

Analyzing Household Preparedness on Flood Management in Riverside: A Focus on Apete Community in Ibadan, Nigeria

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Abstract: Disaster is an inevitable consequence of negative human activities heaped on the environment. It is more pronounced in developing countries where level of preparedness was low in comparison with developed countries. It is against this background that this study evaluates the level of households' preparedness on flood management along Apete river in Ibadan, Nigeria. Concept of disaster preparedness and environmental planning and management provided the analytical framework. Random sampling procedure was used to administer questionnaire in the study area. A structured questionnaire focusing on socio-economic characteristics of residents, causes, effects of flood disaster, control measures and households' level of preparedness on flood management was administered to 172 households' heads (44 in Fanawole, 41 in Morubo, 35 in Papa, 2 in Apete-Oja and 27 in Akere). In-depth interview were conducted with community representatives on coping strategies employed. Qualitative data were content analyzed while quantitative data were analyzed with descriptive statistics and Pearson Product Moment Correlation at 0.05 level of significance. Causes of flood were attributed to heavy rainfall (97.1%), change in river course (45.3%), dumping of waste in water bodies (94.8%), poor drainage system (89.5%), dam failure (55.8%) and narrow bridges (77.9%). Respondents' mean values of the effects of flood were disruption of public and personal property (3.94), disruption of traffic flow (3.73) and destruction of agricultural land (3.35), loss of lives (3.22), outbreak of diseases (3.24) and sewage spill (3.25). The mean values of flood control measures adopted were: proper waste disposal (3.92), ensuring functional drainage (3.68), demolition of buildings along flood plain (3.22) and re-channelization of water bodies (2.62). While households' level of preparedness on flood management were: flood disaster campaign awareness (3.65), use of concrete embankment (3.41), vehicles' tyres as walkway (3.29), relocation of residents during rain peak period (3.33), erection of plank for residents' movement (3.17) and use of sand bag (3.12). There was significant relationship between the effects of flood disaster and households' preparedness on flood management ($r=0.480$). The study recommended the need for scaling up households' preparedness initiatives and effective development control measures, among others.

Key words: Household, Preparedness, Flood, Riverside, Apete

I. Introduction

The incidence of flooding and its damning consequences have posed a serious threat to the security of towns and cities of both developed and developing countries of the world in which Nigeria is not left behind. According to Christopherson (1997) and Oyegbile (2008), flooding is one of the environmental responses to the abuse heaped on it by man's activities and the concern is that the world may be getting close to extinction through natural disasters unless immediate actions are taken to avert the trend.

Research reports on flood disaster revealed that serious flood disasters had occurred in Nigeria cities including Ibadan (1985, 1987 and 1990), Osogbo (1992, 1996, 2002), Yobe (2000) and Akure (1996, 2000, 2002, 2004 and 2006) just to mention a few (Olajuyigbe et al, 2012; Abam, 2006). Adedeji et al (2011) also documented the effects of flooding in Ibadan and Osun in southwestern region, Calabar, Port-Harcourt and Warri in the south-south region; Ilorin, Abuja, Lokoja and Mina in the Middle belt to Kano, Kaduna Jalingo, Maiduguri and Gombe in the North, after heavy downpour, which results to washing away of streets, battering dams, collapsing bridges, submerging buildings, killing of people and separating thousands of people from their homes.

However, this is not the case in most developed countries like United Kingdom and United State of America. As part of ways in mitigating flood disaster, the United States of America has been able to come up with a flood hazard map to show the flood risk for the community. Listening to radio or television for information is of paramount importance in which warnings are given out such as "be aware that flash flooding can occur", "if there is any possibility of a flash flood move immediately to higher ground", "don't wait for instruction to move" (www.fema.gov). Meanwhile, in Nigeria, the lack of precise and specific early warnings from mass media is a contributing factor to the high number of casualties recorded from flooding incidences. Though there may be generalized information on the radio or television pointing to the possibility of heavy

rainfall in the city but as good as the information may be, it may not be specific as to when to expect the flood, what people should do when the rain starts, and what might be readily available adjustment options they should take advantage of to save themselves.

In an attempt to ensure effective flood management, Oyo State government set up a task force aftermath of August 2011 flood disaster in Ibadan. The recommendation of the committee led to reconstruction, rehabilitation of canals, extensions of drain and bridges (Punch, 2012). The government also embarked on demolition of structures erected on statutory setbacks and about 60 houses on flood plains were demolished and more are still slated for demolition (The Nation, 2014).

From all these evidences, it is crystal clear that preparedness for flood management is of paramount importance for households, businesses, and communities residing closer to river channel. It is on this note that this research evaluates households' preparedness on flood management.

II. Statement of Problem

Many households in Nigeria seem do not know the way out when an unforeseen disaster occurs despite the grave and serious impact on lives and properties. From the reports of various scholars, on flood disasters in Nigeria, Ibadan has been specifically mentioned among other cities, on the causes and effects of flood. Rather than recording remarkable progress in flood management, Nigeria has been ranked 15th position in terms of population exposed to coast flooding come in the year 2070 A.D. (Nicholls et al. 2007).

The lack of drainage, combined with shallow valley floors, increase in impermeable surfaces, substandard housing and poor solid waste management, has resulted in at least ten costly and destructive floods in the last 70 years and heightened health risks for Ibadan's residents (UNCHS-Habitat, UNCEP, 1996). The Apete situation which also happens to be one of the major areas in Ido local government of Ibadan harbors a major river known as Apete river, has however, been made worse, as development exacerbates without putting into consideration the effects of such development, more damages have been caused due to restriction of avenues for water to flow easily (Adedeji et al 2012). As pointed out by Aderogba (2012) that there is no city or town in Nigeria that have up to 50% of the built-up areas connected with drains. Apete area faces lack/inadequate infrastructural facilities to curb flooding which has made the area vulnerable to flooding.

In view of the causes and effects of flood incidence in Ibadan particularly Apete area, a comprehensive document was produced which contained basic information about Ibadan development and environmental issues, along with a review of institutions responsible for environmental planning and management within the city (Sustainable Ibadan Project) (Environmental Planning and Management (EPM) Source Book - Volume 1 1997). However, it was reported that sustainable Ibadan project was embarked upon and was initially organized around three cross-cutting issues: sanitation, health and solid waste management, it was designed to mobilize political support from the very beginning. Also government at the state level has also set up a task force which came up with recommendations that will forestall effective flood management across the city of Ibadan. In spite of the foregoing, the problem of flooding persists in Ibadan particularly, Apete area. One reason for this is that these projects were initiated and implemented without any departure from the guidelines of flood management but little effort has been put in building households' preparedness, which suggests the reasons for the failure of the project. The increasing rate of flood disaster in Apete calls for households' preparedness in Apete although not without its own short comings. Most pronounced of these shortcomings are the poor waste management and less formalization in developing logistics capabilities (Adejuwon and Aina, 2014).

Adejuwon and Aina (2014) assumed that human societies have the capacity to recognize the risks and factors that could lead or cause flooding and the appropriate interventions to control or manage them. Households have been involved in diverse preparedness on flood management in Apete, than a decade, a long-enough time for their impacts on peoples and communities to ripe for empirical evaluation. This study therefore evaluates households' preparedness on flood management along Apete river channel, Ibadan, Oyo State, Nigeria. The questions raised and which have been answered by this study are:

1. What are the characteristics of people affected by flood disaster?
2. What are the factors responsible for the flood disaster? Is it the acts of nature or acts of humans?
3. What are the expectations for households' preparedness in case of any situation of flood disaster?
4. In regards to the Ibadan flood disaster, how can the households' efficiency and effectiveness are rated?

Hypothesis

H₀: There is no relationship between the effects of flood disaster on the households and households' preparedness on flood management in Apete community.

III. Scope of the Study

The scope of this study is limited to households' preparedness on flood management along Apete river in Ibadan. Apete is located within the jurisdiction of Ido Local Government in Ibadan, Oyo State, Nigeria. The selection of Apete community is based on the severity of flooding in the area after pilot survey had been made to several localities that have incidence of flood disaster in Ibadan.

IV. Methodology

Ido Local Government is made up of several communities that are spatially developed along Apete river, four communities where flooding was highly predominant were randomly selected. The communities selected for this research are Fanawole, Papa, Morubo, Akere, and Apete-Oja.

Sample Size

The target population for this study comprised male and female adults who are residing along the riverside area in Apete at the period of carrying out the research. Interview guides were conducted on the local government area and community leaders in Apete.

Sampling Procedure

The total number of buildings in the study areas at the period of carrying out this research was 344 (source: Field Survey, 2014). Systematic sampling method was employed for the selection of the sampled buildings. 50% of the total number of buildings within Fanawole, Papa, Morubo and Apete-Oja was chosen as sample size for the study. The sampling interval is two (2), this implies the selection of one building to represents two buildings within the area that are along the river side. A total of 172 buildings were selected for the interview, this enhances effective and efficient data collection. This sample frame gives appropriate result of the general areas.

