policies on flooding and citizen responsibility. A gap in the literature is the absence of a cogent flood policy framework to support the flood management approach. Another gap is the absence or lack of clarity of the roles and responsibilities that inhabitants of flood vulnerable communities can play in addressing flood challenges. Also, no study in Nigeria has examined the application of the punctuated equilibrium theory to strengthen flood policies or potentially trigger changes in flood policies and promote shared community responsibilities as a way of responding to the increasing flood threats in the country. This study has addressed some of these gaps within the riverine communities of the study area.

Summary and Conclusions

In Chapter 2, I included analyses and syntheses of empirical research regarding major themes in the literature, including the problem of flooding, concepts of SR, and flood resilience, as well as the independent variables—gender, flood experience, age, and educational attainment. In this chapter, I discussed literature first from a global and then African perspective before narrowing it to the Nigerian context and focusing on the geographical study area of Ogbaru communities in Southeast Nigeria. Chapter 2 also included a discussion of two theoretical frameworks: the PADM and PET, the rationale for the selections of these frameworks to guide this study, previous applications of these theories, and how they have been applied to the present study.

The literature review highlighted several significant findings, one of which was that although flood hazards have recently become the most common and recurrent

disaster in Nigeria, yet the literature on critical flood data is sparse. Also in Chapter 2, I highlighted research findings that support the knowledge that building flood resilience capabilities to prepare for increased flood events is crucial to a sustainable, effective, and integrated flood management approach. Yet, in Nigeria, and mainly, in the geographical study area, there is no known empirical study that has explored these perceptions and concepts to build community flood resilience through socially responsible behaviors of taking protective action and preparedness.

This study has contributed to filling several gaps in the literature, first by generating critical flood data and information that would promote community flood resilience. Also, by enhancing our understanding of the perceptions of SR to flood resilience among the various selected demographics in the riverine communities, this study has bridged the knowledge gap by contributing to the development of a more effective flood management approach in Nigeria. Additionally, by reframing the flood problem from one of flood defense, to flood resilience, the study may strengthen current flood policies or trigger a change in them to protect vulnerable communities better. Chapter 3 includes a detailed account of the methodology and instrumentation chosen for data collection of SR perceptions among sociodemographic indicators to test the hypotheses for this study.

Chapter 3: Research Method

Introduction

In this study, I explored present conditions of widespread and unprecedented flooding in the Ogbaru riverine communities of Southeast Nigeria. These communities, located along the plains adjoining the river Niger and are some of the most vulnerable to the effects of river flooding. Despite the increasing flood frequency and intensity, coupled with the projected exacerbation in these flood events, there is a lack of effective flood management approaches and weak public policies on flooding. Additionally, there is scant flood data to address this problem, particularly regarding individual and community responsibilities in terms of flood resilience. This study explored the roles of personal SR in promoting community flood resilience through protective action behavior.

The purpose of this quantitative nonexperimental correlational study was to examine the extent to which relationships exist between sociodemographic indicators and SR perceptions of flood resilience in the geographical study area. Exploration and examination of attitudes and behaviors derived from SR perceptions of flood resilience in these communities will potentially contribute to the development of integrated, sustainable, and more effective flood management approaches. Additionally, new ideas generated in this study that reframe and redefine flood problems in the geographical study area may potentially influence the development of a new public policy agenda that supports more sustainable flood management.

Chapter 3 begins with information regarding the correlational research design for this study, its rationale, connections to the research questions, and an explanation of study

variables. Next is a detailed presentation of the methodology, including sampling procedures, data collection, and instrumentation. The research questions and hypotheses, along with the data analysis plan, are presented to demonstrate alignment and consistency with study elements. Also included are issues related to validity threats and ethical procedures. Chapter 3 ends with a summary of the main points and a transition to Chapter 4.

Research Design and Rationale

The independent or predictor variables in this study were sociodemographic factors, which included participants' gender, the experience of flooding, age, and educational attainment. The dependent variable was the participants' perceptions of SR for flood resilience.

The research design for this study was a quantitative nonexperimental, cross-sectional survey. According to Creswell and Creswell (2018), correlational statistics describe and measure associations or relationships between two or more variables that are not subject to control groups or treatments in the same population or between the same variables in different populations. Survey questionnaires are essential tools in correlational research designs used in describing trends, attitudes, and opinions of a population by studying a sample of that population using questionnaires or structured interviews for data collection (Creswell (2014). Therefore, a survey questionnaire in this study was appropriate and justified, given the fact that the research involved describing perceptions of a population and statistical correlational analyses.

The choice of correlation survey as a research design advances existing knowledge because it provides insights into the perceptions (attitudes and opinions) of a sample population and establishes relationships between variables in that population. Correlation does not prove causality, and therefore, I exercised caution in terms of inferring cause and effect relationships.

Two potential constraints involved time and resources. One time-related limitation associated with this research design was the cross-sectional nature of the study, which implied that the findings might not remain the same at a different time in the future. Additionally, both time and a lack of adequate financial resources limited the capacity to conduct a comprehensive and all-embracing survey study that is related to every aspect of this study, particularly in the absence of a research grant or sponsorship. Therefore, I streamlined this study to address the most significant associated elements.

Methodology

Population

The target population for this study comprised the members of Ogbaru riverine communities in Anambra State, Nigeria. These communities experience devastating annual flood events resulting primarily from the overflow of the River Niger, which has led to severe social, economic, environmental, and livelihood impairments. These adverse effects include loss of lives, extensive damage to property, destruction of farmlands, social displacement, livelihood contraction, and environmental degradation such as water pollution.

Sampling Procedures, and Justification

I had planned to employ a multistage sampling technique in choosing the sample frame. This initial plan was to first divide the geographical study area into sub-areas or clusters using the cluster or area probability sampling method. The delineation of the study area was to be followed by a convenience sampling to recruit potential participants at easily accessible public locations. The rationale for the initial choice of this design was the absence of a direct sampling source such as an adequate or published list of potential respondents in the area. However, due to the COVID-19 pandemic and the associated social distancing and movement restrictions, it became impractical to recruit participants for this study using the convenience sampling method. Therefore, I had to use snowball or chain-referral sampling to recruit study participants.

According to Etikan, Alkassim, and Abubakar (2016), the snowball sampling method involves the use of existing study participants or primary data sources to nominate or refer potential participants for recruitment. The rationale for the choice of this sampling design remained the absence of a direct sampling source such as an adequate or published list of potential respondents in the area, but more importantly, the impracticability of accessing the sample population given the COVID-19 pandemic. There are three types of snowball sampling— the linear sampling method, the exponential nondiscriminative sampling, and the exponential discriminative sampling. In the linear and exponential nondiscriminative sampling, every participant refers others for recruitment as participants, whereas in the exponential discriminative sampling, not every recruited participant refers others for recruitment (Etikan et al., 2016).

A significant drawback with the use of snowball sampling is the high dependency on the respondent's judgment. According to Etikan et al. (2016), respondents are likely to refer for recruitment, those who share similar characteristics, views, or perceptions, which may generate biased samples. To limit the effect of the respondent's bias on the sample population, I used a slightly modified version of the exponential discriminative snowball sampling. In this modified version, although all recruited participants were encouraged to refer others for participation, not everyone referred was included in the study. Another drawback of the snowball sampling method is that given its nonprobabilistic nature, it is unrealistic to make statistical inferences or generalizations from the sample to the broader population. Despite these drawbacks, the snowball sampling technique can be useful in gathering critical data and information that may not have been possible with a probability sampling technique, which often require more formal access to lists of the population (Laerd Dissertation, n.d.).

Sample Size

The issue of adequate sample size arises from the question of how large a sample must be to ensure that if a difference exists in the population, there will be a reasonable likelihood of detecting that difference in the sample. Several methods and tools are available to determine the adequate sample size of a research study, i.e., the sample population that will adequately represent the target population to be studied.

In this study, I used G*Power analysis software (version 3.1.9.4) to perform the power calculations, and I determined that this study required an adequate sample size of 108 participants for the four predictor variables, using an effect size of 0.15, an alpha

level of 0.05, and a statistical power of 0.90. However, a sample size of 120 participants was used in this study, exceeding the minimum adequate size required.

Calculating the adequate sample size required first a determination of the value of the following three (elements: the statistical power level, the alpha level, and the effect size. The statistical power is the presence of the conditions that ensure that the likelihood of detecting an effect, and the acceptable minimum is usually 0.8 or 80% or higher (Cohen, 2013). According to Cohen (2013), at a statistical power of 0.8, if a real relationship truly exists between the variables, the null hypothesis will be correctly rejected 80 times if the study is repeated 100 times. For this study, the statistical power of 0.90, higher than the traditional power of 0.80, was selected, and this choice is justified, given the study's aims of exploring whether real relationships exist between the variables. The higher chosen statistical power implies that the findings from this study have a higher chance of being authentic. An alpha level α (type I error) of 0.05 is the traditionally accepted level, i.e., $\alpha = 0.05$. This value implies that there is a 95 percent chance of reaching the right conclusions (and a 5% chance of reaching the wrong conclusion). Also, an α level of 0.01 means a 90 percent reduced chance of reaching the right conclusions. I used the traditional alpha level α of 0.05 (95 percent) in this study. This choice is justified because it increases the study's chances of reaching the right conclusions.

The effect size R^2 indicates the strength of the relationship; if there is a strong effect, then only a few people will be needed before an existing relationship would become evident. Conversely, a weak effect requires the assessment of a large population.

Relying on existing literature and because it is better to use a larger sample population, the relatively smaller effect size of 0.15 in this correlational study is justified.

Procedures for Participant Recruitment and Data Collection

I had initially planned to use the convenience sampling method for participant recruitment at easily accessible locations, including in the streets, shops, businesses, and their homes. I had also planned to use the face-to-face approach of administering a paper survey as the data collection method. However, due to COVID-19 pandemic, the associated social distancing requirements as well as restrictions on local and international travels, it was not feasible to use the planned methods of convenience sampling, and face to face survey administration for participant recruitment and data collection respectively. Instead, I used the snowball method for participant recruitment and the telephone survey administration for data collection. The telephone survey method of data collection was a preferred and justified option for this study. Although I considered online data collection methods, such as Facebook, previous studies indicated an absence of balance in the demography of online respondents. For instance, Hollier, Pettigrew, Slevin, Strickland, and Minto (2017) stated that online respondents were more likely to be female, younger, more highly educated, and in higher income brackets. There is also limited internet access in the geographical study area.

In this study, I invited and recruited 15 participants from my network of contacts, who met the inclusion criteria. The requirement for inclusion as a participant was that they are members of the Ogbaru community, which comprise of individuals who reside within the communities or indigenous members of Ogbaru who are resident elsewhere. I

read out the IRB-approved consent form for this study over the phone and subsequently secured their consent. The consent form outlined that there were no physical, economic, or psychological risks that participants would be exposed to by participating in this study. I also advised that participation is strictly voluntary; participants were not obligated to respond to any part of the survey with which they are uncomfortable and that they could withdraw participation at any time. I provided assurances that their confidentiality and privacy will be respected and that I am the only person who would have access to their personal information, which would be used exclusively for this research. Also, I explained that their identities, such as contact details, would not be required to match data points, and so they were not required to provide their names as part of the consent or data collection process.

After obtaining consent, I administered the SR survey comprising of the questionnaire and the sociodemographic information (see Appendix A). Following the administration of the survey questionnaire to each of the initial 15 respondents, I requested that they provide me with the phone numbers only of other potential participants who they know meet the eligibility criteria for participation in the study. Through the initial 15 participants, I first recruited the second set of 60 participants, and then from these recruits, another set of 45 participants was recruited. Altogether, I administered the telephone survey questionnaire to a total of 120 participant members of the Ogbaru community. This number exceeded the minimum of 108 participants calculated as an adequate sample size

The following four demographic information was collected:

- Sex: Male or Female
- Experience of Flooding: Yes or No.
- The age of the respondent: This information was in four categories, i.e., 18–24 years, 25–34 years, 35–49 years, and 50 years and above.
- The educational attainment variable comprised three categories, i.e., Primary School Completed, Secondary School Completed, and Postsecondary school.

After completing the survey, I debriefed each participant, first by thanking them for participating in the study, and again, reviewing with them the study's purpose. There was no requirement for a followup.

Instrumentation and Operationalization of Constructs

This quantitative correlational survey study utilized a 12-item SR perception survey questionnaire for data collection. The SR instrument was developed originally by Berkowitz and Lutterman (1968) to explore socially responsible personalities using attitudinal and behavioral correlates of a SR scale. The Berkowitz and Lutterman's SR instrument was an 8-item survey questionnaire, which did not specifically include the collation of flood-related SR perceptions. However, Soetanto et al. (2017) modified the Berkowitz and Lutterman's original 8-item SR questionnaire to a 12-item, which accommodates specific references to flooding, climate change, community, and protection against floods, thereby making the questionnaire ideally suited for the collation of flood-related data on SR perceptions. This modified Soetanto et al. (2017) survey instrument, adopted in this study, required respondents to indicate agreement or otherwise with the attitudinal statements on a 4-point Likert scale ranging from strongly

agree (4) to strongly disagree (1). According to Soetanto et al., higher aggregated SR scores in any demographic group indicates an inclination for higher socially responsible behavior and vice versa.

This instrument was appropriate and relevant to this current study because of its demonstrated capacity to collate data on SR perceptions of flood resilience explicitly. Just as with the Soetanto et al. (2017) study, which used the instrument to explore SR perceptions in flood vulnerable communities, this study also aimed at investigating the perceptions of social responsibilities to flooding in vulnerable populations. The survey instrument also allowed for comparisons between these perceptions and demographic indicators within and between communities. I sought and obtained permission from the developers of the instrument, Soetanto et al. (2017) to use their survey instrument in this study (see Appendix B). According to Soetanto et al., the SR instrument established from its creation, a valid and reliable basis for SR research. Soetanto et al. (2017) reported the reliability of the scores in their study as 0.801 (or 80.1%) using the Cronbach's alpha coefficient.

Also, the original instrument and its modified versions have been adapted and widely used in several SR studies in the fields of education, health, and flooding to collate SR perceptions. Soetanto et al. (2017) used the instrument to explore perceptions of SR to flood resilience in four communities in the UK- three of these communities in Birmingham (Witton, Selly Park, and Digbeth), and the fourth in Thornton Heath in South East London. The use of this instrument to measure SR in various fields indicates broad applicability and further confirms instrument reliability.

Operationalization of Variables

A variable is a measurable attribute or characteristic that changes in value (Burkholder, Cox, & Crawford, 2016). This study incorporated four explanatory or independent predictor variables: gender, flood experience, the age of the respondent, and educational attainment. The dependent variable was the participant's SR score. The proper operationalization or measurements of these variables are essential before testing the strengths of their relationships.

The levels (or scale) of measurements for variables include nominal, ordinal, interval, and ratio. A nominal scale variable measures categorical data; these are variables with mutually exclusive attributes, and in which there is no order. An ordinal scale uses numbers to indicate whether there is more or less of a variable. In other words, an ordinal scale measures rank-ordered data or variables. An interval level measurement is one in which adjacent attributes are equidistance from each other, i.e., and there are equal distances between scores on the measure corresponding to similar changes in the variable. An interval scale is also rank-ordered. While an interval scale measure does not have a zero point, a ratio scale has a zero score. The operationalization of each of the four independent predictor variables in this study was as follows:

Gender. The variable Gender is a nominal scale variable. Gender was measured as F for Female, and M for Male. Labels were also assigned to indicate that it is a one-binary variable: 1= F, 2= M.

Experience of flooding. The experience of flooding was a Yes or No response, each being a mutually exclusive attribute. Therefore, this variable is a nominal scale

variable. Labels were also assigned, indicating that it is a one-binary variable, i.e., 1= Y or experienced flooding, and 2= N or have not experienced flooding.

Age of the respondents. The age of the respondents in this study was in ranked groups or categories of years. Therefore, it was an ordinal scale variable presented as 18–24 years, 25–34 years, 35–49 years, 50 years, and above.

Educational attainment. The measurement of this variable was in ranked-order, the highest level of education attained by the respondent. Therefore, it was also an ordinal scale variable presented as Primary (1–6 years), Secondary (7–12 years), and Postsecondary school (13 years and above).

SR perception was measured on a 4-point Likert scale, from strongly agree with a score of 4, to strongly disagree with a point of 1. For each respondent, the scores for three statements (items 1, 4, and 11) were reverse-scored to counter acquiescence bias, and after which, all scores were summed-up or aggregated. For the 12-items on the questionnaire, each respondent, in theory, had between 12 and 48 points. Higher scores represent the inclination for higher SR. Although a Likert scale is an ordinal level measure, the aggregation of the scores made it a nominal scale measure. Therefore, the dependent variable- social responsibility, is a nominal-level data.

Data Analysis Plan

SPSS Version 25 was used to perform statistical tests to determine the relationships that exist between the independent variables and the dependent variable. Before performing the statistical analyses, I screened and cleaned the data first by conducting assessments of data issues such as the normality, skewness, kurtosis, the data

range, i.e., minimum and maximum values, frequency, percentage. The descriptive statistics of the SR scores included measures of central tendency and dispersion such as mean, median, standard deviation, percentage distribution, etc. I also assessed the linearity of the dependent variable data, plotted the Q-QPlots, and checked for outliers. I also evaluated statistical assumptions associated with multiple regression analysis.

The internal consistency or reliability of the SR scores was reported using the Cronbach's alpha coefficient, which ranges from 0.00 to 1.00. While the higher alpha coefficient indicates better reliability, the acceptable range is between 0.50 to 1.00. The inferential statistical analyses were two-tailed with a 5% (or .05) alpha level, which implied a .025 level at each tail. The inferential statistical analyses answered the research questions.

The research questions for this study were:

RQ1: Is there a statistically significant relationship between the gender of respondents and social responsibility perceptions?

H₀₁: No statistically significant relationship exists between the gender of respondents and social responsibility perceptions.

H_{a1}: A statistically significant relationship exists between the gender of respondents and social responsibility perceptions.

RQ2: Is there a statistically significant relationship between the experience of flooding and social responsibility perceptions?

H₀₂: No statistically significant relationship exists between the experience of flooding and social responsibility perceptions.

H_{a2}: A statistically significant relationship exists between the experience of flooding and social responsibility perceptions.

RQ3: Is there a statistically significant relationship between respondents' age bracket and social responsibility perceptions?

H₀₃: No statistically significant relationship exists between respondents' age bracket and social responsibility perceptions.

H_{a3}: A statistically significant relationship exists between respondents' age bracket and social responsibility perceptions.

RQ4: Is there a statistically significant relationship between respondents' educational attainment and social responsibility perceptions?

H₀₄: No statistically significant relationship exists between respondents' educational attainment and social responsibility perceptions.

H_{a4}: A statistically significant relationship exists between respondents' educational attainment and social responsibility perceptions.

RQ5: Do the independent variables of gender, flooding experience, age, and educational attainment collectively predict social responsibility perceptions?

H₀₅: The independent variables of gender, flooding experience, age, and educational attainment collectively do not predict social responsibility perceptions.

H_{a5}: The independent variables, gender, flooding experience, age, and educational attainment collectively predict social responsibility perceptions.

Descriptive Statistics

Descriptive statistics provide information that describes and organizes the basic features of the data in a study (Frankfort-Nachmias & Leon-Guerrero, 2015). The organization and description of the independent and dependent variables provide a preliminary understanding of the data by indicating the measures of central tendency (i.e., means, median, and mode) depending on the level of measurements (nominal, ordinal, or interval-ratio). The descriptive statistical analysis was essential because it also indicated the appropriate measures of variability in the distribution, which include the standard deviation, the range of scores (the difference between the highest and the lowest scores), the distribution frequency, skewness, and kurtosis of the various data. However, the descriptive analysis does not indicate the significance of the statistical relationships between the variables.

Inferential Statistics

While descriptive statistics describe a dataset, inferential statistics allows for predictions from that data. According to Frankfort-Nachmias and Leon-Guerrero (2015), inferential statistics are techniques or procedures that are concerned with making inferences or predictions from the sample data to the population.

Independent Samples *t*-Test and Point biserial Correlation. I employed the use of these two statistical tools to answer research questions 1 and 2 and test their hypotheses.

RQ1: Is there a statistically significant relationship between the gender of respondents and social responsibility perceptions?

RQ2: Is there a statistically significant relationship between the experience of flooding and SR perceptions?

The independent samples *t*-test was an appropriate tool to compare the mean difference in each of the groups in the independent variables (gender and the experience of flooding) against aggregated SR scores. The variables—gender and the experience of flooding—were binomial with two groups each: Male and Female for the gender variable, and Yes (for those who have experienced flooding), and No (without the experience of flooding). The aggregated score for the SR perception was continuous. The *p*-value tested the hypotheses. For instance, if in RQ1, $p < .05$, it means there is a statistically significant difference between gender and social responsibility, and we reject the null hypothesis that there is no statistically significant relationship between gender and social responsibility. In other words, a relationship exists. Conversely, $p > .05$ suggests that there is no statistically significant difference, and we accept the null hypothesis that there is no relationship between both variables.

In addition to the independent sample *t*-test, I also used the Point biserial correlation, which is a particular case of Pearson's product-moment coefficient, to answer the research questions 1 and 2, test the hypotheses, and determine the correlation between both variables. Instead of comparing two continuous variables as with the Pearson's coefficient, the Point biserial correlation examines or explores relationships or associations between a dichotomous variable, in this case, gender, and a continuous variable, the SR score. The correlation statistic indicates the strength and direction of the association, i.e., whether it is positive or negative. The associated *p*-value shows whether

the association is statistically significant or not. For instance, if $p > .05$, the association is not statistically significant, and we would accept the null hypothesis that there is no relationship between both variables. Similarly, if $p < .05$, it is statistically significant, and we reject the null hypothesis. With this analytical tool, I reported and interpreted the strength and direction of the relationship.

One-way ANOVA and Spearman's coefficient of correlation. I used these statistical tests to provide answers to research questions 3 and 4. The one-way ANOVA compared the means of the dependent variable in the groups of the independent variable. Age bracket was in four groups, while educational attainment had three groups or categories. In determining whether a relationship exists between the different levels in the age bracket, for example, and the dependent SR score, if the one-way ANOVA indicates $p > .05$, there is no statistically significant difference in the mean SR scores between the four age groups. Therefore, the null hypothesis that there is no relationship between the age of the respondents and the social responsibility perceptions would be accepted. Similarly, if $p < .05$, the null hypothesis would be rejected.

Spearman's coefficient of correlation statistic r was used to determine the strength and direction of a correlation between each of the independent variables (age brackets and educational attainment) and the SR score. The value of r ranges between +1, a perfect positive linear relation or correlation, and -1, a perfect negative linear relationship or correlation. The corresponding p -value confirms whether we accept or reject the null hypothesis. If $p > .05$, there is no statistically significant difference in the means of the groups, the null hypothesis that there is no statistically significant relationship between

the independent and dependent variables is accepted. Similarly, if $p < .05$, the converse is true. The strength and direction of the correlations were reported and interpreted.

In testing the hypothesis associated with RQ5, I used the multiple linear regression analysis (with dummy variables) to examine the effects of two or more of the independent variables on the dependent variable by establishing relationships between them, as stated by Frankfort-Nachmias and Leon-Guerrero (2015). It was important to create dummy variables because although in multiple linear regression, the two-level categorical variables—gender and experience of flooding, could be easily entered into the regression model with meaningful interpretation, this would not be so with the other variables. The age of respondents and educational attainment had four and three-level categories, respectively. Therefore, to produce meaningful interpretation with these variables, it was necessary to dummy-code them first before entering them into a regression operation. The creation of dummy-coded dichotomous variables enables the system to perform a multiple regression several times, each time, allowing for the removal of the weakest or correlated variable.

In using the multiple regression in testing the RQ5 hypothesis, the goal was to find the set of independent variables that would significantly influence or best predict the dependent variable. I reported and interpreted the coefficient and significance levels for the variables in the model. Additionally, the predictive capability and goodness of fit for the model were also reported and interpreted, thereby providing an excellent explanation of the complex social world.

Threats to Validity

In quantitative research, the concept of validity is the extent to which an instrument measures what the researcher is trying to measure. According to Creswell (2014), validity refers to the degree to which one can draw meaningful and useful inferences from scores in a research instrument. Creswell (2018) described validity as symbolizing the extent of accuracy of a research instrument and the capacity to make valuable inferences from the data collected with the instrument.

There are two types of validity—external and internal validity. External validity refers to the generalizability of the results and conclusions drawn from an empirical investigation (O’Sullivan, Rassel, Berner, & Taliaferro, 2017). This type of validity is essential because researchers would want to generalize findings to a broader population or across populations, settings, and time. O’Sullivan et al. (2017) described internal validity as the extent to which the independent variables accounts for a change in the dependent variable, and that the dependent variable is an appropriate indicator of the measure it is required to reflect. Furthermore, Johnson (2014) asserted that while external validity is the degree of likelihood that the research result would hold in the larger world, internal validity is concerned with the internal structure of the research design. Certain factors may potentially threaten the external and internal validity of this study.

One potential threat to the external validity of this study was the use of a nonprobabilistic sampling method—the snowball sampling technique to sample the participants. This technique compromised or weakened the generalizability of the results. However, mitigating this potential threat to external validity was the fact that this study

did not so much aim to generalize the findings to larger populations but to explore, examine, and understand the flood problem from a social responsibility perspective, and use the data developed to strengthen flood management.

One potential threat to the internal validity of this study was the problem of multicollinearity, which is the potential for one independent variable to confound or correlate with other independent variables in a multiple regression analysis, thereby negatively affecting the predictive power of the variables. This problem of multicollinearity weakens the statistical significance of an independent variable. According to Onwuegbuzie (2000), multiple regression analysis increases the likelihood of multicollinearity as a potential threat to the internal validity among the multiple regression variables. This potential threat occurs in the data analysis stage. Multicollinearity could, therefore, lead to “inflated or unstable statistical coefficients, thereby providing rival explanations for findings” (Onwuegbuzie, 2000. p. 42). In this study, I addressed this potential threat by evaluating the multicollinearity statistics before conducting the regression analysis.

Reliability is another measure of quality in a quantitative study. The study instrument’s reliability refers to the consistency of the instrument’s measure (Heale & Twycross, 2015; Creswell & Creswell, 2018). According to Frankfort-Nachmias and Leon-Guerrero (2015), reliability is the extent to which measurements are repeatable, yielding consistent results every time. It does not imply validity because although a measure may be reliable, it may not be measuring what it intended to. To rule out inconsistent results, researchers must look for consistency of measurements over time,

either in relationships with similar variables or in measurements made by other researchers (Frankfort-Nachmias & Leon-Guerrero, 2015). This study examined and reported the reliability of the instrument measurements, i.e., the internal consistency and stability of the social responsibility scores using the Cronbach's alpha reliability test. According to Warner (2013), Cronbach's alpha reliability is the most popular form of reliability assessment, particularly for scales with multiple-item scales. Cronbach's alpha coefficient of reliability usually ranges from 0.00 to 1.00. A higher coefficient indicates better instrument reliability, and the acceptable range is between 0.50 to 1.00.

Ethical Procedures

This study proceeded by following the established procedures of Walden University's Institutional Review Board (IRB) to ensure the ethical treatment and protection of human research participants. I obtained all relevant institutional permissions and approvals (IRB Approval #: 05-06-20-0526835) before the commencement of the study. All researchers are required to be aware of ethical issues when researching human subjects (Burkholder, Cox, and Crawford, 2016). Some of the ethical issues related to matters of rights of the participant, privacy, informed consent, anonymity, and confidentiality were addressed. I considered the ethical issues and determined that the potential risks to the participants were minimal. Therefore, I assured them of protection from any of these risks. Additionally, I also assured participants of their privacy and the confidentiality of their data collected. This study was strictly voluntary.

I provided the participants with my phone number, as well as the phone number of the University's Research Participant's Advocate, should the participants wish to

discuss their rights or any ethical issue of concern. Also, I indicated that I would have sole access to and control of the participant's responses and that these responses would be stored physically and electronically in a password-protected database for five years. Finally, I declared that there was no potential conflict of interest in this study.