Questionnaire and two (2) types of interview guides were prepared for the study. The questionnaires were directed to the residents. One interview guide was prepared for the director of the Ministry of Physical Planning and Urban Development while the other interview guide was prepared for the Baale of Apete community.

Conceptual Framework and Literature Review

There have been many concepts on flood management, but for the benefit of this study the concept of environmental planning and management, concept of disaster risk reduction and the concept of disaster preparedness have been used as background.

Environmental Planning and Management (EPM)

The EPM concept entered the planning dictionary or can be said to have originated in the 1960's with the social movement and revolution, which changed the concept and discipline of physical planning. The movement originated in U.S. with the integration of social planning with physical planning. Alschuler, Brooks, Peter Marris, Howard Odum and others are among the earlier planners who propagated the concept of EPM.

UNCHS defines environmental planning and management approach as the process in which it allows for interactive, participation of stakeholders in reaching a consensus on environmental issues which need to be planned and managed. The Environmental Planning and Management (EPM) process is designed by the United Nations Centre for Human Settlement (UNCHS-Habitat) to facilitate effective urban environmental management (UNCHS (Habitat)/UNEP 1997). During the 1980s, ideas about environment development relationships were changing dramatically and by the time of the Earth Summit in Rio in 1992, it was widely accepted that environment and development must go forward together and be balanced, in other words, towards sustainable development.

One of the fundamental challenges facing cities today is to plan better and manage more effectively the process of urban development, in order to avoid or alleviate environmental problems while still realizing the positive potentials of city growth and change. Many international support programmes aim directly at helping cities to improve their EPM capabilities. Typically, this is done by working with local partners to develop specific EPM "demonstrations", through which new approaches and methods can be worked out and applied in the real world of local conditions. These programme-supported "demonstrations", addressing specific issues but carefully focused on the general EPM process, then provide on the job training to local practitioners, and valuable guidelines and frameworks which can be applied to other issues in the same city, or to other cities in the country with a diminishing need for external support.

The Istanbul Manifesto recommends: "Support environmental planning and management demonstrations at both the city wide strategic level, and at the neighborhood level. Key features of the strategic level are, firstly, to incorporate EPM into existing city management systems; secondly, to actively involve the

private sector and public interest groups in the formulation of environmental plans; and thirdly, to establish an ongoing information monitoring system open to the public and useful to project and management objectives.

At the neighborhood level, initiatives should emerge from expressed community needs and leadership of representative community organizations. This two pronged approach will strengthen municipal capacity to plan and manage, make effective linkages between community action and local government operations and services, and demonstrate immediate benefits of the EPM approach to city residents.

Four important principles should guide both levels of activity. Firstly, initiatives should be locally defined, and cities and local communities should be firmly in control of the direction and content of assistance offered by external agencies. Secondly, external inputs should be in scale with local capacities, and the activities be used to strengthen local capacities. Thirdly, any demonstration projects should emphasize both institutional and financial sustainability. Finally, any initiatives, while creative and innovative, should be easily understood and offer clear benefits.” (Istanbul Manifesto, June 1996)

This initiative is designed to consolidate developments from existing USAID programmes with a new emphasis on environmental services. The USAID approach underlines the need for a participatory process, especially in the development of new types of public-private partnerships for long term solutions to urbanization problems. The initiative supports replicable city demonstrations which emphasize citizen participation in the achievement of a balance of economic, environmental and social concerns.

The SCP has developed a family of city EPM demonstration projects, currently active in over 20 different cities around the world. Each of these SCP projects involves a city level strategic partnership focused on capacity building to provide municipal authorities and their partners in the public, private and community sectors with an improved environmental planning and management capacity. Special emphasis is laid on broad based participation in across sectoral and inter-organizational process. Each city project is supported by specialist expertise and facilities from the SCP core team, who also assist the local partners in the crucial task of replicating the SCP demonstration experience to other issues and into other cities in the country and the region.

The APELL programme focuses on industrial environmental risk management. Its goal is to prevent technological accidents and to reduce their impacts by assisting decision makers and technical personnel to increase community awareness of the hazards, and to prepare response plans for use in emergencies. The programme provides specialized expertise and information through APELL's global network of international experts, enabling cities to launch local partnerships with industries and communities. APELL works globally and has developed operational partnerships with numerous specialized agencies and industrial associations.

For some aspects of EPM there is still not enough known about the technical and operational processes or about the physical conditions themselves. Cities are in great need of reliable understanding on which to base policies and actions, yet may lack the methodologies and capacities for generating operationally relevant answers. A fourth important modality of activity for international programmes, therefore, is support for applied research and development which is directly relevant to the needs of urban environmental planning and management. By sharing this expertise on a wider scale, international programmes can support applied research which could not be afforded by individual cities. International programmes can also help cities with the design, organization and funding of EPM relevant research programmes based on partnerships between global and local efforts thereby helping to develop local capacities.

The Istanbul Manifesto recommends: “There is a need for good quality information and methodologies to support environmental planning and management. A substantial, though under-utilized, body of relevant research exists. Therefore, design and funding of need based research programmes which are based on partnerships between ongoing global and local efforts are required; policy makers and local communities should be involved in research and should receive access to research results; the scientific community should commit itself to address operational priority needs; and decision makers should commission scientific research relevant to implementing the urban environment agenda.” (Istanbul Manifesto, June 1996)

Concept of Disaster Risk Reduction

Disaster Risk Reduction is the systematic development and application of policies, strategies and practices to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards within the broad context of sustainable development (Hellen, 2011). As indicated in the introduction, natural disasters and floods in particular have become frequent and are likely to occur in future due to climate variability. It may therefore, not be feasible to remove the flood risk .What is important therefore is to fully understand the flood risk and the associated effects within the framework of Disaster Risk Reduction .This can be done by developing the flood hazard and risk profiles which can be used to design appropriate measures to manage and mitigate the floods and build people’s adaptation capacity and resilience (Report on the Regional Stakeholders’ Consultative Workshop on Disaster Risk Management, 2004).

Studies undertaken in the past have shown that the frequency and intensity of disasters have tremendously increased over the last few years, rendering the already impoverished populations more vulnerable

(concept note on the Comprehensive Vulnerability Assessment and Analysis Survey for Zambia, 2006). Despite the increase in the frequency and magnitude, no comprehensive impact assessment study on the socio-economic livelihoods of people has been undertaken. Hence the response to the impact of hazards such as floods has been reactive. There is, therefore, need to establish a proactive as opposed to reactive risk and vulnerability framework for Disaster Reduction and Mitigation in the study area.

According to UNISDR (2009) disaster is defined as a serious disruption of the functioning community or a society involving widespread human, material, economic or environmental losses and impacts, which exceed the ability of the affected community or society to cope using its own resources. In another definition, according to UNISDR (2009) disasters are often described as a result of the combinations of vulnerabilities that present and insufficient capacity of measures to reduce or cope with the potential negative and catastrophic consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation Hellen (2011). Wisner (2004) maintains that disasters are a constraint to economic and human development at the household and national level when roads, bridges, hospitals, schools and other facilities are damaged.

According to Shaluf (2007) disasters are classified as natural, man-made or hybrid, which covers all types of disastrous events. He also maintains that natural disasters are catastrophic events resulting from natural causes, are beyond human control and are often termed as "Acts of God". Some of the natural disasters such as earthquakes, strike with no early warning, while flash floods are sudden and difficult to forecast and give people little time to escape or to take other essentials with them. Anderson (2010) adds that disasters caused by hazard-induced climate change can damage or destroy school facilities and educational systems, threatening the physical safety and psychological well-being of communities and interrupting economic continuity. Action Aid reports that natural disasters like flood destroy the lives of more than 300 million people every year and also state that disasters can affect anybody at any time, but in most cases the poorest and most vulnerable people are affected first and are hit hardest.

Ways in which natural disasters impact the education sector include:

- The return of residents to their affected homes.
- Lack of access to homes due to disruptions in transportation systems, destroyed bridges, damage to building structures and facilities.
- Psycho-social trauma leading to attention-deficit problems and lack of focus in residents' daily business.

Concept of Disaster Preparedness

The concept of disaster preparedness encompasses measures aimed at enhancing life safety when a disaster occurs, such as protective actions during an earthquake, hazardous materials spill, or terrorist attack. It also includes actions designed to enhance the ability to undertake emergency actions in order to protect property and contain disaster damage and disruption, as well as the ability to engage in post disaster restoration and early recovery activities.

Preparedness is commonly viewed as consisting of activities aimed at improving response activities and coping capabilities. However, emphasis is increasingly being placed on recovery preparedness that is, on planning not only in order to respond effectively during and immediately after disasters but also in order to successfully navigate challenges associated with short- and longer-term recovery.

The Capability Assessment for Readiness (CAR), which was developed by FEMA and the National Emergency Management Association (NEMA), identifies thirteen elements that should be addressed by states in their preparedness efforts.

As used in the disaster literature, the concept of preparedness has a variety of dimensions that are in turn supported by a number of activities. Dimension of preparedness consists of the various goals or end-states that preparedness seeks to achieve. Activities are concrete actions that need to be taken in order to meet those goals (Jeannette Sutton and Kathleen Tierney, 2006).

All preparedness activities must be based on knowledge about hazards, the likelihood of different types of disaster events, and likely impacts on the natural and built environment, households, organizations, community institutions and communities. Types of information that provide a focus for preparedness activities include the potential for detrimental impacts of the hazards on health and safety, continuity of operations and government, critical facilities and infrastructure, delivery of services, the environment, economic and financial conditions, and regulatory and contractual obligations. Loss estimation tools such as HAZUS and HAZUS-MH were designed specifically to help communities envision the potential impacts of future disasters and mitigate and prepare for such events. Community-based disaster scenarios also provide a solid basis for preparedness efforts.

This dimension of preparedness centers on strategies that make it possible for households, organizations, and other units of analysis to manage both preparatory activity and response processes. The MDC dimension includes identifying lines of authority and responsibility and specifying how resources will be managed, information analyzed, and decisions made. For example, guidance documents advise businesses to prepare for disaster by organizing an emergency management group that includes representation from the affected area, security, safety and health, environment, maintenance, human resources, planning and logistics, and public relations. Local emergency management agencies and crisis-relevant organizations must now adopt the National Incident Management System (NIMS) which requires the identification of organizational roles, titles, and responsibilities for each incident management function specified in the emergency operations and response plan.

The MDC dimension also includes activities that are designed to ensure that emergency operations will be carried out effectively when disaster strikes. These activities include training, drills and exercises, and educational activities for members of the public, households, and businesses. MDC also includes developing policy, vision, and mission statements; developing and using enabling authorities; setting performance objectives; and assigning responsibilities in areas such as oversight and coordination.

Management activities and preparedness agreements are of little use unless resources are available to support response activities. The goal of resource management is to identify and establish internal and external resources necessary for disaster response and recovery. Identifying resource needs, acquiring resources, and storing and distributing resources are thus key preparedness dimensions. The resource management dimension of preparedness is closely tied to the planning dimension in that plans commonly involve strategies for resource sharing, such as mutual aid agreements.

Included in the concept of resources are human, material, and informational sources of support. Skilled, well-trained personnel and staff constitute critical resources. Communications resources are critical for all response activities at all levels of analysis, although communications media can vary from low-tech to very high-tech. Disaster response tasks such as evacuation and other self-protective measures, search and rescue, emergency medical care, fire suppression, debris removal, emergency transportation, security and credentialing, and response coordination have specific resource and logistical requirements that must be taken into account during the planning process.

Preparedness for communications and warning include the development of a communications plan, the establishment of a warning system including developing protocols and procedures, regular testing and support, and addressing the interoperability of multiple responding organizations and personnel. The resource dimension also includes efforts designed at mobilizing resources to continue with operations when key resources are destroyed. Businesses and communities must prepare for the possibility that an alternate facility, in addition to the primary facility, will be needed for recovery and resumption of services following a disaster event. Emergency preparedness for a community may include an alternate emergency operations center, efforts to introduce redundancy into key response systems, and procedures to locate, acquire, store, and test back-up resources.

Protecting the health and safety of family members, vulnerable populations, employees and customers, and community members is a top priority during an emergency or disaster. Preparing to take action includes the creation of a disaster supplies kit with items such as food, clothing, first aid supplies, tools, and key documents. It also includes the designation of evacuation routes and exits, shelter, training and information on safety procedures, incident stabilization, damage assessment, and the identification of resources needed to support response and recovery operations.

Property protection and hazard mitigation include preparedness activities to protect homes, buildings, facilities, equipment and vital records that are essential to restoring operations once an emergency has occurred. Activities include the use of applicable building construction standards; hazard avoidance through appropriate land use practices; relocation, retrofitting, or removal of structures at risk; removal or elimination of the hazard; protection systems such as fire and smoke alarms or emergency power generation systems; records preservation; facility shutdown; and the establishment of hazard warning and communication procedures.

At the organizational level, planning activities seek to develop strategies to address problems that are likely to develop when a disaster strikes, and training seeks to ensure that all those involved in the response are able to carry out their assigned duties.

However, disasters almost invariably bring surprises, and for that reason preparedness activities must also focus on improving the ability to improvise, innovate, and think creatively. Preparing to improvise may seem like a contradiction, but in fact the two concepts are complementary.

The household is the smallest unit of analysis for preparedness. A household may consist of an individual, a family of two or more, extended families, single parents with children, persons who are co-residing in a single residential unit, or even those who are transient. Just as "every disaster is local," preparedness begins in the home with some simple steps that can be taken to improve life safety, property protection, and survival from hazardous events.

Households vary in many ways that are important for understanding both disaster vulnerability and disaster preparedness. Particularly in the aftermath of Hurricane Katrina, it is clear that while many households are able to prepare for disasters, others lack the wherewithal and resources. For households, vulnerability is associated with income, education, ethnicity, age, and linguistic isolation. Factors such as income influence access to safe housing options and to insurance. Other axes of stratification play a role in making households either more or less vulnerable, better or less well prepared (Tierney, Lindell, and Perry, 2001; Tierney, 2005).

Behavioral metrics and normative guidance for household preparedness generally focus on six of the dimensions discussed earlier: hazard knowledge, formal and informal response plans and agreements, life safety protection, property protection, emergency coping and restoration of key functions, and initiation of recovery. The main emphases tend to fall in the area of hazard knowledge, life safety, and property protection, with specific attention placed on assembling a disaster supplies kit, mitigation activities, and developing a family communications plan.

Disaster preparedness is an essential component of any disaster management planning because it minimizes the adverse effects of a hazard, and that disaster preparedness must be seen as an active, ongoing process. Disaster management therefore involves the response to or anticipation of a hazardous event through a set of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels as reported by UNESCO (2010).

A community is a social unit that may or may not be contiguous with a local political jurisdiction. The boundaries of a community may be represented by neighborhoods with common ethnicity, interest-based associations, or other social groups. However, for purposes of this discussion, the community is represented by the local political jurisdiction (municipal government, city government, county government) responsible for emergency preparedness, emergency alert and notification, emergency response and recovery (this concept of community is borrowed from Sorensen and Rogers, 1988). Communities range from small rural towns with limited governmental resources for public safety and emergency management to large municipalities with emergency operations boards and city-wide preparedness initiatives. With an increasing emphasis on regional preparedness, we also take into account regional collaboration and multi-jurisdictional planning.

Disaster is defined as a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses, which exceed the ability of the affected community/society to cope using its own resources (ISDR, 2002). Paton and Johnston (2001) define disasters as those events that displace the structural, economic, organizational, cultural and spiritual well-being of communities by destroying their means of existence. Disaster could either be human-induced or natural occurrences. Disasters are natural if they just happen without being induced by humans like tsunamis, volcanoes, earthquakes, storms and floods. **Hazard** is defined as a potentially damaging physical event, phenomenon or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation (ISDR, 2002). **Disaster Risk Reduction** is defined as the systematic development and application of policies, strategies and practices to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) adverse impact of hazards, within the broad context of sustainable development as reported in ISDR (2002). **Disaster prevention** refers to those activities that provide outright avoidance of the adverse impact of hazards and related environmental, technological and biological disasters. **Disaster preparedness** refers to activities and measures taken in advance to ensure effective response to the impact of disasters, including the issuance of timely and effective early warnings and the temporary removal of people and property from a threatened location. **Disaster management**, according to the Disaster Management Act (South Africa, 2002), means a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures aimed at: (a) preventing or reducing the risk of disasters; (b) mitigating the severity or consequences of disasters; (c) emergency preparedness; (d) a rapid and effective response to disasters; (e) post disaster recovery and rehabilitation.

V. The Study Area

Population Size of Ibadan

Ibadan, one of the oldest cities in Africa, is the capital of Oyo State, Nigeria, and has eleven local government areas (See figure 3.2). By 1856, the population was estimated at 60,000, rising to over 200,000 in 1890, to over 238,000 in 1921, and more than 386,000 in 1931 (Mabogunje, 1962). The 1991 census in Nigeria put the population of the city at 1.22 million with a density of 475 person's km². Ibadan's population was 2.55 million according to the 2006 estimate by the National Population Commission. The population was projected to increase at 3.2 percent annually, to 2.89 million people by 2010 (Oyo State Government 2011).