Summary

Chapter 3 included the rationale for the choice of a quantitative, correlational survey as the research design for this study to answer the research questions and test the hypotheses. Chapter 3 also comprised an in-depth description of the research methodology, which included the sampling procedure, calculation of the sample size, participant recruitment, and data collection. Also, this chapter provided information on the published instrumentation- the perception questionnaire, its application to flood resilience study, the reported validity and reliability, as well as the plan for data analysis. Additionally, Chapter 3 contained an examination of the potential threats to the external and internal validity of the study and presented possible steps the I took to address them. Finally, this chapter provided ethical procedures to treat and protect human participants, as well as ethical concerns related to data collection, treatment, confidentiality, and protection. In Chapter 4, I present a comprehensive account of the results as well as the data analysis, including the existence or otherwise of a statistically significant correlation between the independent indicators and SR perceptions for flood resilience.

Chapter 4: Results

Introduction

The purpose of this quantitative nonexperimental correlational study was to examine the extent to which relationships, if any, exist between sociodemographic indicators and SR perceptions of flood resilience in the geographical study area of Ogbaru riverine communities in Nigeria. Exploration and examination of attitudes and behaviors derived from the SR perceptions of flood resilience among members of these communities potentially contribute to the development of integrated, sustainable, and more effective flood management approaches. Data and ideas generated from this study may influence the development of a new public policy agenda that supports better flood management.

The independent or predictor variables in this study were the respondents' gender, the experience of flooding, age, and educational attainment. The dependent variable was the respondents' perceptions of SR. The research questions sought to examine whether relationships exist between the sociodemographic indicators and SR perceptions of flood resilience. It also involved determining the relative contributions of the individual sociodemographic indicators to SR perceptions.

Chapter 4 begins with data collection procedures followed by an explanation of measurement levels of the independent and dependent variables. Next is the section on the results, which include an evaluation of statistical assumptions and analyses organized according to research questions. Chapter 4 ends with a summary of the study's main findings and a transition to Chapter 5.

Data Collection

On receipt of IRB approval (05-06-20-0526835), I started the process of participant recruitment and data collection, which spanned from May 28 to June 24, 2020, a time frame of 4 weeks. During participant recruitment and data collection procedures, there were issues with the plan initially proposed in Chapter 3. In the initial plan, I proposed the convenience sampling method for participant recruitment, as well as face to face, in-person, and paper-based surveys for data collection. However, in this study, I eventually used the nonrandom snowball or chain referral sampling method for participant recruitment and telephone surveys for data collection. These modifications were due to the COVID-19 pandemic and associated social distancing and movement restrictions, which made it impractical to conduct this study using convenience sampling and face-to-face paper surveys.

From my network of contacts, I identified, invited, and recruited 15 participants who met the inclusion criteria for participating in the survey. The requirement for inclusion as a participant was that they are members of the Ogbaru community, which comprise of individuals who reside within the communities or indigenous members of Ogbaru who are resident elsewhere. After obtaining consent, I administered surveys over the phone. Then, I requested each participant to refer about six other eligible participants for potential inclusion in the study by providing their phone numbers only. I contacted most of the referred individuals and recruited 60 to participate in the study. After obtaining their consent and administering phone surveys, I requested this set of 60

respondents also to refer at least one person who met the eligibility criteria to participate in the study.

In total, 120 respondents participated in the survey. The survey consisted of 12 statements to which respondents indicated their level of agreement or otherwise on a 4-point Likert scale. Scores on all 12 statements were aggregated, with respondents having a potential score range between 12 (very low SR) and 48 (very high SR). However, before aggregating the scores, three SR statements (items 1, 4, and 11) were reverse-scored to counter acquiescence bias. In this study, the Cronbach's alpha coefficient of reliability indicated an acceptable value of 0.729 (or 72.9%; see Appendix C).

Cronbach's alpha coefficient values of 0.50 (or 50%) and above indicate an acceptable internal consistency or reliability. Respondents were also required to provide information regarding four sociodemographic indicators: gender, flood experience, age, and educational attainment.

Baseline descriptions and demographic characteristics of the sample population indicated that males accounted for 55.8% of the total respondents, i.e., the sample population, while females accounted for 44.2%. The male to female ratio for the Ogbaru community is reported to be about 52 to 48. Therefore, there is a similarity in gender ratio between the sample population and the target community.

Data Analysis and Results

Using SPSS software version 25, I analyzed each of the independent variables and the dependent variable first to obtain descriptive statistics, including measures of central tendency as well as frequency distribution and percentage of the sample population. The

objective was to describe data and present it in a meaningful way for ease of interpretation. I used inferential statistics to analyze data to determine whether or not relationships exist between the independent variables and the dependent variable.

Descriptive Statistics for Independent and Dependent Variables

The following are the descriptive statistics that characterize the four independent variables and the dependent variable.

Gender. Descriptive statistics for gender are presented in Table 1. Statistics indicated that 53 respondents were female with a mean SR score and standard deviation (SD) of 36.81 and 4.412, respectively. There were 67 male respondents with a mean SR score and a standard deviation of 38.00 and 4.642. Appendix D shows that of the 120 respondents, the percentage distribution of gender is 55.8% male and 44.2% female.

Table 1

Descriptive Statistics for Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
SR Score	Female	53	36.81	4.412	0.606
	Male	67	38.00	4.642	0.567

Experience of flooding. Table 2 includes descriptive statistics of the experience of flooding. Eighty respondents indicated that they had experienced flooding, while 40 reported that they had no experience flooding. The mean and standard deviation scores were 37.03 and 4.581, respectively, for respondents with flood experience. In contrast,

for those without this experience, mean and standard deviation scores were 38.38 and 4.442, respectively (see Appendix D).

Table 2

Descriptive Statistics for Experience of Flooding

Experience of Flooding	N	Mean	Std. Deviation	Std. Error Mean
SR Score				
Yes	80	37.03	4.581	0.512
No	40	38.38	4.442	0.702

Age bracket. Table 3 shows the descriptive statistics of the four groups, which comprised the age bracket. The distribution of the statistics were as follows: 18–24 years ($N = 26$, $M = 36.31$, $SD = 4.47$); 25–34 years ($N = 27$, $M = 37.59$, $SD = 4.99$); 35–49 years ($N = 35$, $M = 37.54$, $SD = 3.97$); and 50 years and above ($N = 32$, $M = 38.25$, $SD = 4.88$). The frequency distribution and the percentage of the age bracket of respondents showed that 21.7% and 22.5% of the respondents were in the 18–24 years and 25–34 years age brackets, respectively. Also, 29.2% of the respondents belonged to the 35–59 years age bracket, while 26.7% of the respondents were 50 years and above (see Table D3).

Table 3

Descriptive Statistics of Age Brackets

	N	Mean	Std. Deviation	Std. Error	SR Score		Minimum	Maximum
					95% Confidence Interval for Mean			
					Lower Bound	Upper Bound		
18–24	26	36.31	4.470	0.877	34.50	38.11	26	43
25–34	27	37.59	4.994	0.961	35.62	39.57	30	46
35–49	35	37.54	3.966	0.670	36.18	38.91	28	45
50 and Above	32	38.25	4.879	0.863	36.49	40.01	28	44
Total	120	37.48	4.561	0.416	36.65	38.30	26	46

Educational attainment. Table 4 shows the descriptive statistics for educational attainment. The distribution statistics for the respondents are as follows: Completed primary school (N= 8, M= 32.38, SD = 2.504); Completed secondary school (N= 51, M= 35.04, SD= 4.059); Completed a postsecondary school (N= 61, M= 40.18, SD= 3.294). The frequency distribution and the percentage indicated that respondents who completed primary school (1–6 years) accounted for only 6.7%. In comparison, those who completed secondary (7–12 years) and postsecondary school (13 years and over) accounted for 42.5% and 50.8%, respectively (see Table D4).

Table 4

Descriptive Statistics for Educational Attainment

	SR Score							
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Primary School completed (1-6 yrs)	8	32.38	2.504	0.885	30.28	34.47	29	36
Secondary School Completed (7-12 yrs)	51	35.04	4.059	0.568	33.90	36.18	26	43
Post Secondary School (13 yrs and over)	61	40.18	3.294	0.422	39.34	41.02	32	46
Total	120	37.48	4.561	0.416	36.65	38.30	26	46

SR scores. Table 5 shows that there were 120 cases or respondents in this study.

Table 5

Case Entries of SR Scores

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
SR Score	120	98.4%	2	1.6%	122	100.0%

The descriptive statistics for the dependent variable- the SR score is presented in Tables 6. The scores ranged from a minimum of 26 to a maximum of 46. The mean and

standard deviation were 37.48 and 4.561, respectively. The table also showed a skewness and kurtosis statistics of -0.332 and -0.671, respectively.

Table 6

Descriptive Statistics for SR Scores

	N	Range	Minimum	Maximum	Mean	Std. Dev.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SR Score	120	20	26	46	37.48	4.561	-0.332	0.22	-0.671	0.43
Valid N (listwise)	120									

Evaluation of Statistical Assumptions

In this study, I used several statistical tools to answer the research questions and test the hypotheses. The Independent samples *t*-Tests and the Point biserial correlation (r_{pb}) were used to answer research questions 1 and 2. In contrast, the ANOVA and Spearman's rho correlation were employed to answer research questions 3 and 4. For RQ5, I used multiple linear regression analysis (with dummy variables).

First, I evaluated the assumption of independence of observations by merely noting that different participants in any group or category did not belong in another group. The assumption of the adequacy of the sample size is determined to be met when there are at least 20 records for each predictor variable. This assumption applies if there is a normal distribution of the dependent variable. If the distribution is not a normal one, then more than 20 records or participants would be required per predictor variable. In this study, there were four predictor variables, which indicated that 80 cases would be

adequate if the dependent variable is normally distributed. The sample size in this study was a total of 120 participants, which corresponds to 30 participants per predictor variable. It satisfies the assumption of the adequacy of the sample size, whether a normal distribution or not.

In evaluating the assumption of normal distribution or normality of the dependent variable, I first considered the significance (p -values) of the Shapiro-Wilk (S-W) and the Kolmogorov-Smirnov (K-S) tests (see Appendix E). For normally distributed data, the S-W and the K-S tests would usually indicate $p > .05$, i.e., a nonstatistically significant result. Appendix E shows the tests of the statistical assumptions, including normality associated with the dependent variable and multiple regression analysis. Appendix Table E1 shows that for this data, $p = .005$ for the S-W test, and $p = .003$ for the K-S test, i.e., $p < .05$, for both tests. Therefore, based on these tests, the dependable variable significantly failed to satisfy the normality assumption. However, I proceeded with the analysis given the reasonably large sample size of 120 ($N = 120$), which is valid under the central limit theorem on the normality of the population parameters from which I drew the sample. Also, to fulfill the assumption of normality, the statistic value of the skewness and kurtosis were evaluated. These values should be between +1 and -1 for a normal distribution. The statistic for the skewness and kurtosis of this data were -.332 and -.671 (Table E2). They fall between the -1 and +1 range and therefore meet the assumption of normality. The next evaluation was the Levene's test Equality of Variances. This test shows $p = 1.00$, i.e., $p > .05$ (Table E3). It is not statistically significant and fulfills this assumption of the equality of variances.

I also evaluated other statistical assumptions more directly related to multiple regression analysis. The assumption of an absence of multicollinearity means that it is assumed that there is no correlation between the independent variables. If the correlation statistic r between the predictor variables is higher than 0.7, i.e., $r > 0.7$, then the variables are correlated. I evaluated this assumption by observing the correlation table (Table E4), which shows that there is no correlation exceeding 0.7. The highest correlation statistic r was between the experience of flooding and gender $r = .521$, i.e., $r < .7$. Therefore, this assumption was satisfied. The VIF and Tolerance scores also confirmed the assumption of the absence of multicollinearity. Table E5 shows the collinearity statistics table. If there is no multicollinearity, the VIF must be below 10, and the Tolerance above 0.2. The table shows that the highest VIF score was 1.401, and the lowest Tolerance score was 0.713. The assumption that there is no multicollinearity was confirmed.

Another assumption associated with multiple linear regression is that the residuals have a normal distribution. I evaluated this assumption by considering the P-Plot. The closer the dots lie to the diagonal line, the more likely that the residuals have a normal distribution. Figure E5 confirmed that this assumption was met as most of the scores are on the diagonal line. Figure E6 is the histogram showing the normal distribution of the residuals, thereby also confirming that this assumption of the normal distribution of the residuals was met.

Additionally, the standard residual statistics is assumed to fall within the range of -3 (minimum) and +3 (maximum). Table E6 shows the residual statistics in which the

standard residual are -2.807 (minimum) and +2.274 (maximum). It falls within the accepted range, and so this assumption is satisfied.

I also evaluated the histogram of the distribution of the dependent variable (Figure E1), which appeared as normally distributed. The Q-Q Plot (Figure E2) shows that, as expected for a normal distribution, most of the scores or points fall on or very close to the line. Observation of the Box Plot indicated that there were no outliers (Figure E3), thereby satisfying the assumptions of no outliers. The test of the assumption of homoscedasticity was evaluated by examining the scatterplot of standardized residuals and the predicted values (Figure E4). Homoscedasticity assumes that the variation in the residuals, i.e., the amount of errors in the model, is similar at each point of the model. This assumption was satisfied because the scatterplot does not indicate an obvious pattern or a pattern with the appearance of a funnel shape. The evaluation of the key statistical assumptions confirmed them to be satisfactory.

Research Question 1

In RQ1, I sought to determine whether a statistically significant relationship exists between the gender of the respondents and social responsibility perceptions.

The following null and alternative hypotheses were formulated to answer this research question:

H₀: No statistically significant relationship exists between the gender of respondents and social responsibility perceptions.

H_a: A statistically significant relationship exists between the gender of respondents and social responsibility perceptions.

I used the independent *t*-test to compare the means SR scores for the male and female participants in the sample to establish whether there is a statistically significant difference in their social responsibility perceptions for flood resilience. In selecting this statistical test, I considered that gender was a nominal binomial variable. Also established were the assumptions of normality, independence of observations, absence of outliers, and the adequacy of the sample size, all essential assumptions for this test.