Relief and Drainage

Ibadan lies mostly on lowlands which are punctuated by rocky outcrops and series of hills. These outcrops are mainly granitic. Three major landforms of hills, plains and river valleys dominate the whole landscape of the region. The average elevation is 230 m above mean sea level. The metropolis is drained by three important rivers, river Ogunpa, river Ona and river Ogbere and their several tributaries including Omi, Kudeti, Alaro and Alapata. This combination of hills and river valleys provide a good drainage for the city but it has suffered a lot of abuse due to blockages of the water courses by solid wastes coupled with the construction of structures along the river courses and sometimes right within the river course itself. These practices constitute the major reasons for the incessant flooding as occasioned by the recent flood disaster on the night of 26th August 2011. The metropolis is drained by three important rivers, river Ogunpa, river Ona and river Ogbere.

There are several tributaries of these rivers. The major tributary of river Ogunpa is the river Kudeti, both of them drain the eastern part of Ibadan. The western part of the city, which consists of more recent residential and other developments, is drained by the river Ona and its numerous tributaries, including the Alalubosa, Oshun and Yemoja streams.

Historical Background of Ido Local Government

This research was carried out in Apete Area of Ibadan, Oyo State in Nigeria. Apete is located in Ido Local Government. Historically, the local government was created from former Akinyele local government in May, 1989. The Administrative Headquarters of Ido local government is located at Ido. It shares boundaries with Iseyin and Afijio Local Government Area to the North, Akinyele Local government Area to the east, Ibarapa East Local Government Area to the West. It also shares boundaries with Ogun State to the south (See figure 2).

This Local Government Area has a land mass of 1,010,954 square kilometers with the 2010 estimated population of 117,129 using a growth rate of 3.2% from the 2006 population census which was 103,261 whereby male was counted to be 51,750 and female was 51,511, with a population density of 116 persons per square kilometer. The residents of the local government area are mostly farmers, traders, transporters and civil servants. They are Yorubas and other tribes from various parts of the country. Soil fertility in the area enhances the production of maize, cocoa, oil palm, cassava and vegetables. It has processing industry at Ilaju. The study population comprises of households' along Apete River (men and women in the study area).

The floods in the study area over the years were often as a result of prolonged rainfall and human factors that led to inundation of stream sand river channels.

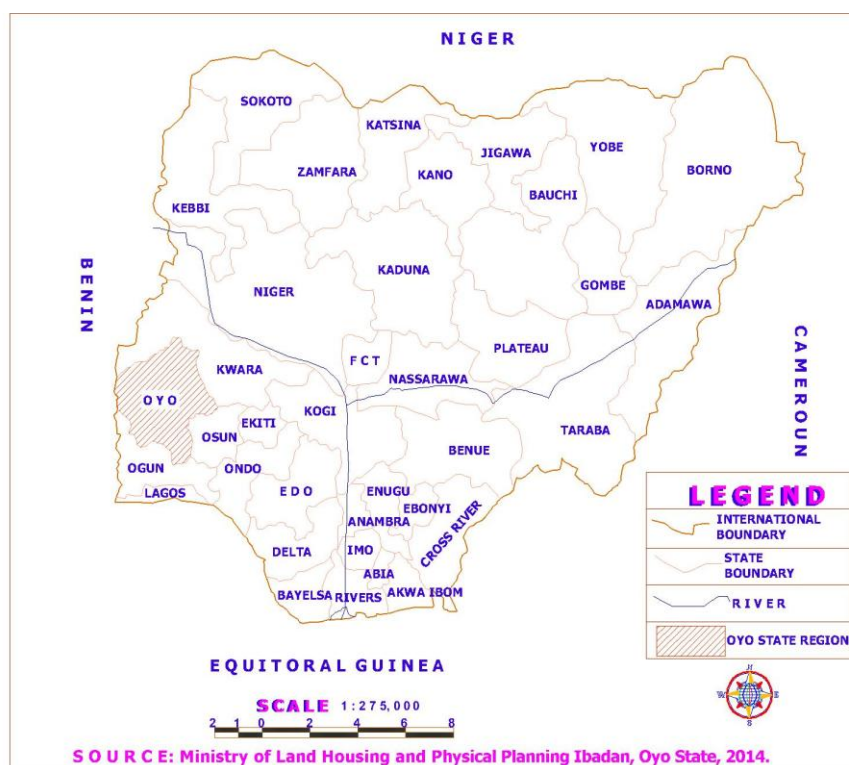


Figure 1: Oyo State Map in the National Context

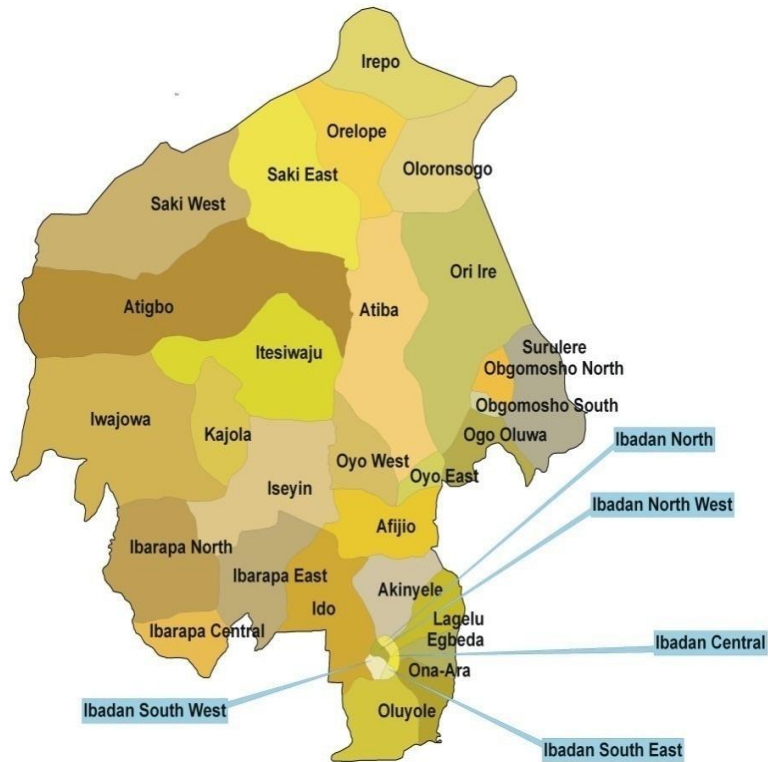


Figure 2: Map of Oyo state indicating the Local Governments

Source: Ministry of Land and Housing and Physical Planning Ibadan, Oyo State (2014)

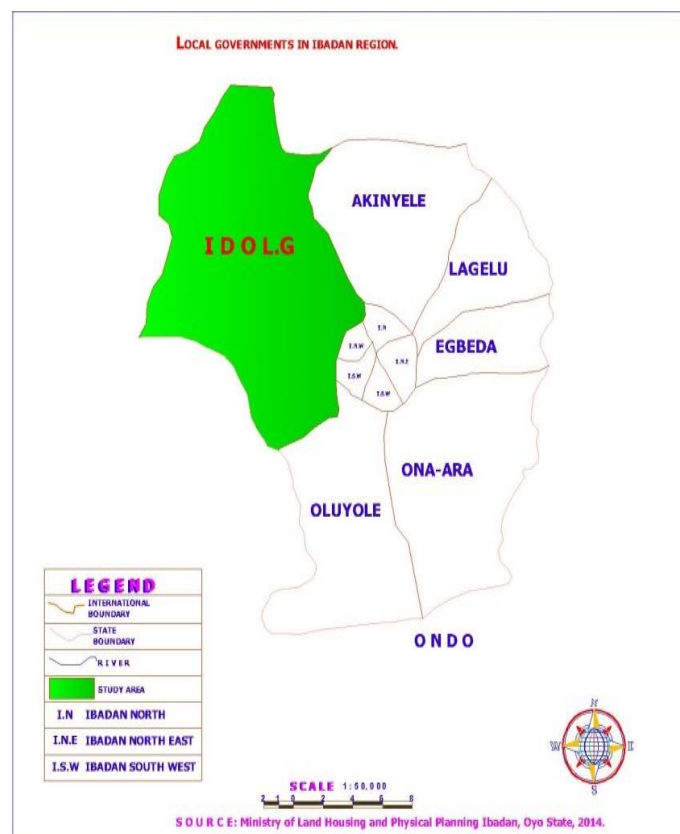


Figure 3: Ido in the Context of Local Governments in Ibadan.

Functional Assessment of Apete

This chapter considers the existing situation of Apete's flooding disaster and management in terms of the causes of flooding, consequences of flooding, measure of flood controls and household preparedness of flood management.

Causes of Flood in the Area

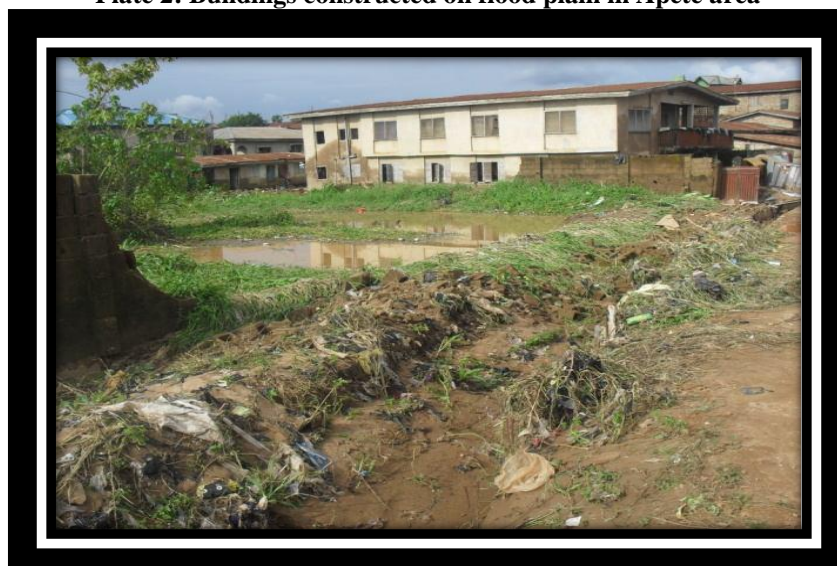
The causes of flood have been attributed to natural and anthropogenic factors. The work of Ologunorisa and Adejumo (2005) noted that the most important causes of floods are heavy, prolonged rainfalls and river overflows which are categorized under the natural cause of flood. Though, Douglas et al. (2009) opined that human action and inaction are the causes of flood. Olajuyigbe et al (2012) noted that, part of the man-induced causes of flood are construction on flood path, sudden Dam failure, inappropriate land use, inadequate drainage capacity, poor waste management practices of the inhabitants etc. (See plate 1, 2 and 3).

Plate 1: Refuse dumped inside water channel in Apete-Oja area



Source: Research field survey, 2014.

Plate 2: Buildings constructed on flood plain in Apete area



Source: Adapted from Ajayi et al (2012)

Plate 3: Poor drainage system in Apete-Oja



Source: Research field survey, 2014.

Natural Causes of Flood

Table 1 reveals the natural causes of flooding in the study area. 97.1% of the respondents attributed the cause of flood disaster to heavy rainfall, as most of the residents said that the magnitude of rainfall was high as also affirmed by the Nigerian Meteorological Agency (NIMET) who had predicted that there will be very heavy down pour and flooding in a number of states in Nigeria in 2012 where Oyo State, Ibadan was specifically mentioned as a city to experience flooding. International Institute of Tropical Agriculture (IITA) also reported that the rainfall on August 26, 2011 was most intense between 18.10 hr and 19.20 hr when 75% or 140.63 mm of the rain fell (Ajayi et al 2012). It can also be deduced that, change of Apete river course, arising from heavy rainfall is the main cause of flood in this area. 45.3% of the respondents affirmed yes that change in river course is also as contributing factor for this menace. Though (54.7%) of the respondents declined to this. It is however evident that majority of households along the study area attributed the cause of flooding to be heavy rainfall as a natural cause of flood.

Table 1: Natural causes of flood disaster

Serial number	Natural causes of flood	Frequency	Percentage
1.	Heavy Rainfall the source of flooding	Yes	No
		167	97.1
		5	2.9
		172	100.0
2.	Is change of River course the source of flooding		
		78	45.3
		94	54.7
		172	100.0

Source: Research field survey, 2014

Human Causes of Flood in the Area

The table 2 shows that the release of water specifically from Eleyele dam, arising from heavy rainfall is the main cause of flood in the study area. 55.8% of the respondents attributed the reason for this menace to this factor. Following such heavy falls in the past years, the reservoir level of Eleyele dam had been consistently high. Consequential to this development and in conformity with the operational rule of dams, it has become imperative to release water gradually in order to maintain a tolerable capacity level for the dam safety and by extension, safety of life and properties downstream. Although (44.2%) of the respondents said no.

With respect to narrow bridges as cause of flooding in the area, 77.9% of the respondents shifted the blame on the government stating the reason that the bridges constructed are too narrow in case there is overflow of river bank while 22.1% of the respondents disagreed on this.

Waste generation and management are challenges to both governments and urban dwellers, (Mabogunje, 1987, Oyebande, 2005 and Aderogba, 2010). Refuse and other wastes are usually dumped into available open spaces, including drainage channels and river plains. This practice has led to the blockage of drainage channels at various points. 94.8% and 89.5% of the respondents agreed that flooding is usually a product of illegal waste disposal and poor drainage system which have led to such blockages.

The cause of flood is further compounded by the fact that most buildings were built right within the immediate flood plain of the river. In general, a larger proportion (62.8%) of the households' respondents agreed that most buildings did not observed appropriate setback thereby shifting such blame on the planning authority for approving such buildings. It was also observed that buildings along the flood plain observed less than 30 meters setback to the river which is in contrast to what (Ajayi et al 2011) affirmed, that the mean distance of floodable land to rivers is over ninety meters as state by (Akintola 1994). A lesser percentage of respondents (41.3%) agreed that over population is one of the causes of flood in the area in relation to this, a larger percentage (58.7%) of the respondents disagreed with this factor. However, it was observed that the study area is not too populated and it can be deduced that people tend to move away from flood prone area in case there is going to be further occurrence.

Table 2: Human induced causes of flood disaster

Serial number	Human induced causes of flood	Frequency	Percentage
1.	Dam failure		
	Yes	96	55.8
	No	76	44.2
	Total	172	100.0
2.	Narrow Bridges		
	Yes	134	77.9
	No	38	22.1
	Total	172	100.0
3.	Illegal disposal of waste		
	Yes	163	94.8
	No	9	5.2
	Total	172	100.0
4.	Poor drainage system		
	Yes	154	89.5
	No	18	10.5
	Total	172	100.0
5.	Building within statutory set back		
	Yes	108	62.8
	No	64	37.2
	Total	172	100.0
6.	Overpopulation		
	Yes	71	41.3
	No	101	58.7
	Total	172	100.0

Source: Research field survey, 2014.

Effect of flood in the study areas

According to Adejuwon and Aina (2014) who affirmed that, Ibadan and other parts of the country have been affected by flooding resulting to flight of residents from their abode. It has claimed many lives, and millions of properties have been damaged and lost due to its occurrences. Flood in Ibadan is caused by both natural and human factors which has tremendous effects on the residents. Plate 4 and 5 revealed the effects of flood in the study areas.

Plate 4: A typical building on flood plain in Akere area



Source: Research field survey, 2014.

Plate 5: Effect of flood on a building in Morubo area



Source: Research field survey, 2014.

The Likert scale was used to ascertain the severity of the effect of flood. Level of severity in the effect of flood was classified into five, for the calculation of severity of flood index (SFI). The variables were used in ascertaining the level of severity of flood disaster. Each scale was rated using Likert as either “Very much severe”, “very severe”, “severe”, “fairly severe”, “not severe”.

- I. A weighted value (WV) is attached to the five different ratings which the respondents used in indicating how severe the effect of flood was on public and personal property, traffic flow, drainage channel, sewage spills, outbreak of diseases, agricultural land and loss of lives. The five attributes are;

Very much severe	5
Very severe	4
Severe	3
Fairly severe	2
Not severe	1
- II. To arrive at the severity of measures of flood control index (SFI) on each of the variables, the summation of the weighted value (SWV) calculated was divided by the total number of questionnaires administered on field survey.
- III. The SWV was calculated through the addition of the product of the numbers of response to each of the variables and the weight values attached to each rating, for example if “a, b, c, d, e” are the number of respondents that reactively expressed their level of satisfaction. i.e

$$SMV = (a \times 5) + (b \times 4) + (c \times 3) + (d \times 2) + (e \times 1)$$

$$a+b+c+d+e$$

IV. The mean of the SFI distribution was also computed. Furthermore, the deviation about the mean of each variable, the variance and the standard deviation of the distributions were also calculated to measure the scatter around the mean, that is, how large the observations fluctuate above it or how smaller the observation distributes below it. The coefficient of variation was calculated to measure the scatter in the data relative to the mean in percentages.