Table 7 shows Levene's Test for equality of variances, which uses the *F*-Statistic to compare the variances of two groups, i.e., male and female, and determines if the variation in these groups is equal or different. The result of this test shows an *F*-statistic of .000 and a *t*-statistic of 1.424 with 118 degrees of freedom. The corresponding two-tailed $p = .157$, i.e., $p > .05$. This result shows that the difference in the mean SR scores between male and female participants was not statistically significant. In other words, the variances can be assumed equal, and so, the null hypothesis was accepted. Therefore, it was concluded that there is no statistically significant relationship between gender and social responsibility.

Table 7

Levene's Test for Equality of Variances in Gender

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
SR Score	Equal variances assumed	0.000	1.000	- 1.424	118	0.157	-1.189	0.835	- 2.842	0.465
	Equal variances not assumed			- 1.432	114.044	0.155	-1.189	0.830	- 2.833	0.455

The 95% confidence interval (CI) associated with a mean difference of -1.189 in SR scores between males and females is (-2.842, 0.465). This relatively narrow CI range suggests a reasonably high certainty about the conclusion of an insignificant difference in SR scores between both gender populations. The large sample size accounted for the small CI and high confidence with which it can be concluded that if 95 is drawn out of 100 samples from this population, there will be no significant difference in the actual mean values between males and females.

In addition to the independent sample *t*-Test, I used the point biserial correlation r_{pb} , which is a type of Pearson's product-moment coefficient to answer the research question and test the hypotheses. Tabel 8 shows the Point biserial correlation between SR score and gender.

Table 8

Point-Biserial Correlation Between SR Score and Gender

		SR Score	Gender
SR Score	Pearson Correlation	1	0.130
	Sig. (2-tailed)		0.157
	N	120	120
Gender	Pearson Correlation	0.130	1
	Sig. (2-tailed)	0.157	
	N	120	120

Point biserial correlation statistic between SR score and gender, r_{pb} was 0.130, which indicates a considerably weak, but positive relationship between both variables. This weak association was not statistically significant; $p = 0.157$, i.e., $p > 0.05$. The scatterplot of the correlation (Figure 5) depicts slightly increasing SR scores from females (coded as 1.0) to males (coded as 2.0). The plot also showed the equation of the fit line as given by:

Equation of graph: $y = 35.62 + 1.19x$, where 35.62 is the intercept, and 1.19 is the slope. The $R^2 = .017$. The identical numerical value of **1.19** in the slope of the graph, and the mean differences (Table 7), confirm that these results hold.

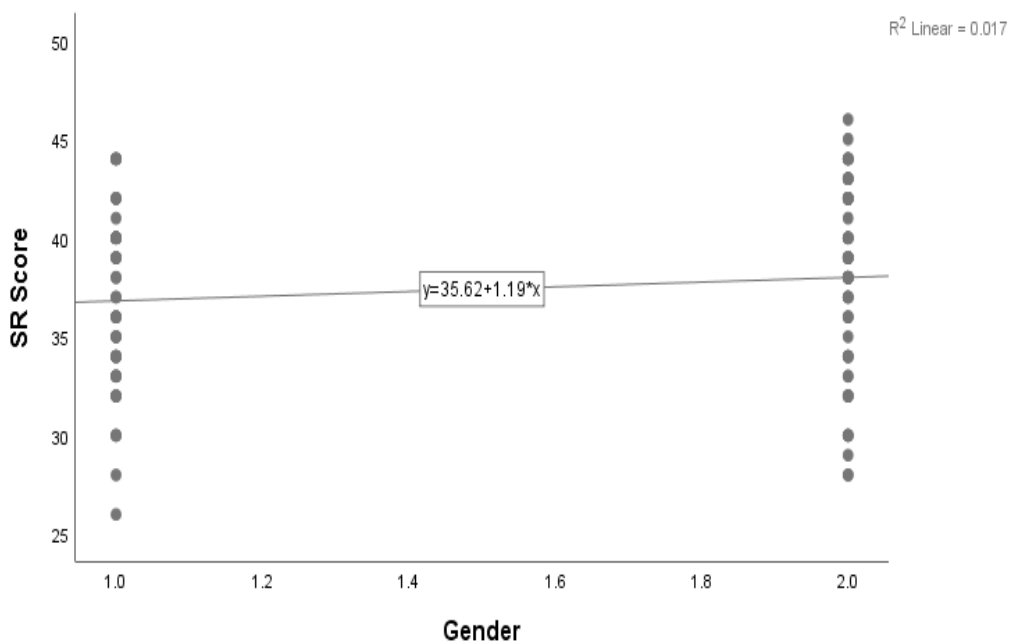


Figure 5. Scatterplot of point biserial correlation between SR scores and gender.

In conclusion, the results from both the independent sample *t*-Tests and the Point biserial correlation confirmed that there was no statistically significant relationship between SR and gender even though a weak but positive association exists between both variables. Therefore, the null hypothesis that there is no relationship between gender and social responsibility is accepted.

Research Question 2

In RQ2, I sought to determine whether a statistically significant relationship exists between the experience of flooding and social responsibility perceptions. The null and alternative hypotheses were as follows:

H_02 : No statistically significant relationship exists between experiences involving flooding and social responsibility perceptions.

H_{a2} : A statistically significant relationship exists between experiences involving flooding and social responsibility perceptions.

The experience of flooding was a nominal binomial variable. In testing the null hypothesis to answer the research question, I used the independent t -Test to compare the means of the SR scores in the two groups. These comprised of those who responded with a Yes, indicating they had experienced flooding and those who responded with a No, meaning that they had not experienced flooding.

Table 9 shows Levene's test for equality of variances, which uses the F -Statistic to compare the variation in the two groups, i.e., Yes and No, and determine if the variation is equal or different. The result of this test showed an F -statistic of 0.342 and a t -statistic of -1.537 with 118 degrees of freedom. The corresponding two-tailed p -value was .127, i.e., $p > .05$; the difference between the Yes and No populations was not statistically significant, i.e., there was no statistically significant difference in the experience of flooding.

Table 9

Levene's Test for Equality of Variances in Experience of Flooding

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
SR Score	Equal variances assumed	0.342	0.560	-1.537	118	0.127	-1.350	0.878	-3.089	0.389
	Equal variances not assumed			-1.553	80.307	0.124	-1.350	0.869	-3.080	0.380

In other words, the null hypothesis cannot be rejected. Therefore, it must be accepted that there is no statistically significant relationship between the experience of flooding and social responsibility.

The mean difference in SR scores between the populations which had experienced flooding and those without the experience of flooding was -1.350. The 95% CI associated with this difference was -3.089, 0.389. This relatively narrow CI range suggested a reasonably high certainty about the conclusion of an insignificant difference in SR scores between both populations. The large sample size accounted for the small CI and high confidence. Therefore, if we draw 95 out of 100 samples from this population, there will be no significant difference in their actual mean values.

I also used the point biserial correlation to answer the research question and test the hypotheses. It is used to measure the strength and association that exists between a continuous variable (the SR score) and a dichotomous variable (the experience of flooding). Table 10 shows the point biserial correlation, r_{pb} between the experience of flooding and SR score. The correlation statistic r_{pb} between SR score and experience of flooding was .140, which indicated a very weak and positive relationship between both variables. Also, this weak association was not statistically significant; $p = .127$, i.e., $p > .05$. This result confirmed that we accept the null hypothesis that there was no statistically significant relationship between the experience of flooding and social responsibility.

Table 10

Point Biserial Pearson's Correlation Between Experience of Flooding and SR Score

		SR Score	Experience of Flooding
SR Score	Pearson Correlation	1	0.140
	Sig. (2-tailed)		0.127
	N	120	120
Experience of Flooding	Pearson Correlation	0.140	1
	Sig. (2-tailed)	0.127	
	N	120	120

The scatterplot of the correlation (see Figure 6) also showed slightly increasing SR scores from respondents who had experienced flooding (Y, coded as 1.0) to those who had no such experience (N, coded as 2.0). The scatterplot also shows the equation of the fit line as $y = 35.68 + 1.35x$, where 35.68 is the intercept, and 1.35 is the slope. The $R^2 = 0.020$. The identical values of the slope of the graph, i.e., **1.35**, and the mean differences (Table 9), i.e., **-1.35**, confirm that these results hold.

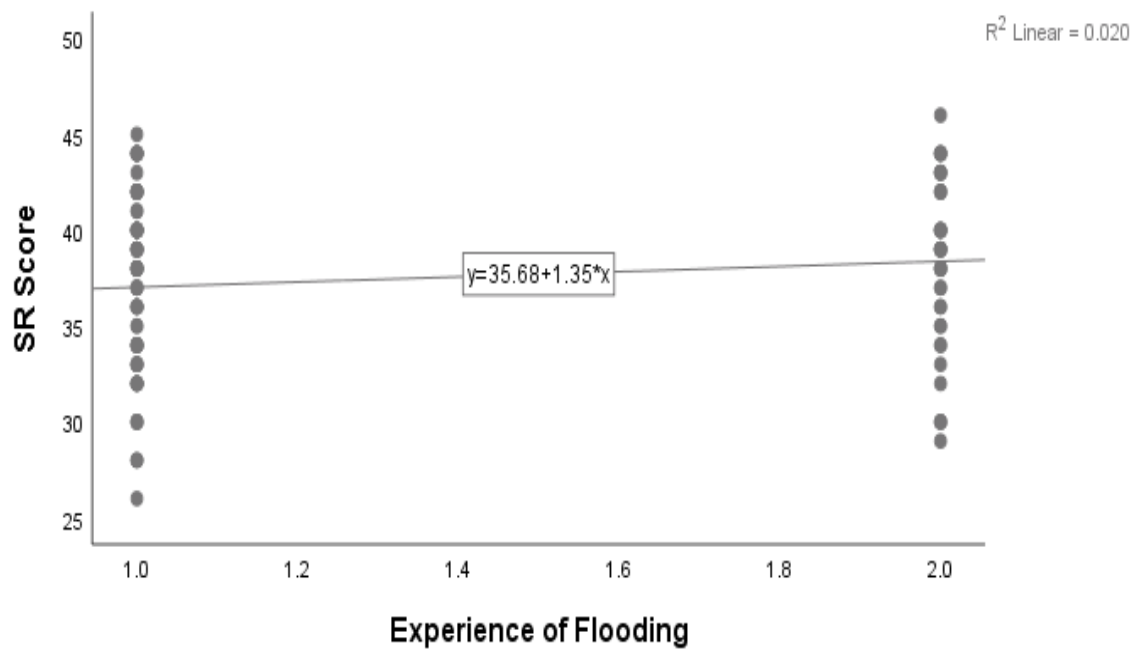


Figure 6. Scatterplot of point biserial correlation between SR scores and experience of flooding.

In conclusion, the results from both the independent sample t-tests and the point biserial correlation confirmed that there was no statistically significant relationship between the experience of flooding and social responsibility even though a weak positive association exists between both variables. The null hypothesis is accepted.

Research Question 3

In RQ3, I queried whether a statistically significant relationship exists between the age groups of the respondents and the social responsibility perceptions.

The null and alternative hypotheses are as follows:

H_{03} : No statistically significant relationship exists between respondents' age bracket and social responsibility perceptions.

H_{a3} : A statistically significant relationship exists between respondents' age bracket and social responsibility perceptions.

To answer RQ3 and test the null hypothesis that no statistically significant relationship exists between the age bracket of the respondents and social responsibility perceptions, I conducted a one-way ANOVA using SPSS software version 25. This test allows for a comparison of the means of the dependent variable in the four groups of the independent variable (age bracket). According to Frankfort-Nachmias & Leon-Guerrero (2015), some of the assumptions for employing this tool include a) that the independent variable consists of two or more categorical groups; b) that the dependable variable is a normally distributed interval level, or continuous scale measurement; and c) that the variances are homogenous. In this sample population, the independent variable, the age bracket, was categorized into four groups. Also, the dependable variable, the SR score, is a scale measurement and meets the assumption of normality.

Table 11 shows the outcome of Levene's test for homogeneity of variances. Interpreting the SR score based on the means, the result showed an F -statistic of 1.227 at 3 and 116 degrees of freedom. The p -value of .303 is greater than the .05 threshold, indicating that there were no significant differences in the SR scores across the age groups. Therefore, the variations between the four age groups were equal: $F(3, 116) = 1.227, p(.303) > .05.$, thereby fulfilling the assumption of homogeneity of variances. Thus all assumptions of ANOVA were satisfied.

Table 11

Levene's Test for Homogeneity of Variances in Age Brackets

		Levene Statistic	df1	df2	Sig.
	Based on Mean	1.227	3	116	0.303
	Based on Median	0.739	3	116	0.531
SR Score	Based on Median and with adjusted df	0.739	3	109.583	0.531
	Based on trimmed mean	1.184	3	116	0.319
Total	2475.925	119			

The results from the one-way ANOVA analysis shown in Table 12 revealed an F -statistic of .881 at degrees of freedom of 3 and 116, and a p -value of .453, which is greater than the .05 threshold, i.e., $F(3, 116) = .881, p(.453) > .05$. The high p -value indicates that there is no statistically significant difference in the mean SR scores between the four age groups. Therefore, the null hypothesis stating that there was no statistically significant relationship between the age of the respondents and the social responsibility perceptions was accepted.

Table 12

One-Way ANOVA Comparing Means of Age Brackets and SR Score

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	55.182	3	18.394	0.881	0.453
Within Groups	2420.743	116	20.868		
Total	2475.925	119			

I also used Spearman's nonparametric rank-order correlation coefficient rho, ρ , to answer this research question and test the hypothesis. The correlation table shown in Table 13 shows a correlation coefficient between SR scores and age bracket ($\rho = .151$), which indicated a weak, positive relationship between both variables. Also, this weak association is not statistically significant ($p = .100$, i.e., $p > .05$), confirming that the null hypothesis that there is no statistically significant relationship between age brackets and social responsibility was accepted.