Severity of Effect of flood Index (SFI) in the Area

The severity of the effect of flood within the study area is shown in table 3; the highest mean is 3.94, while the least is 2.38. The average mean is 3.30. The range of SFI variables is 1.56. effect with high SFI include; disruption of public and personal property, disruption of traffic flow by flooding the road and destruction of agricultural land, with 3.94, 3.73, and 3.35, respectively. It could be deduced that the level of severity of effect indices listed above was higher than the mean value for the study area, which implies that the residents also perceive the effects to be severe in the area. However, there are some effects that residents do not think it severely affect the area. These include; causes of sewage spill, outbreak of diseases such as malaria especially where there is stagnant water, loss of lives and blockage of drainage with 3.25, 3.24, 3.22 and 2.38 respectively perhaps it falls below the mean value of 3.30. Though, it stands inappropriate to have the respondents saying blockage of drainage is less significant in the study area because it was obvious from the area as also observe in Plate 3.

SFI = Severity of Flood index

Mean (\bar{X}) = \sum (sum total of X ÷ number of effects)

$SD = \sqrt{\sum (X - \bar{X})^2}$

$\sigma^2 =$ Variance

$\sigma^2 = \sum (X - \bar{X}) \div N$

Table 3: Effect of flood disaster

Effect of flood	RATING					EWV	EWV ÷ TOTAL(X)	\bar{X}	X - \bar{X}	X - \bar{X}^2
	5	4	3	2	1					
disruption of public and personal property	47	85	28	6	6	677	3.94	3.30	0.64	0.4096
disruption of traffic flow	43	59	56	9	5	642	3.73	3.30	0.43	0.1849
blockage of drainage channel	2	66	32	17	7	411	2.38	3.30	-0.91	0.8281
causes of sewage spill	37	42	45	23	25	559	3.25	3.30	-0.05	0.0025
causes outbreak of diseases	34	41	46	34	17	557	3.24	3.30	-0.06	0.0036
destruction of agricultural land	29	53	53	24	13	577	3.35	3.30	0.05	0.0025
loss of lives	23	63	38	26	21	554	3.22	3.30	-0.08	0.0064
total							23.12			

Source: Research field survey, 2014.

*EWV = Effect Weighted Value

Measure of Flood Control in the study area

Disasters could, in fact, be reduced, if not prevented. Present advancements in science and technology, including early warning and forecasting of natural phenomena, together with innovative approaches and strategies for enhancing local capacities, the impact of natural hazards, somehow could be predicted and mitigated, its detrimental effects on populations reduced, and the communities adequately protected (Adejuwon and Aina, 2014).

An important question posed in the questionnaire was how the measure of flood control has been effective in the study area.

Likert scale was also used to ascertain the level of effectiveness on the measures of flood control. Level of effectiveness was classified into five, for the calculation of effective of flood control measures index (EFI). The variables were used in ascertaining the level of effectiveness of flood control measures. Each scale was rated using Likert as either “Very much effective”, “very effective”, “effective”, “fairly effective” and “not effective”.

- V. A weighted value (WV) is attached to the five different ratings which the respondents used in indicating how effective flood control measure was on demolition of building along flood plain, ensure functional drainage system, channelization of water bodies and ensuring proper disposal of refuse in the study area. The five attributes are;
- | | |
|---------------------|---|
| Very much effective | 5 |
| Very effective | 4 |
| Effective | 3 |
| Fairly effective | 2 |
| Not effective | 1 |
- VI. To arrive at the effectiveness of flood control index (EFI) on each of the variables, the summation of the weighted value (SWV) calculated was divided by the total number of questionnaires administered on field survey.
- VII. The SWV was calculated through the addition of the product of the numbers of response to each of the variables and the weight values attached to each rating, for example if “a, b, c, d, e” are the number of respondents that reactively expressed their level of satisfaction. i.e.
- $$SMV = (a \times 5) + (b \times 4) + (c \times 3) + (d \times 2) + (e \times 1)$$
- $$a + b + c + d + e$$
- VIII. The mean of the EFI distribution was also computed. Furthermore, the deviation about the mean of each variable, the variance and the standard deviation of the distributions were also calculated to measure of flood control that scatter around the mean, that is, how large the observations fluctuate above it or how smaller the observation distributes below it. The coefficient of variation was calculated to measure the scatter in the data relative to the mean in percentages.

Effectiveness of flood control Index (EFI) in the Area

The level of effectiveness of flood control within the study area is explained with Likert’s scale (See table 4). From the table it is reveals that the highest mean (\bar{X}) is 3.92, while the least is 2.64. The average mean is 3.36. The range of EFI variable is 1.28. The control measures with high positive deviation above the mean include ensuring proper waste disposal of waste (3.92) and ensuring functional drainage (3.68). It could be deduced that respondents believed that the households are trying their best in ensuring free flow of run-off water and that it is left for the government to demolish buildings along flood plain and channelization of water bodies in the study area.

Table 4: Effectiveness of flood control measures

Measure of flood control	RATING					MWV	MWV ÷ TOTAL(X)	\bar{X}	X - \bar{X}	X - \bar{X}^2
	5	4	3	2	1					
demolition of buildings along flood plain	27	58	41	16	30	552	3.21	3.36	-0.15	0.0225
ensuring functional drainage	41	61	54	8	6	633	3.68	3.36	0.32	0.1024
channelization of water bodies	34	56	58	9	15	451	2.62	3.36	-0.74	0.5476
ensuring proper disposal of refuse	57	65	35	9	6	674	3.92	3.36	0.56	0.3136
Total							13.43			0.9861

Source: Research field survey, 2014.

*MWV= MEASURE WEIGHTED VALUE

Effectiveness of Household's Preparedness

The work of Adejuwon and Aina, (2014) identifies various stakeholders who described preparedness; according to a principal officer of Oyo State emergency management agency, “preparedness refers to ability to anticipate a situation and making adequate plan either to **prevent** occurrence of phenomenon or to **curtail** or **mitigate** excesses of a phenomenon.” While the disaster risk coordinator of Nigerian Red Cross Society, Oyo State branch quipped that, “preparedness refers to a set of interrelated activities of a state in readiness to combat disaster.”

Likert scale was used to ascertain the effectiveness level of households’ on preparedness to flood disaster. Level of effectiveness was classified into five, for the calculation of effectiveness of households’ preparedness index (EHPI). The variables used in ascertaining the level of effectiveness on households’ preparedness to flood disaster. Each scale was rated using Likert as either “Very much effective”, “very effective”, “effective”, “fairly effective”, “not effective”.

- I. A weighted value (WV) is attached to the five different ratings which the respondents used in indicating how effective flood control measure was on demolition of building along flood plain, ensure functional drainage system, channelization of water bodies and ensuring proper disposal of refuse in the study area. The five attributes are;
 - Very much effective 5
 - Very effective 4
 - Effective 3
 - Fairly effective 2
 - Not effective 1
- II. To arrive at the effectiveness of flood control index (EFI) on each of the variables, the summation of the weighted value (SWV) calculated was divided by the total number of questionnaires administered on field survey.
- III. The SWV was calculated through the addition of the product of the numbers of response to each of the variables and the weight values attached to each rating, for example if “a, b, c, d, e” are the number of respondents that reactively expressed their level of satisfaction. i.e.

$$SMV = (a \times 5) + (b \times 4) + (c \times 3) + (d \times 2) + (e \times 1)$$

$$a + b + c + d + e$$
- IV. The mean of the EFI distribution was also computed. Furthermore, the deviation about the mean of each variable, the variance and the standard deviation of the distributions were also calculated to measure the scatter around the mean, that is, how large the observations fluctuate above it or how smaller the observation distributes below it. The coefficient of variation was calculated to measure the scatter in the data relative to the mean in percentages.

Effectiveness on Households’ Preparedness on Flood Disaster Index (EHPFI) in the Area

The level of effectiveness on households’ preparedness on flood disaster within the study area explained in table 5 using the Likert’s scale. The table reveals the highest mean (\bar{X}) is 3.65, while the least is 3.12. The average mean is 3.33. The range of EHPFI variable is 0.53. The households’ preparedness with high positive deviation above the mean include flood disaster campaign awareness of flood (3.65) and flood disaster use of concrete embankment (3.41). This finding indicates that some households in the community lacked confidence to rely on cooperative solutions or to depend on government for defensive strategies and actions. Another interesting finding was that the households’ most preferred option of flood disaster is campaign awareness on flood which seemed to be based on their perception that the impacts were severe and that campaign awareness was reliable because prior to the flood disaster they heard that there would be heavy down pour that year, but they didn’t take cognizance of the warning or probably were ignorant of what and how it might affect them.

This suggests that in reality, the households did appreciate the fact that sea level will rise once there is going to be heavy downpour. The effectiveness of households’ preparedness was assessed in minimizing the impacts of flood disasters. Majority of the respondents claimed that campaign awareness on flood disaster they deployed was very much effective or effective. Nevertheless, a few respondents mentioned that they had less effectiveness in their level of preparedness by using vehicle tyres for movement, use of concrete floor, use of sandbags and erecting of planks for movement of people.