Table 13

Spearman's Correlation rho, ρ , Between SR Scores, and Age Brackets

		SR Score	Age bracket
Spearman's rho	Correlation Coefficient	1.000	.151
	SR Score		
	Sig. (2-tailed)	.	.100
	N	120	120
	Correlation Coefficient	.151	1.000
	Age bracket		
	Sig. (2-tailed)	.100	.
	N	120	120

Results from both the one-way ANOVA and the Spearman's rho correlation confirmed that there was no statistically significant relationship between the age of the respondents and social responsibility even though a weak positive correlation exists between both variables. The null hypothesis was accepted.

Research Question 4

In RQ4, I considered whether a statistically significant relationship exists between educational attainment and social responsibility perceptions.

H₀₄: No statistically significant relationship exists between respondents' educational attainment and social responsibility perceptions.

H_{a4}: A statistically significant relationship exists between respondents' educational attainment and social responsibility perceptions.

I first conducted a one-way ANOVA to answer this research question and test the null hypothesis that no statistically significant relationship exists between the educational attainment of the respondents and social responsibility perceptions. The one-way

ANOVA test compares the variations in the three groups of educational attainment (the independent variable) with the dependent variable, the SR score. Some assumptions for employing the one-way ANOVA a) that the independent variable consists of two or more categorical groups; b) that the dependable variable is an interval level or continuous scale measurement, which is also normally distributed; and c) that the variances are homogenous. In this sample population, educational attainment is a categorical variable with three groups: those respondents whose highest educational attainment was primary/elementary school, secondary/high school, and postsecondary school.

Table 14 shows the outcome of Levene's test for homogeneity of variances in educational attainment. It reveals a $p = .080$, i.e., $p > .05$, indicating that there is no statistically significant difference. In other words, there is equality or homogeneity of variance. Therefore, the variations between the three groups were equal: $F(2, 117) = 2.580$, $p(.080) > .05$, thereby fulfilling the assumption of the homogeneity or equality of variances.

Table 14

Levene's Test for Homogeneity of Variances in Educational Attainment

		Levene Statistic	df1	df2	Sig.
	Based on Mean	2.580	2	117	0.080
	Based on Median	2.276	2	117	0.107
SR Score	Based on Median and with adjusted df	2.276	2	110.135	0.108
	Based on trimmed mean	2.512	2	117	0.085

Table 15 shows the results from the one-way ANOVA. The p -value of .000 revealed that there is at least one statistically significant difference in the SR scores between the three groups of educational attainment, i.e., $F(2, 117) = 36.865, p < .05$. This result indicated that the null hypothesis, which states that there is no relationship between educational attainment and social responsibility, must be rejected. Therefore, it was concluded that the alternative hypothesis, which holds that a statistically significant relationship exists between educational attainment and social responsibility, was accepted.

Table 15

One-Way ANOVA Comparing Means of Educational Attainment and SR Score

SR Score					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	957.112	2	478.556	36.865	0.000
Within Groups	1518.813	117	12.981		
Total	2475.925	119			

Because the results confirmed that there were significant differences between educational attainment and SR, I calculated the effect size (Eta Square η^2) of this difference using the formula:

$$\text{Effect size} = \text{Between Group Sum of Squares} / \text{Total Sum of Squares} = 957.112 / 2475.925 = 0.3866 \text{ or } 38.66\%.$$

The effect size, η^2 , is 38.66% variability. The eta-squared is a measure of the proportion of the total variance in a dependent variable that is associated with the effects of the different groups of the independent variable (Yigit & Mendes, 2018). The eta-square or percentage variability used with a one-way ANOVA provides a better understanding of the practical significance of the effects, if any that different groups of an independent variable exert on the dependable variable. Therefore, groups in the educational attainment accounted for 38.66% of the variability in the social responsibility scores (see Appendix F).

Appendix F shows the post hoc result of multiple comparisons of the effects of the three groups of educational attainment- primary school completed, secondary school completed, and postsecondary school completed on social responsibility. I interpreted the Bonferroni test because the equality of variance had been satisfied. The results showed that there was no statistically significant difference in social responsibility between respondents who completed primary school and those who completed secondary school ($p = .163$; $p > .05$). However, there was a statistically significant difference between respondents who completed primary school and those who completed postsecondary school ($p = .000$; $p < .01$) with a mean difference of 7.805. Additionally, between secondary school completed and postsecondary school completed, there was also a statistically significant difference ($p = .000$; $p < .01$) with a mean difference of -5.141. In essence, the relationship between educational attainment and social responsibility is highest among respondents' who have completed postsecondary education.

I used Spearman's rho nonparametric correlation statistics also to answer this research question and test the hypothesis. Table 16 shows the correlation between educational attainment and SR scores.

Table 16

Spearman's Correlation Coefficient ρ , Between Educational Attainment, and SR Scores

		SR Score	Educational Attainment
Spearman's rho	Correlation Coefficient	1.000	.631**
	Sig. (2-tailed)	.	.000
	N	120	120
Spearman's rho	Correlation Coefficient	.631**	1.000
	Sig. (2-tailed)	.000	.
	N	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

The results showed a correlation coefficient of .631, which indicated a strong and positive linear relationship between both variables. Also, this strong association is statistically significant; $p = .000$, i.e., $p < .01$, confirming that we must reject the null hypothesis that there is no statistically significant relationship between educational attainment and social responsibility. There was a statistically significant relationship between educational attainment and social responsibility.

In conclusion, the results from both the one-way ANOVA and the Spearman's rho correlation confirmed that there was a statistically significant, strong, and positively

linear relationship between educational attainment and social responsibility. The null hypothesis was rejected.

Research Question 5

In RQ5, I queried whether the independent variables—gender, flooding experience, age, and educational attainment—collectively predict social responsibility perceptions better than any single variable alone. The null and alternative hypotheses were as follows:

H₀₅: The independent variables—gender, flooding experience, age, and educational attainment—collectively do not predict social responsibility perceptions better than any variable alone.

H_{a5}: The independent variables—gender, flooding experience, age, and educational attainment collectively predict social responsibility perceptions better than any variable alone.

I used the multiple linear regression analysis with dummy coded variables to test the null hypothesis and answer this research question. However, before conducting the analysis, I evaluated the key assumptions associated with regression analysis and determined that they were all met. All the independent variables (gender, flooding experience, age, and educational attainment) were dummy-coded to capture the effect of each category on the dependent variable. Thus, the variables were dummy coded with male = 1 and female = 0 for gender and yes = 1 and no = 0 for flood experience. The age of the respondent was dummy coded into four different variables where the category of

interest was coded as 1 and other categories 0; the same procedure was applied to educational attainment, which produced three different dummy coded variable groups.

The dummy coded variables were entered as the independent variables in the regression analysis. During the first estimation, some of the independent variables were eliminated for being nonsignificant while others were discarded by SPSS due to insufficient data arising from the small number of respondents for that category in the explanatory variable. Therefore, I adopted an iterative process of eliminating nonsignificant independent variable to get the model of best fit. Based on this iterative process, the best-fit model achieved was robust with a strong group correlation of $R = .711$, $R^2 = .505$, adjusted R^2 of .474, and Durbin Watson statistic of 1.08. Table 17 shows the model summary. Thus, the combined effect size of the independent variables on the dependent variable was large at .711 or 71.1% of the variability.

Table 17

Model Summary of Multiple Regression Analysis with Dummy Variables

<i>Model Summary^b</i>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.711 ^a	.505	.474	3.308	1.078

a. Predictors: (Constant), Gender=Male, ExperienceofFlooding=Yes, EducationalAttainment=Secondary School Completed (7-12 yrs), AgeoftheRespondents=35-49, AgeoftheRespondents=25-34, AgeoftheRespondents=50 and Above, EducationalAttainment=Post Secondary School (13 yrs and over)

b. Dependent Variable: SR Score

Table 18 shows the result of the ANOVA. The regression goodness of fit was statistically significant ($p = 0.00$), i.e., $F(7, 112) = 16.325$, $p < .01$, indicating a robust predictive capability of the predictor variables.

Table 18

ANOVA of Multiple Regression Analysis with Dummy Variables

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1250.421	7	178.632	16.325	.000 ^b
	Residual	1225.504	112	10.942		
	Total	2475.925	119			

a. Dependent Variable: SR Score

b. Predictors: (Constant), Gender=Male, ExperienceofFlooding=Yes, EducationalAttainment=Secondary School Completed (7-12 yrs), AgeoftheRespondents=35-49, AgeoftheRespondents=25-34, AgeoftheRespondents=50 and Above, EducationalAttainment=Post Secondary School (13 yrs and over)

Table 19 shows the model of the multiple regression analysis with the coefficient statistic of the various categories of the independent variables. The regression model showed that the coefficients for the educational attainment groups—postsecondary school and secondary school were positive at 9.69 ($t = 7.381$, $p < .01$) and 4.864 ($t = 3.624$, $p < .01$) respectively. They were also statistically significant. Also, the coefficients for the age categories in the model—50 years and above, 35–49 years and, 25–34 years were positive at 4.134 ($t = 3.969$, $p < .01$), 2.230 ($t = 2.405$, $p < .05$), and 1.663 ($t = 1.813$, $p > .05$) respectively, only the age group 25–34 was statistically not significant.

Table 19

Model of Stepwise Multiple Regression Analysis with Dummy Variables

<i>Coefficients</i>		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
Model		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	28.842	1.542		18.710	0.000		
	EducationalAttainment=Post Secondary School (13 yrs and over)	9.690	1.313	1.067	7.381	0.000	0.212	4.724
	EducationalAttainment=Secondary School Completed (7-12 yrs)	4.864	1.342	0.529	3.624	0.000	0.207	4.826
	AgeoftheRespondents=50 and Above	4.134	1.042	0.402	3.969	0.000	0.430	2.327
	ExperienceofFlooding=Yes	-2.219	0.768	-0.230	-2.890	0.005	0.696	1.436
	AgeoftheRespondents=35-49	2.230	0.927	0.223	2.405	0.018	0.513	1.948
	AgeoftheRespondents=25-34	1.663	0.917	0.153	1.813	0.072	0.622	1.608
	Gender=Male	1.777	0.635	0.194	2.799	0.006	0.917	1.090

a. Dependent Variable: SR Score

However, the inclusion of the 25–34 years age group in the regression analysis, despite its nonsignificant coefficient, improved the model’s robustness. Males recorded a positive, though low, but statistically significant coefficient at 1.77 ($t = 2.799, p < .01$). Those with the experience of flooding were the only negative coefficient in the model at -2.219 ($t = -2.890, p < .01$), indicating a negative social responsibility perception for flood resilience.

Summary

From an initial 15 respondents that I contacted through my network of friends, a total final sample size of 120 respondents participated in this study. Participant

recruitment was done through snowball referral, while the data collection method of survey administration was by the telephone.

Using SPSS Version 25, I analyzed data first by conducting descriptive statistics of the independent variables (socio-demographic indicators)—gender, the experience of flooding, age, and educational attainment—and the dependent variable, the SR scores. Females were 44.2%, and males were 55.8% of participants. Most respondents (66.7%) reported that they had experienced flooding, while 33.3% had not. Also, the age distribution was as follows: 18—24 years (21.7%), 25—34 years (22.5%), 35—49 years (29.2%), and 26.7% of respondents' were 50 years and above. Additionally, most respondents (50.8%) had completed a postsecondary school, followed by those who had completed a secondary school education (42.5%), and only 6.7% of respondents stopped their formal education at the primary school level.

I used the independent sample *t*-tests and point biserial correlation to answer RQ1 and RQ2. The one-way ANOVA and Spearman's rho correlation tests were used to respond to RQ3 and RQ4. Statistical assumptions were evaluated and satisfied. The results indicated that individually, gender, the experience of flooding, and age did not have a statistically significant relationship with social responsibility. In contrast, educational attainment had a statistically significant relationship and a strong positive linear correlation with social responsibility.

For RQ5, the multiple regression analysis (with dummy variables) produced a best-fit regression model to show the variables that would best predict the perceptions of social responsibility for flood resilience. The result indicated that all the groups in the

model were positive predictors of social responsibility, except for the age group 25–34 years, which was statistically insignificant. Additionally, the group which had experienced flooding had a negative perception of social responsibility for flooding. The age group, 18–24 years, failed to contribute to the model.

Chapter 5 includes an interpretation of the findings, limitations of the study, and recommendations for further research. It consists of implications for positive social change and the practice of public policy in Nigeria. Chapter 5 also includes a discussion on how findings from the current study align with or diverge from previous research findings. Finally, Chapter 5 concludes with a statement regarding the potential of the study to address increasing flood disasters.

Chapter 5: Discussions, Conclusion, and Recommendations

Introduction

The purpose of this quantitative nonexperimental correlational study was to examine the extent to which relationships, if any, exist between sociodemographic indicators and SR perceptions of flood resilience in Ogbaru communities in Anambra State, Nigeria. New data and ideas generated from this study also reframe and redefine severe flood problems in the geographical study area, and in doing so, may influence the development of a new public policy agenda that supports better flood management.

The use of a survey questionnaire in this correlational research study was appropriate, given the focus on exploring perceptions of a sample population. It helped in providing specific and measurable outcomes that were validly and reliably analyzed. There were four independent variables in this study: the gender of the respondents, the experience of flooding, age, and educational attainment. The dependent variable was the public perceptions of social responsibility for flood resilience. The study was conducted to examine SR perceptions of flood resilience in the geographical study area and to investigate their relationships with sociodemographic indicators. In contributing to the development of an integrated, sustainable, and more effective flood management approach as well as strengthened related flood policies, addressing these problems may potentially enhance community flood resilience.

Findings indicated that for RQ1, RQ2, and RQ3, the gender of respondents, their experience of flooding, and their age each had a statistically insignificant relationship with SR. Therefore, for each of these research questions, the null hypothesis was

accepted. Findings indicated that for RQ4, a statistically significant relationship exists between educational attainment and SR, and this relationship was strong and positively correlated. The results for RQ5 indicated that the best-fit regression model showed that although all independent variables were predictors of SR, the completion of a postsecondary school was the strongest predictor. The model had a high predictive capacity of 71.1% and accounted for 50.5% of variations in SR.

Chapter 5 includes a description of how the study's findings confirm or deviate from previous results in the peer-reviewed literature, as well as an analysis and interpretation of this study's findings within the context of the theoretical frameworks. Chapter 5 also includes limitations of the research, recommendations for further research, and implications for positive social change. This chapter ends with a conclusion regarding the vital essence of the study.