Table 5: Effectiveness of household's preparedness

effectiveness of household's preparedness	RATING					EHPW V	EHPWV ÷ TOTAL(X)	\bar{X}	X - \bar{X}	X - \bar{X}^2
	5	4	3	2	1					
campaign awareness	48	43	60	14	7	627	3.65	3.33	0.32	0.1024
Use of vehicle tyres for movement	38	29	57	42	6	567	3.29	3.33	-0.04	0.0016
use of concrete embankment	39	30	73	23	7	587	3.41	3.33	0.08	0.0064
relocation of residents	35	34	63	32	8	572	3.33	3.33	0	0
Erection of planks for movement of people	36	20	64	43	8	546	3.17	3.33	-0.16	0.0256
use of sandbags	30	35	42	55	10	536	3.12	3.33	-0.21	0.0441
Total							19.97			0.1801

Source: Research field survey, 2014.

*EHPWV = Effectiveness Households’ Preparedness Weighted Value

Planning Approval for the buildings in the study area

Table 6 shows that, 90.7% of the households' respondents claimed that they have planning approval which is in relation to what Agbola et al (2012) affirmed that, 26,553 building within the approved statutory setbacks of rivers/stream in the eleven LGAs of metropolitan area of Ibadan in 2011 (Oyo State Government 2011) and yet, most of the property owners claimed they had approved building plans. However 8.1% of the respondents said no; reason being that the approval process is financially huge in which their income level could not cater for. 1.2% of the respondents are indecisive.

However, the larger percentage of the respondents might be assumed to give false information because they think government might take development control action on their buildings. Furthermore, their responses contradicted what was observed during reconnaissance survey, as most of the affected houses were built along flood plains or too close to river channel and some of them had erected fences around their buildings on the flood plains thereby changing the course or direction of the river, hence contributing to the rain water flowing into nearby homes.

There is no building with a valid planning approval that would be sited on the statutory setback as revealed in plate 6 and if probably an approval is given, that means it is either politically motivated or given on the basis of relationship that exist between the developer and the planning authority. This is actually in connection with what Agbola et al (2012), conceived that, monetary inducements, poverty, greed, inadequate awareness, and undue political influence were some of the reasons for the violations.

Table 6: Planning approval for the buildings

	Frequency	Percent
Yes	156	90.7
No	14	8.1
No response	2	1.2
Total	172	100.0

Source: Research field survey, 2014.

Plate 6 Building red-mark for none compliance to planning approval in Akere area



Source: Research field survey, 2014.

Method of Waste Disposal

Indiscriminate dumping of refuse and solid wastes is a major problem constituting blockage of river courses, stream channels and artificial drainage channels in Ibadan metropolis as noted by Ajayi et al (2012). This was observed in plate 1 and confirmed from table 7 when, 43.0% of the respondents indicated dumping of refuse around as method of waste disposal in the study areas (See plate 7), followed by 31.4% of the respondents who indicated that burning of refuse as method of waste disposal while a fewer percentage of 5.2% confessed that dumping of waste into surrounding gutter as their method of waste disposal. This could have been responsible for the 2011 flooding. However 19.8% of the respondents adopted the method of waste disposal through refuse agent or an apportioned waste disposal site which is an indication of their level of

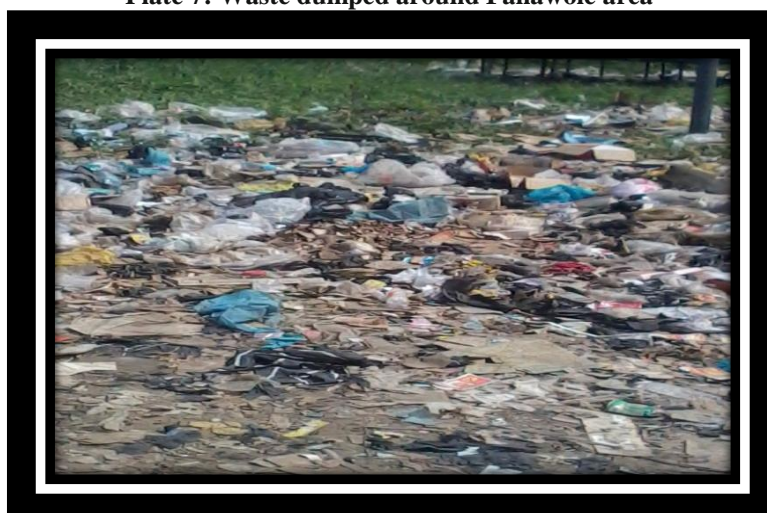
preparedness toward flood management. Hence, poor waste disposal practices are one of the greatest factors contributing to flooding (Oladele et al, 2014).

Table 7: Method of waste disposal

Method of waste disposal	Frequency	Percent
refuse agent/ refuse dispose site	34	19.8
refuse dump around	74	43.0
burning of refuse	54	31.4
surrounding gutter	9	5.2
none of the above	1	.6
Total	172	100.0

Source: Research field survey, 2014

Plate 7: Waste dumped around Fanawole area



Source: Research field survey, 2014

Coping Mechanism during Heavy Rainfall by Households in the study area

Table 8 shows that 38.4%, of the households’ respondents had to device means or coping measures such as clearing of drainage for easy flow of run-off water, followed by local clearing method (i.e. using spade to give way for run-off water in order to prevent their properties from being affected in the event of another flooding epoch) with 16.9%, although this has further contributed to the effect of flood, perhaps carrying out this method on flood plain has led to the diversion in the direction of flow of the river, thereby causing the flood to find its way into the nearby buildings. 5.8% of the residents preferred to relocate from the area while 10.5% of residents adopted the use of vehicles tyres for movement when there is heavy down pour (See plate 8). 8.1% of the residents erected planks for people’s movement as shown in plate 9, while 8.1% of the residents said they do pray that flood should not occur, they may probably based their assertions on the thought that flood is a natural disaster. Only very few of the households’ respondents gave helping hands to agencies when flood disaster occurred in August 26 2011. Other methods by which the households survive during the flood is by ensuring refuse is not dump inside drainage channel and use of sandbag to prevent surface run-off.

Table 8: Coping mechanism during heavy rainfall

	Frequency	Percent
No response	5	2.9
clearing of drainage for easy flow of run-off water	66	38.4
ensuring refuse is not dump in drainage channel	6	3.5
ensuring refuse is not dump on drainage channel	4	2.3
giving helping hand to agencies in case of emergency	3	1.7
Erecting planks for movement of people	14	8.1
Prayer	14	8.1
relocation from the area	10	5.8
Using of vehicle tyres for movement	18	10.5
local clearing method	29	16.9
use of sandbag	3	1.7
Total	172	100.0

Source: Research field survey, 2014. *Multiple responses

Plate 8: Vehicle tyres for easy movement of people in Morubo Area



Source: Research field survey, 2014.

Plate 9: Erected planks for easy movement



Source: Research field survey, 2014.

The measures used above have been effective for the households with 84.1% of the respondents affirming yes as shown in table 9. Perhaps heavy rainfall has not occurred compare to what was experienced in August 26 2011 as recorded by IITA that has 187.5mm rainfall. 11.9% of the households' respondents assumed that the measures adopted have not been effective giving complains that the government has turned a blind eye to the area and that they are financially incapacitated.

Table 9: Effectiveness of measure(s) adopted

	Frequency	Percent
No response	3	1.7
Yes	148	84.1
No	21	11.9
Total	172	100

Source: Research field survey, 2014.

Having analyzed the opinions of the respondents on how effective the measures they adopted, table 10 shows that (52.3%) of the respondents still believed government measures are most effective, if appropriate action is taken by the government in the weaknesses of the existing flood prevention system as well as the weaknesses of the various local planning agencies entrusted with the responsibilities of managing disaster risks. Moreover, (25%) of the respondents affirmed that households' measures are also effective because they tend not to be ignorant of the physical and environmental conditions of their different residential neighborhoods, particularly concerning flood risk potential, followed by (20.3%) of the respondents who believed that community measures are also effective, which can also be regarded as the cooperation within the residential neighborhoods as a way of mitigating flood, through campaign awareness and monthly development meeting whereby salient issues pertaining to their environment will be discussed. Private measures were given little consideration with (1.7%) reason being that most private base activities are profit oriented.

Table 10: Effective flood control measure

	Frequency	Percent
government measures	90	52.3
community measures	35	20.3
household measures	44	25.6
private measures	3	1.7
Total	172	100.0

Source: Research field survey, 2014. .