Interpretation of Findings

This study included 120 respondents, of which 67 (55.8%) were male, and 53 (44.2%) were female. Eighty respondents (66.7%) reported recent flood experience, while 40 respondents (33.3%) had no past flood experience. The age of respondents was grouped into four categories: 18—24 years (21.7%), 25—34 years (22.5%), 35—49 years (29.2%), and 50 years and above (26.7%). Educational attainment responses were categorized in the following three groups: primary school completed (6.7%), the secondary school completed (42.5%), and postsecondary school completed (50.8%).

The percentage of respondents who had completed only primary school education was relatively low at 6.7%, compared to secondary (42.5%) and postsecondary education

(50.8%). This low percentage of primary school respondents could potentially mask study outcomes regarding educational attainment. With respect to gender, the demographic characteristics or gender ratio in the sample population, i.e., males (55.8%) and females (44.2%) is similar to the publicly available gender ratio data of males (52%) and female (48%) in the study population. Therefore, similarities in gender distributions between the study and sample populations imply that the sample is reasonably proportional to the broader community. Nonetheless, due to the nonprobabilistic sampling technique employed during participant recruitment, results should be interpreted with caution.

Research Question 1

In RQ1, I queried whether a statistically significant relationship exists between the gender of respondents and SR perceptions. Results from the independent sample *t*-tests and point biserial correlation confirmed that there was slightly higher, but statistically insignificant SR perception in terms of flood resilience among men compared to women. Overall, there was no statistically significant relationship between gender and social responsibility even though a weak positive correlation exists between both variables ($p = .157$, i.e., $p > .05$, and a small effect size $r = .13$). There was no statistically significant relationship between gender and SR perceptions of flood resilience.

The result suggests that gender differences, although insignificant, reflect slightly higher confidence in terms of men's capability to perceive flood risks and take preventive or socially responsible actions to protect their families. The findings are consistent with previous research which, also found a weak and statistically insignificant relationship

between gender and flood risk perception (Armas et al. (2015); Harvatt, Petts, & Chilvers, 2011; Adelekan & Asiyambi, 2016).

Research Question 2

In RQ2, I sought to find out whether a statistically significant relationship exists between experiences involving flooding and SR perceptions. Results from the independent sample *t*-tests and point biserial correlation indicated that individuals who had no recent experience of flooding demonstrated a slightly higher but insignificant SR perception in terms of flood resilience compared to those without the experience. The null hypothesis was accepted, indicating that there was no statistically significant relationship between the experience of flooding and SR even though a weak positive correlation exists between both variables ($p = .127$, i.e., $p > .05$, and a small effect size $r = .14$).

The results of this study suggest that recent experience of flooding had no significant bearing on SR perceptions of flood resilience. This finding is surprising because the geographical study area is historically flood-prone, and I expect individuals who have experienced flooding to have a relatively higher perception of flood risks and SR for flood resilience in the community than those who do not have the experience of flooding. Additionally, this result contrasts with the majority of the findings in much of previous research, which suggests that the experience of flooding shapes people's attitudes and responses to future flood events, and which consequently shape the perceptions of social responsibility for flood resilience. However, other research findings support this study's result. For instance, Begg et al. (2017) found that citizens who

experienced severe consequences from flooding may be insufficiently motivated to take personal responsibility for protective measures in the future. Another possible interpretation of this finding is that members of the communities who do not have recent experience of flooding may have a high social awareness of flood risk perception and the need to take responsibility for protective action.

The relatively low number of this group of respondents without recent experience of flooding (33.3%) could be attributed to the inclusion in the participant population of indigenous members or natives of the Ogbaru community who are not resident within the area.

Research Question 3

In RQ3, I probed whether a statistically significant relationship exists between the age of the respondents (grouped in categories) and social responsibility perceptions. I tested the hypothesis using a one-way ANOVA and the Spearman's nonparametric correlation statistics rho, ρ . The ANOVA compared the means of the dependent variable in the four groups of the independent variable. The result revealed a p -value of .453, i.e., $F(3, 116) = .881, p > .05$, which indicates that there was no statistically significant difference in the mean social responsibility scores between the four age groups. Therefore, the null hypothesis was accepted, indicating that there was no statistically significant relationship between the age of the respondents and the social responsibility perceptions. The Spearman's nonparametric correlation statistics rho, ρ confirmed a correlation coefficient of .151, between the age of the respondents and the social responsibility, which indicates a weak but positive linear relationship between both

variables. It also confirmed that this weak relationship was not statistically significant: $p = .100$, i.e., $p > .05$, and so, the null hypothesis was accepted.

Although elderly populations are known to be more vulnerable to extreme events than younger ones, and therefore, more inclined to take protective resilience-enhancing action, the result here seems to suggest that vulnerability in the older population may be countered by other factors. This finding is consistent with Cvetković et al. (2016), who found that older populations above the age of 48 years were less likely than the younger ones to take preventive, protective action against flood disasters.

Research Question 4

RQ4 involves the question of whether a statistically significant relationship exists between educational attainment and SR perceptions. I tested the hypothesis using a one-way ANOVA and Spearman's nonparametric correlation statistics rho, ρ . The results from the one-way ANOVA indicated a $p = .000$, i.e., $F(2, 117) = 36.865$, $p < .01$. This result indicates that we must reject the null hypothesis and accept the alternative hypothesis that a relationship exists between educational attainment and social responsibility. The results of the Spearman's correlation statistics showed a correlation coefficient, $\rho = .631$, which indicates a strong and positive linear relationship between both variables. Also, this strong association is statistically significant; $p = .000$, i.e., $p < .01$, confirming a rejection of the null hypothesis that there is no statistically significant relationship between educational attainment and social responsibility.

This finding implies that there is at least one statistically significant difference in the SR scores between the three groups of educational attainment. The post hoc test of

multiple comparisons for educational attainment showed that the largest mean difference of 7.805 between the groups is associated with the group that completed postsecondary school, with a statistically significant difference ($p = .000$; $p < .01$). In essence, this implies that the relationship between educational attainment and social responsibility is highest among respondents who have completed a postsecondary education. Also, this result is consistent with findings in previous research studies (Hoffmann & Mutarak, 2017), which had implied that the attainment of higher education equipped individuals with a better ability to gather and process flood-related information. Additionally, the findings in this study also imply that students in secondary schools would benefit from educational programs that would provide knowledge on climate change, flood risk reduction, as well as promote resilience-enhancing pro-environmental behavior.

Research Question 5

With RQ5, I sought to determine whether the independent variables collectively better predict social responsibility perceptions.

In interpreting the overall model, the results indicated a high predictive capacity of 71.1% ($R = 0.711$) and a high explanatory power of 50.5% ($R^2 = .505$). This result implies that the model explains 50.5% of the variability in the social responsibility perception. The model was statistically significant, $F(7, 122) = 16.325$, $p < .01$. Therefore the null hypothesis was rejected, and the alternate hypothesis was accepted, indicating that taken collectively, at least one of the independent variables best predict social responsibility. In the model, the independent variable with the highest standardized beta coefficient value, β , is the most important, and the variable with the least β -value, the

least important. The p -values shown indicate the level of significance of the independent variable. Using the standardized beta coefficient value, β for comparison, this overall model demonstrates that the most critical predictor variable was the postsecondary school, followed by secondary school.completed. Next were the age groups of 50 years and above, and the 35–49 years. These groups were all positive predictors, which were also statistically significant. Although the age group 25–34 years and the male gender both had a positive standardized beta coefficient, the 25–34 years age group was not statistically significant ($p = .072$). Those who had experienced flooding had a negative predictive capacity, which implied a negative social responsibility perception. The results indicate that individuals 35 years and older who had completed a secondary or a postsecondary education are likely to be more socially responsible than those without these attributes.

This finding in this study, which showed that the completion of postsecondary education is by far the strongest predictor of social responsibility perception for flood resilience, is consistent with my expectation. Higher education through college or university equips individuals with a relatively more in-depth knowledge of the value of engaging in pro-environmental resilience-enhancing protection behavior and, therefore, a higher perception of social responsibility for community flood resilience. According to Soetanto et al. (2017), the higher likelihood of socially responsible behaviors for flood resilience measures in older populations, as shown by an increased inclination to take protective action, may be explained by two reasons. First is the increased vulnerability to

extreme events in these populations, and secondly, these populations have a greater sense of community belonging and cultural affinity over time.

Interpretation in the Context of the Theoretical Frameworks

I used two theoretical frameworks as foundations to guide this study: The PADM and the PET. The PADM is a systematic multistage method of explaining citizen's responses to long-term threats of environmental hazards and disasters. It can account for a population's response to imminent threats of a flood disaster through several conditions, which may act together to influence both the perceptions of the risks and the process by which people take protective action decisions (Lindell & Hwang, 2008; Lindell & Perry, 2012). The findings from this study suggest that the strongest predictors of social responsibility for community flood resilience are the completion of a postsecondary school education, a secondary education, the age of 50 years and above, and 35–49 years.

These four sociodemographic behaviors best predict socially responsible, resilient-enhancing protective behaviors. The implication is that flowing from the PADM, these indicators best process the three core perceptions of the framework, which equate to the SR perceptions—the threat, protective action, and stakeholder perceptions—resulting in protective action decisions and socially responsible behaviors. These findings also imply that the sociodemographic indicators with low predictive capacity, such as those between the ages of 25–34 years, would benefit from targeted educational and informational programs. Those excluded from the model were between the ages of 18 and 24 years, would also benefit from such programs. These programs could provide this

youth population of 18–34 years of age knowledge on the environment, climate change, flood risk reduction, and resilience-enhancing pro-environmental behavior.

The PET characterizes political systems and processes as both stable and dynamic, with most policies remaining stable for extended periods, followed by punctuation that will result in an incremental or catalytic policy change (Cairney, 2012; Meijerink, 2005). Institutional structures and systems reinforce existing policy agendas by exerting policy monopolies. However, a change in policy or punctuation of the stable policy equilibrium can result from breaking the policy monopoly by successfully challenging the way a problem is defined, perceived, or framed (Penning-Rowsell et al., 2017). Figure 2 shows the PET model.

In the context of the PET, findings from this study reframe the perception of the flood problem and offer a new perspective. This new perspective involves the building of community flood resilience through nonstructural measures of enhanced social responsibility for protective action behaviors by the people most directly impacted by the floods. No study in the geographical study area or Nigeria has redefined or reframed the increasingly devastating flood problems from such a social-process perspective.

This reframing of the flood problem has the potential to reset the flood policy agenda by creating new policy actors or policy entrepreneurs who would trigger changes in flood policies through advocacy and problem renegotiations with the relevant institutions in Nigeria. These institutions include the newly created Federal Ministry of Humanitarian Affairs, Disaster Management, and Social Development, NEMA, the Anambra State Emergency Management Agency (ASEMA). In essence, using the PET as

a guide, the findings of this study can punctuate the relative flood stability and trigger changes in flood policies in Nigeria by provoking new policy negotiations and agenda-setting.

Limitations of the Study

This research was constrained by some limitations, which were outside my control as the researcher. One major limitation of this study was the COVID-19 pandemic and the associated social-distancing and movement restrictions, which made it impracticable to recruit participants and administer the survey through a preferred face to face approach. Related to this limitation was the telephone administration of the survey to individuals across continents. A second limitation was the nature of the research design, which was correlational, and does not support cause-and-effect relationships. To overcome this limitation, I exercised caution in the use of interpretive language that may infer causal relationships.

A third limitation was the use of a Likert Scale in the instrument to measure responses. Responses are restricted or limited only to the finite number of answer options provided, which may not be comprehensive for respondents. Therefore, the use of the Likert scale may have resulted in creating a bias that could influence the study outcome by its potential to mask more appropriate responses of the respondents. Associated with the use of the Likert scale is the difficulty in measuring the difference between one value and another. According to Frankfort-Nachmias and Leon-Guerrero (2015), although the values in the Likert scale reflect a higher or lower degree of agreement, the distance between any two of these values has no numerical meaning.

A fourth potential limitation involved time. It would have taken a considerable amount of time, probably in years, to conduct a comprehensive and all-embracing study related to every aspect relevant to flood resilience. Therefore, the research was focused and streamlined to address elements considered most important to the study, which included a broadening of the understanding of the SR perceptions for flood resilience among various demographics in the geographical study area of Ogbaru riverine communities. Also, given the cross-sectional nature of this study, it is understood that the data and information generated would offer only a snap-shot of the situation at a single point in time. Therefore, the findings may not hold at a future point in time, e.g., 5-years later.

Another limitation of this study was the use of a nonprobabilistic sampling method- the snowball sampling technique to sample the participants. This technique contains inherent biases, and in this study, for instance, the selection of potential participants was highly dependent on the judgment of existing respondents, who would naturally refer others who share similar perceptions and characteristics with them. Such biases compromise or weaken the external validity of this study and the generalizability of the results. However, mitigating this limitation was the fact that this study did not so much aim to generalize the findings to larger populations but to explore, examine, and understand the flood problem from a SR perspective, and use the data developed to strengthen flood management and enhance community flood resilience.

Recommendations

The age group 50 years and above in this study was broad and may potentially mask different outcomes. I would recommend future research to create additional distinct age groups, e.g., 50–60 years, 61–65 years, and 65 years and above. The inclusion of these additional age groups would allow for a more in-depth examination of the effects of older populations on SR perceptions of flood resilience.

Systematic errors and sampling biases are associated with nonprobabilistic methods. Therefore, I would recommend that future researchers incorporate probabilistic techniques into their sampling design. A probabilistic approach will also strengthen the capacity to generalize findings to a broader population and other contexts.

Finally, another area of future research is an investigation into possible explanations for the findings in this study of the absence of a significant difference in SR perceptions between those who have recently experienced flooding and those who have not. Additionally, future researchers may want to consider probing the negative SR perception by those who have experienced flooding. Such research may include a more in-depth investigation into the lived experiences of recent victims of severe flooding from the geographical study area, who have been forced out of their homes and into refugee camps as internally displaced people. It may also be necessary to examine further whether the flood experience is direct or indirect and whether any of the two groups provides a more reliable determinant of community flood resilience behavior than the perception of social responsibility.

Implications

One positive social change implication of my study is that the findings can potentially enhance community flood resilience by increasing the awareness of flood risks and promoting flood resilient-enhancing behaviors. The results of this study indicate that public education and informational strategies and programs on climate change, flood resilience, risks, mitigation, adaptation, disaster response, etc., should be developed to the benefit of members of the Ogbaru community, particularly those with low SR perceptions. The study findings indicate that such individuals include young members of the community, particularly from the age of 18 to about 35.

These flood risk education and information strategies can be formal and informal, and their value in enhancing flood resilient enhancing behavioral action has been well-documented. Formal strategies and programs include the incorporation of environmental, climate, and flood disaster courses into the curricula of the public educational system. The study findings indicate that educational attainment to the postsecondary school level is the strongest predictor of SR perceptions. Therefore, promoting formal education from the secondary school level is key to building community flood resilience, especially with the inclusion of these pro-environmental courses. Advancing formal education is, therefore, a critical social change implication of this study. Informal strategies also promote positive social change by driving stakeholder engagement at the community level. These informal strategies are vital also because they would target the youth population of 18–35 years of age, such as farmers, entrepreneurs, and traders, who may not necessarily benefit from formal educational programs in schools and colleges.

These informational strategies would involve communicating the same pro-environmental issues to the community members through religious groups and events such as church platforms, groups, and meeting functions such as the “August Meeting” activities, a well-organized and highly-regarded annual gathering of christian women from the community. Other informal informational communication channels could be through the use of trade groups, cultural groups, and events such as the popular traditional Age Grade associations, to which young individuals proudly belong depending on their age groups. The cultural masquerade fraternity of young men is another informal informational channel of communicating flood risk awareness and preparedness.

A significant implication of my study findings, which has the potential for positive social change, is its capacity to contribute to the development of a sustainable, integrated, and more effective flood management in Ogbaru and Nigeria. Through better flood protection and management, this study can potentially promote positive social change by enhancing livelihood sustenance, improving the sociocultural well-being of the community, and boosting economic growth. Another positive social change implication is that by reframing the flood problem and casting a possible solution through the lens of nonstructural social processes, this study can trigger much-needed changes in flood policies. These policy changes would potentially come about through increased activities of public policy actors or entrepreneurs, who, through advocacy, would galvanize efforts to reset the policy agenda.

Conclusion

River floods have become an extreme and annual phenomenon, causing extensive devastation and threatening the livelihoods and the socioeconomic developments of Ogbaru riverine communities, the geographical area of this study. This quantitative correlational study will contribute significantly to addressing the problems associated with the lack of effective flood management in the geographical study area. It achieved its set purpose of assessing relationships between sociodemographic indicators and SR perceptions of flood resilience. My study results showed that individually, there was no significant relationship between the independent variables of gender, the flooding experience, age, and SR perceptions. However, educational attainment had a statistically significant relationship with SR perceptions. The regression model developed indicated that collectively, the independent variables predict the SR perceptions. The educational attainment of postsecondary and secondary education, as well as the age groups of 35 years and above, were the most critical predictors of SR for flood resilience. This model demonstrated a high predictive capacity of 71.1% and showed that the independent variables in the model collectively explain 50.5% of the variation of the dependent variable, social responsibility.

My findings from this study imply that the sociodemographic indicators with low predictive capacity, such as the youth of 18–35 years age group, would benefit considerably from targetted and tailored educational and informational programs. The study may also enhance the institutional capacity of Nigeria's Federal Ministry of Humanitarian Affairs, Disaster Management, and Social Development, and its related

National and State flood management agencies, particularly NEMA and ANSEMA, to plan, prepare and respond to flood matters.

Additionally, through the vital flood data and information generated, the study has the potential to contribute to the development of an integrated, more effective, and sustainable flood management in the geographical study area in particular and in other flood-prone communities in general. Above all, by reframing the flood problem from a different lens, this study offers, as part of its solution, the potential for building community flood resilience through nonstructural measures of social responsibility for protective action behaviors by the people most directly impacted by floods. This reframing of the flood problem also has the potential to advance the practice of public policy by equipping public policy administrators, advisors, and decision-makers with new tools to drive a more effective and sustainable flood policy interventions. Finally, given the absence of previous research on community flood resilience from a nonstructural SR perspective in Nigeria, this study will expand the body of knowledge and create a sound foundation for future research and analysis in the emerging field of community flood resilience in Nigeria.

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Appendix A: Social Responsibility Survey Instrument

Survey Questionnaire

	Please mark with an X and only respond once to each question.	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)
1	It is no use worrying about flooding within the community as I can't do anything about it anyway				
2	Every person should give some of their time for the good of their local community				
3	Our country would be a lot better off if we didn't have so many rules				
4	Letting your neighbors down is not so bad because you can't do good all the time for everybody				
5	It is the duty of each member of a community to do the very best they can to increase their protection against floods				
6	People would be a lot better off if they could live far away from other people and have less interaction with them				
7	I would like to take part in a volunteering project				
8	I feel very bad when I have failed to finish a job I promised I would do				
9	I feel it is important to always tell the truth to others				
10	I feel it is important to get on well with your neighbors				
11	I do not feel that climate change is an important issue that will affect me				
12	I feel that it is important that people should always obey the law				

Sociodemographic Information

Please mark with an X or a Circle, and respond only once to each question.				
Gender	Female	Male		
Age of Respondents (Years)	18 – 24	25 – 34	35 – 49	50+
Educational Attainment	Primary School (1- 6 Years)	Secondary School (7- 12 Years)	Post Secondary School (> 13 years)	
Experience of Flooding.	Yes	No		

Soetanto et al. (2017)

Appendix B: Permission to Use SR Perception Instrument

Re: Request for Permission to use your Questionnaire Instrument.

□

You replied on Tue 12/24/2019 4:28 AM

Reginald Oranye

Fri 5/3/2019 10:41 AM

Dr. Soetanto,

I am truly grateful for your permission. I will let you know when my research study has been completed, and will keep in touch.

Thank you very much and best regards.

Reginald Oranye

Get [Outlook for Android](#)

From: Robby Soetanto

Sent: Friday, May 3, 4:43 a.m.

Subject: RE: Request for Permission to use your Questionnaire Instrument.

To: Reginald Oranye

Dear Reginald,

Yes, I confirm that I grant a permission for you to use the instrument, subject to your acknowledgements and citations of our paper in your PhD thesis and all future publications.

All the best with your research,
Robby

From: Reginald Oranye

Sent: 03 May 2019 03:39

To: Robby Soetanto <>

Subject: Re: Request for Permission to use your Questionnaire Instrument.

Dear Dr. Soetanto,

I write to gently remind you of my request for your gracious permission to use your instrument in my Ph.D. thesis. As indicated in my last mail, I'll be pleased to cite and acknowledge your paper in my thesis and future publications.

I look forward to your kind response.

Thanks and regards.

Reginald Oranye.

From: Reginald Oranye
Sent: Friday, April 19, 2019 5:20 AM
To: Robby Soetanto
Subject: Re: Request for Permission to use your Questionnaire Instrument.

Dear Dr. Soetanto,
 I apologize for the delayed response. I'll definitely be pleased to acknowledge and cite your paper in my thesis and future publications, and I hereby affirm to do so. Any information on the instrument validity and reliability will also be greatly appreciated. Thank you and best regards.
 Reginald Oranye
 Get [Outlook for Android](#)

From: Robby Soetanto
 Sent: Monday, April 15, 8:56 a.m.
 Subject: RE: Request for Permission to use your Questionnaire Instrument.
 To: Reginald Oranye

Dear Reginald,

Thank you for your email.

I can grant a permission for you to use the instrument, only if you acknowledge and cite our paper in your PhD thesis and all future publications.

Please do not hesitate to contact me, should you have further queries.

All the best for your research endeavour.

Robby

Dr Robby Soetanto

Lean approach in precast concrete component production

The perceptions of social responsibility for community resilience to flooding

Online Learning for STEM Subjects

** Sometimes my messages arrive outside of the working day but I never expect a reply from you outside of your normal working hours **

This email has been written by Robby Soetanto and the contents may not reflect the opinions or policies of Loughborough University

From: Reginald Oranye
Sent: 12 April 2019 20:34
To: Robby Soetanto < >
Subject: Request for Permission to use your Questionnaire Instrument.

Dear Professor Soetanto,

I am a Ph.D. student in the Department of Public Policy and Administration at Walden University in the United States. I have completed my course work, and I am in the proposal stage of my dissertation. My research focus is on the perceptions of river flood risk and social responsibility in Nigeria.

I am keenly interested in the 2016 article: "The Perceptions of Social Responsibility for Community Resilience to Flooding: The impact of Past Experience, Age, Gender and Ethnicity", which you jointly published with Professors Aaron Mullins and Nebil Achour.

I find that the "modified statements" that you employed in the questionnaire/instrument of that study are very much applicable to my proposed study. I, therefore, write to respectfully request your kind permission to use them. However, I may consider a slight modification of your instrument from a 12-item questionnaire to a 6 or 8- item questionnaire. I strongly believe that my use of your instrument or a modified version of it would be of considerable help in my research, and I'll be most grateful for your kind and gracious assistance.

Thanks and best regards.

Reginald Oranye.
Ph.D Student
Public Policy and Administration
Walden University

Appendix C: Cronbach's Alpha Reliability Statistics

Table C1

Case Processing Summary for Cronbach's Alpha Statistics

Case Processing Summary			
		N	%
Cases	Valid	120	86.3
	Excluded ^a	19	13.7
	Total	139	100.0

a. Listwise deletion based on all variables in the procedure.

Table C2

Cronbach's Alpha Reliability Statistics

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.729	.790	12

Appendix D: Frequency and Percentages Distribution of the Variables

Table D1

Frequency and Percentage Distribution for Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
	Female	53	43.4	44.2	44.2
Valid	Male	67	54.9	55.8	100.0
	Total	120	98.4	100.0	
Missing	System	2	1.6		

Table D2

Frequency and Percentage for the Experience of Flooding

		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	80	65.6	66.7	66.7
Valid	No	40	32.8	33.3	100.0
	Total	120	98.4	100.0	
Missing	System	2	1.6		
	Total	122	100.0		

Table D3

Frequency and Percentage Distribution for Age Bracket

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	26	21.3	21.7	21.7
	25-34	27	22.1	22.5	44.2
	35-49	35	28.7	29.2	73.3
	50 and Above	32	26.2	26.7	100.0
	Total	120	98.4	100.0	
Missing	System	2	1.6		
	Total	122	100.0		

Table D4

Frequency and Percentage Distribution for Educational Attainment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary School completed (1-6 yrs)	8	6.6	6.7	6.7
	Secondary School Completed (7-12 yrs)	51	41.8	42.5	49.2
	Post Secondary School (13 yrs and over)	61	50.0	50.8	100.0
	Total	120	98.4	100.0	
Missing	System	2	1.6		
	Total	122	100.0		

Table D5

Frequency and Percentage Distribution for SR Score

	Frequency	Percent	Valid Percent	Cumulative Percent
26	1	.8	.8	.8
28	3	2.5	2.5	3.3
29	1	.8	.8	4.2
30	7	5.7	5.8	10.0
32	8	6.6	6.7	16.7
33	6	4.9	5.0	21.7
34	9	7.4	7.5	29.2
35	4	3.3	3.3	32.5
36	8	6.6	6.7	39.2
Valid 37	6	4.9	5.0	44.2
38	11	9.0	9.2	53.3
39	12	9.8	10.0	63.3
40	14	11.5	11.7	75.0
41	2	1.6	1.7	76.7
42	10	8.2	8.3	85.0
43	5	4.1	4.2	89.2
44	11	9.0	9.2	98.3
45	1	.8	.8	99.2
46	1	.8	.8	100.0
Total	120	98.4	100.0	
Missing System	2	1.6		
Total	122	100.0		

Appendix E: Evaluation of Statistical Assumptions Associated with the Dependent
Variable and Multiple Regression

Table E1

Shapiro-Wilks Test of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
SR Score	0.104	120	0.003	0.968	120	0.005

a. Lilliefors Significance Correction

Table E2

Skewness and Kurtosis

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SR Score	120	20	26	46	37.48	4.561	-0.332	0.221	-0.671	0.438
Valid N (listwise)	120									

Table E3

Levene's Test of Equality of Error Variances

		Levene Statistic	df1	df2	Sig.
SR Score	Based on Mean	0.000	1	118	1.000
	Based on Median	0.000	1	118	0.994
	Based on Median and with adjusted df	0.000	1	115.290	0.994

Based on trimmed mean	0.000	1	118	0.993
-----------------------	-------	---	-----	-------

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.
a. Dependent variable: SR Score

Table E4

Correlation of Independent Variables to Evaluate Multicollinearity

		SR Score	Gender	Age bracket	Educational Attainment	Experience of Flooding
Pearson Correlation	SR Score	1.000	0.130	0.138	0.613	0.140
	Gender	0.130	1.000	0.141	-0.152	-0.047
	Age bracket	0.138	0.141	1.000	-0.126	-0.521
	Educational Attainment	0.613	-0.152	-0.126	1.000	0.124
	Experience of Flooding	0.140	-0.047	-0.521	0.124	1.000
Sig. (1-tailed)	SR Score		0.079	0.067	0.000	0.063
	Gender	0.079		0.062	0.048	0.303
	Age bracket	0.067	0.062		0.085	0.000
	Educational Attainment	0.000	0.048	0.085		0.088
	Experience of Flooding	0.063	0.303	0.000	0.088	
N	SR Score	120	120	120	120	120
	Gender	120	120	120	120	120
	Age bracket	120	120	120	120	120
	Educational Attainment	120	120	120	120	120
	Experience of Flooding	120	120	120	120	120

Table continues

Table E5

*Collinearity Statistics**Coefficients^a*

Model	Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	16.584	2.236		7.418	0.000					
Gender	1.795	0.615	0.196	2.918	0.004	0.130	0.263	0.192	0.960	1.042
Age bracket	1.293	0.323	0.313	4.007	0.000	0.138	0.350	0.264	0.713	1.402
Educational Attainment	4.814	0.495	0.653	9.718	0.000	0.613	0.671	0.640	0.960	1.041
Experience of Flooding	2.226	0.746	0.231	2.984	0.003	0.140	0.268	0.197	0.724	1.381

a. Dependent Variable: SR Score

Table E6

*Residual Statistics**Residuals Statistics^a*

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	31.09	42.95	37.48	3.229	120
Std. Predicted Value	-1.977	1.694	.000	1.000	120
Standard Error of Predicted Value	.475	.985	.662	.099	120
Adjusted Predicted Value	30.79	43.21	37.48	3.230	120
Residual	-9.200	7.455	.000	3.222	120
Std. Residual	-2.807	2.274	.000	.983	120
Stud. Residual	-2.847	2.329	.000	1.004	120
Deleted Residual	-9.463	7.818	-.002	3.361	120
Stud. Deleted Residual	-2.940	2.376	-.002	1.013	120
Mahal. Distance	1.510	9.755	3.967	1.550	120
Cook's Distance	.000	.062	.009	.012	120
Centered Leverage Value	.013	.082	.033	.013	120

a. Dependent Variable: SR Score

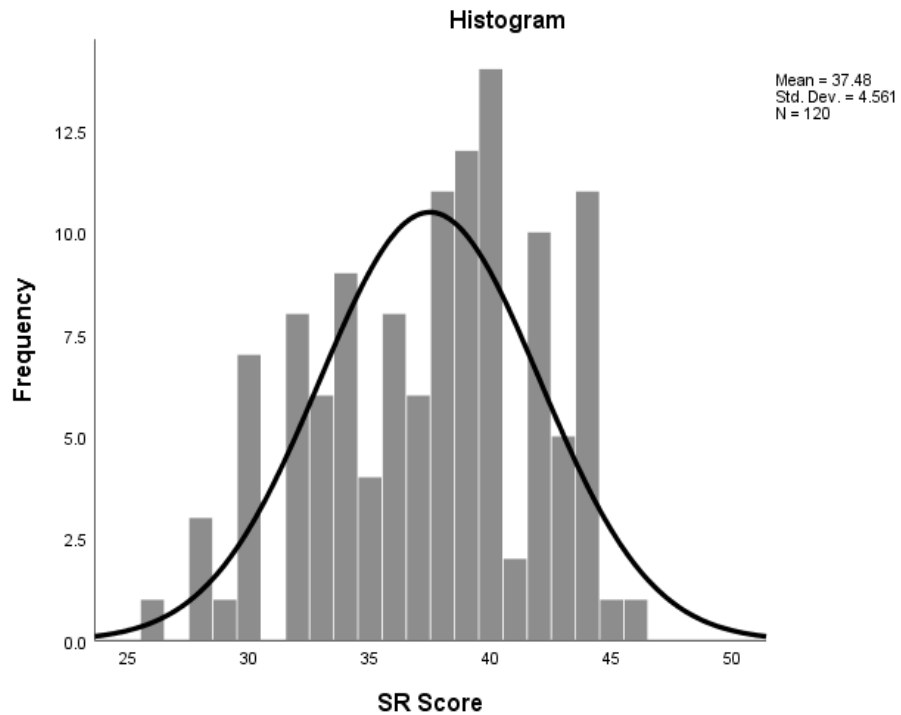


Figure E1. Histogram of the dependent variable- SR score.

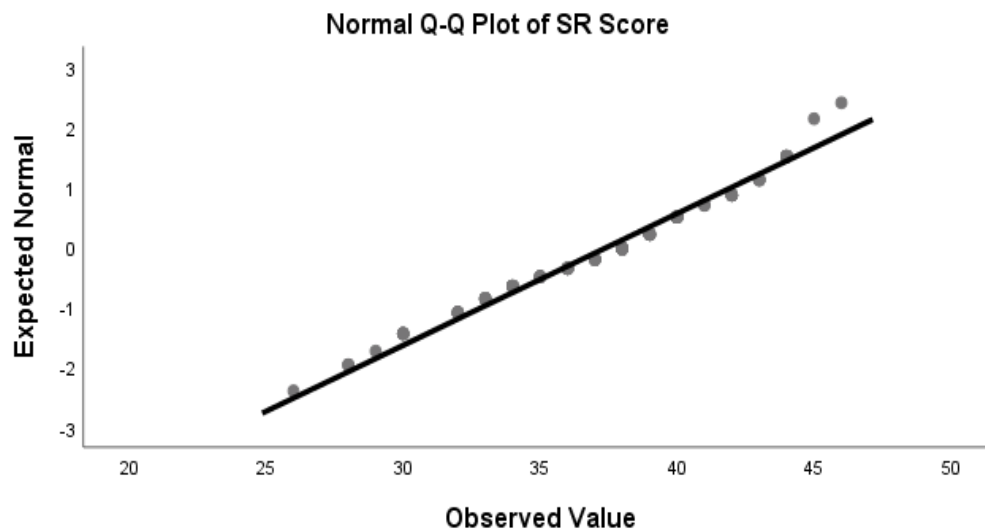


Figure E2. Q- Q Plot of SR score.

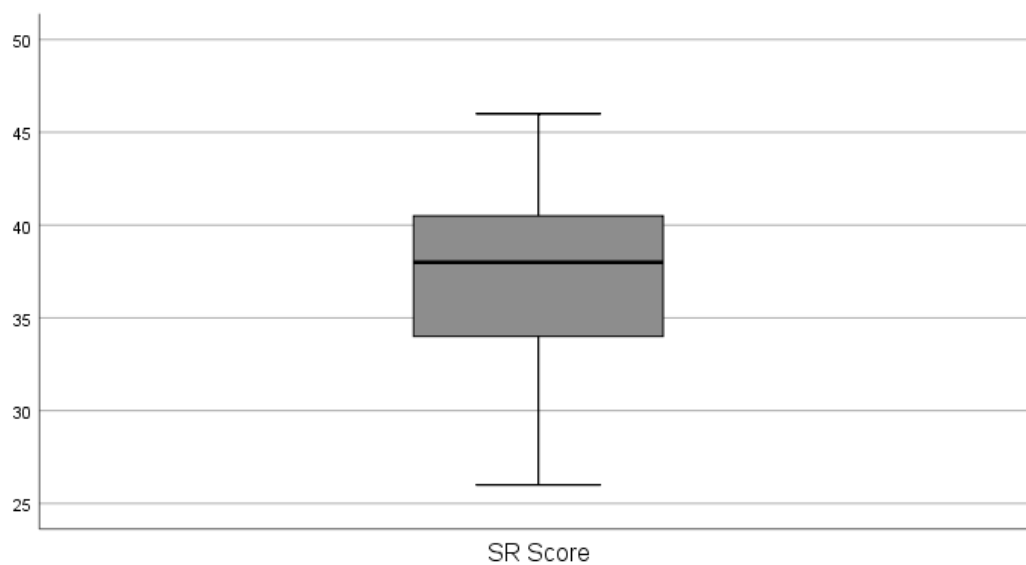


Figure E3. Box Plot of SR score.

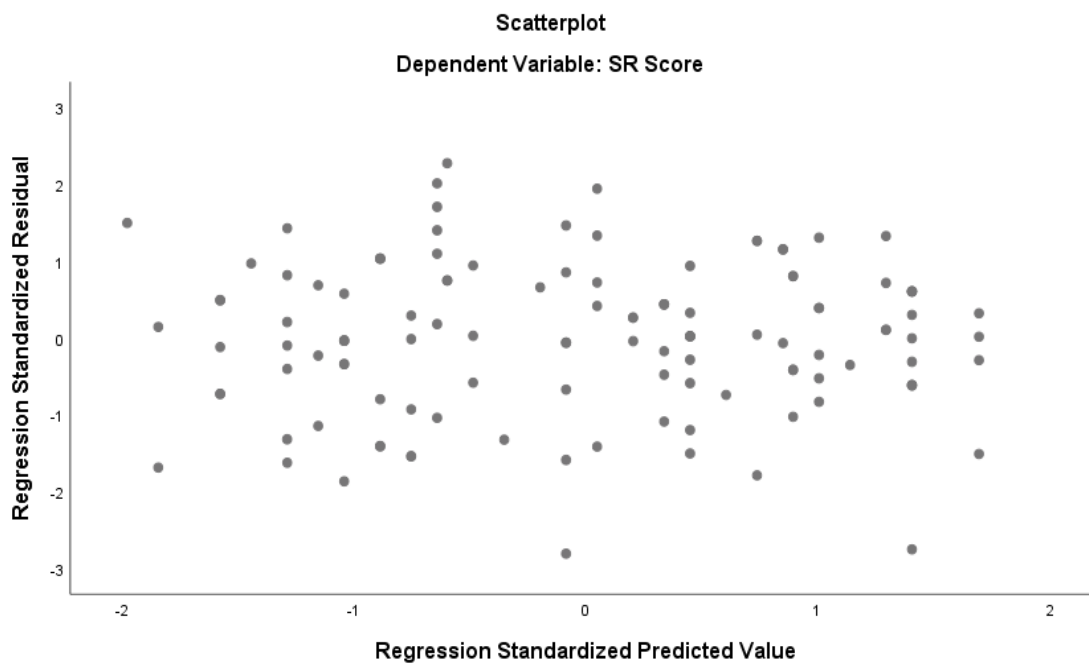


Figure E4. Scatterplot of standardized residuals and predicted values to evaluate homoscedasticity.

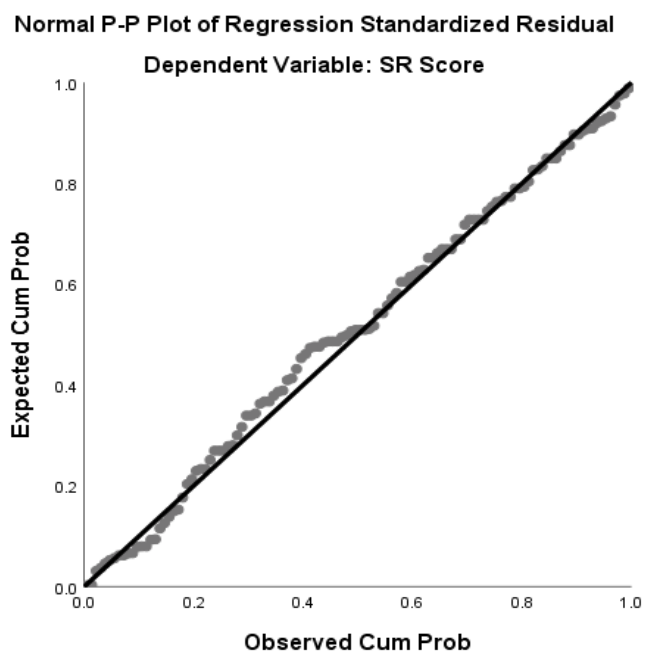


Figure E5. Normal P-plot of regression standardized residual.

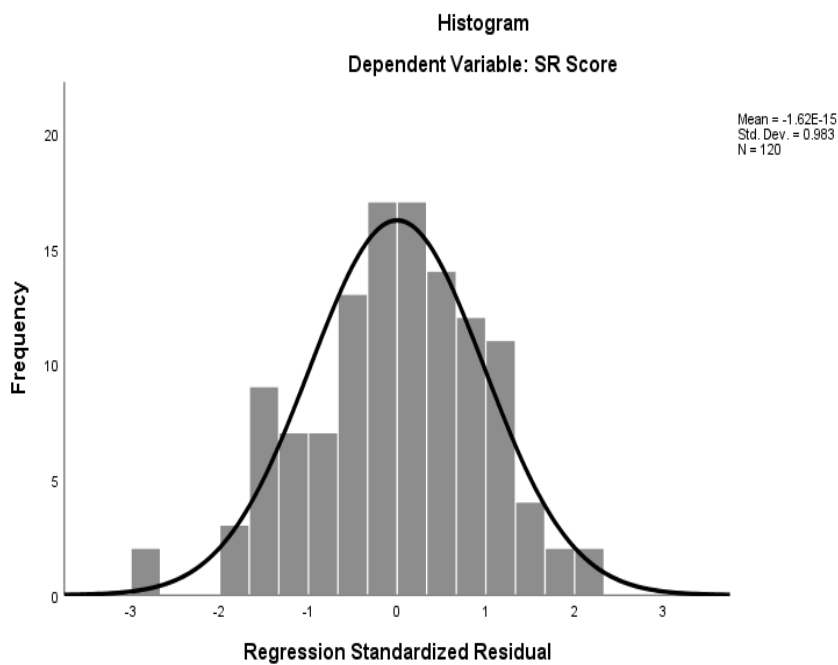


Figure E6. Histogram showing normal distribution of residuals.

Appendix F: Post Hoc Test of Multiple Comparisons for Educational Attainment

		Dependent Variable:					
(I) Educational Attainment		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
Bonferroni	Primary School completed (1-6 yrs)	Secondary School Completed (7-12 yrs)	-2.664	1.370	0.163	-5.99	0.66
		Post Secondary School (13 yrs and over)	-7.805*	1.355	0.000	-11.10	-4.51
	Secondary School Completed (7-12 yrs)	Primary School completed (1-6 yrs)	2.664	1.370	0.163	-0.66	5.99
		Post Secondary School (13 yrs and over)	-5.141*	0.684	0.000	-6.80	-3.48
	Post Secondary School (13 yrs and over)	Primary School completed (1-6 yrs)	7.805*	1.355	0.000	4.51	11.10
		Secondary School Completed (7-12 yrs)	5.141*	0.684	0.000	3.48	6.80
Games-Howell	Primary School completed (1-6 yrs)	Secondary School Completed (7-12 yrs)	-2.664	1.052	0.059	-5.43	0.10
		Post Secondary School (13 yrs and over)	-7.805*	0.980	0.000	-10.47	-5.14
	Secondary School Completed (7-12 yrs)	Primary School completed (1-6 yrs)	2.664	1.052	0.059	-0.10	5.43
		Post Secondary School (13 yrs and over)	-5.141*	0.708	0.000	-6.83	-3.46
	Post Secondary School (13 yrs and over)	Primary School completed (1-6 yrs)	7.805*	0.980	0.000	5.14	10.47
		Secondary School Completed (7-12 yrs)	5.141*	0.708	0.000	3.46	6.83