Preparedness and Plans Considered by the Households

Preparedness of households and the community in natural disaster occurrence is considered of utmost importance for disaster risk management. When asked about how households can get prepared for flood disaster, table 11 shows that (27.9%) of the respondents positively indicated that through flood awareness campaign they get prepared. Finally, (29.1%) of the respondents gave the opinion of ensuring proper waste disposal in order not to get the drainage silted up with waste.

Table 11: Preparedness and plans considered by the household(s)

	Frequency	Percent
No response	5	2.9
clearing of refuse from the drainage channel	30	17.4
first aid provision in case of emergence	4	2.3
flood awareness campaign	48	27.9
government's help	1	.6
not to build on flood plain	11	6.4
participation in environmental sanitation	20	11.6
proper waste disposal	50	29.1
proper waste management	1	.6
use of concrete floor	2	1.2
Total	172	100.0

Source: Research field survey, 2014.

*Multiple responses

Government and Households Measures

Ologunorisa and Adejumo (2005) observed that flood control needed the cooperative agreement between government and local communities, and an enlightenment program through environmental education and mass media that could be largely accomplished through radio broadcast. In order to ameliorate the effect of flood events, there should be proper provision of refuse dump site and campaign as advocated for in the table 12 which shows that 36.4% of respondents, closely followed by 35.2% agitated for provision of good road and functional drainage system from the government which should adequately involve public participation in the study area. The State government, in collaboration with the local governments and households, should ensure proper waste management, effective environmental sanitation and discouraging inappropriate land use in or near floodplains, as inappropriate land use is often in the study.

Table 12: Government and households measures

	Frequency	Percent
channelization of river course	9	5.1
ensuring effective environmental sanitation	6	3.4
no to build on the flood plain	1	.6
proper waste management	30	17.0
provision of good road and functional drainage	62	35.2
provision of refuse site and campaign awareness	64	36.4
Total	172	100.0

Source: Research field survey, 2014.

*Multiple responses

Probability of Flood Occurrence in the Study Area

It can be deduced from the table 13 that the respondents are quite sure that flooding could subsequently occur, as seen from the view of 56.4% who attested positively, and this is obviously due to the fact that the causes of flood in the area has not been dealt with particularly the anthropogenic causes of flood disaster.

Table 13: Probability of flood occurrence

	Frequency	Percent
Yes	97	56.4
No	75	43.6
Total	172	100.0

Source: Research field survey, 2014.

Table 14 reveals the reason why 36.4% of the households' respondents are of the opinion that flooding could occur again, because there have not been solution that is good enough to address the problem of flood in the area. The other reason being that heavy rainfall can still occur (18.8%). In fact, the river channel and drainage are small and not well linked together coupled with the fact that government has not been helping matters. Although, (26.1%) of the households' respondents claimed to have synergized actions by actively participating in the monthly environmental sanitation thereby ensuring refuse are burn at whenever it is been disposed off.

Table 14: Reason for flood occurrence

	Frequency	Percent
heavy rainfall can still occur	33	18.8
no good solution for last flood	64	36.4
people have synergized actions in curtailing it	46	26.1
refuse is properly managed	3	1.7
that is my prayer	26	14.8
Total	172	100.0

Source: Research field survey, 2014.

Effects of Unchecked Flooding

Aderogba (2012) opined that floods in the cities and towns are becoming common phenomenon whereas it is not a welcome scene because of its destructive and devastating effects. As observed in the study area that if care is not taken, Houses will get submerged, collapsed and washed away, if flood disaster is not given an appropriate check. Landscape will get destroyed, road network will get damaged, kiosks, culverts and

bridges will be washed away as shown in plate 10 leading to the inability of people to go about their daily activities, including school children, motorists, and traders etc. As evident in the table 15 where (57.0%) of the households' respondents are so much concerned about their property particularly their buildings, 15.1% of the respondents stated that landscape might be destroyed while 14.5% opined that road network might get damaged.

Table 15: Effects of flood when unchecked appropriately

	Frequency	Percent
collapse of buildings	98	57.0
disease outbreak	17	9.9
damage of road network	25	14.5
destruction of landscape	26	15.1
dilapidation of physical infrastructure	6	3.5
Total	172	100.0

Source: Research field survey, 2014.

Plate 10: Stranded school girl wading through flood water in fear to her place of abode,



Source: Adapted from Aderogba (2012)

Table 16 reveals the main reason why residents think that flood disaster could occur again. Within the study 38.4% believed that no corrective measures have been put in place and previous causes of flood have not been given appropriate attention. No doubt that, Ajayi et al (2012), opined that flood disaster would not be averted naturally, their impacts and severity will increase in the future if corrective steps are not taken. Also the other reasons given by 33.7% and 27.3% of the respondents are; the previous causes of flood haven't being given attention and that government has abandoned the area by not taking necessary actions so as to provide a lasting solution to flood disaster in the area.

Table 16: Reason for effects of flood disaster

	Frequency	Percent
no corrective measure has been taken	66	38.4
government has abandoned the area	47	27.3
the previous causes of flood haven't being given attention	58	33.7
others specify	1	.6
Total	172	100.0

Source: Research field survey, 2014

Table 17 reveals the Pearson correlation coefficient (r) is 0.480 with a p-value of 0.000. This implies that there is moderate relationship between the effects of flood disaster and households' preparedness on flood management in the study area. For p-value of 0.000 which is less than 0.05 confidence level, findings revealed that there is significant correlation between the effects of flood disaster and households' preparedness on flood management in the study. This study hereby rejects the null hypothesis. This further explains that all hands must be on deck in order to forestall a high level of households' preparedness in the study area.

Table 17: Pearson Product Moment Correlation on the effects of flood disaster and household level of preparedness on flood management in the study area

		Effects of flood disaster	Households' preparedness
Effects	Pearson Correlation	1	.480**
	Sig. (2-tailed)		.000
	N	172	172
preparedness	Pearson Correlation	.480**	1
	Sig. (2-tailed)	.000	
	N	172	172

Source: Research field survey, 2014

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

VI. Summary of Findings, Recommendation and Conclusion

This section summarizes flood incidence in Apete which poses a serious threat not only to the livelihoods and lives of the residents, but also pertaining to the environment and economy of the area. The problem lies within the households' ability to deal with this flood and the effects thereof. The ability of the households to implement preparedness and mitigation for flood disaster is very important and therefore it must be taken into consideration. In order to evaluate households' preparedness, individual interviews as an approach in qualitative method, were utilized to determine the capacity of households and further detect the causes and effects of flood reduction gaps in the households. The summary of findings is listed below, followed by recommendations and conclusion.

Findings

The socio-economic characteristics of the respondents show that larger percentages of the household respondents (69.2%) are learned (possessing tertiary education). This will perhaps inform their level of preparedness on flood disaster and could as well be prevented if households are educated on its causes, effects, as well as applying mitigating measures that could prevent reoccurring flood in the area. However, it was observed that majority of self-employed and students (40.1%) earn between #5000 -15000 this could have consequently affected their level of preparedness on flood management in the study area.

A significant proportion of the respondents attributed the major cause of the flood in the study area to heavy rainfall (97.1%), as most of the residents said that the magnitude of the rainfall was high. Furthermore, human causes of flood disaster such as improper refuse disposal into available open spaces, including drainage channels and river plains. This practice has led to the blockage of the drainage channels at various points. 94.8% and 89.5% of the households' respondents agreed that flooding is usually a product illegal disposal of waste and poor drainage system respectively.

Investigation showed that 56.4% of the respondents are certain that flooding could occur again, and this is obviously due to the fact that the causes of flooding in the area have not been dealt with, particularly the human causes of flooding.

The effect of flooding in the study area is highly severe which has caused disruption of public and personal properties, disruption of traffic flow and destruction of agricultural lands within the area.

Majority of the households uphold the control measures of flood which include; proper waste disposal and ensuring functional drainage. It could therefore be deduced that households are trying their best in ensuring free flow of run-off water and that it is left for the government to demolish buildings along flood plain and channelization of water bodies in the study area, in order to enhance effective control measures. However, Lager percentage of the respondents still believed Government measures will be most effective, if appropriate actions are taken by the government in the weaknesses of the existing flood management system as well as the weaknesses of the various local planning agencies entrusted with the responsibilities of managing disaster risks.

This finding indicates that some households in the community lacked confidence to rely on cooperative solutions or to depend on government for defensive strategies and actions.

When asked about how households can get prepare for flood disaster, the respondents indicated that flood awareness campaign (27.9%) and proper waste disposal (29.1%) were plans considered.

Another interesting finding was that the households most preferred option of flood management is campaign awareness on flooding and this seems to be based on their perceptions that, the impacts were severe and that campaign awareness was reliable, because prior to the flood disaster they heard that rain would be much and heavy before the previous flood disaster but they didn't take cognizance of the warning or probably were ignorant of how it might affect them. Majority of the respondents claimed that the campaign awareness on flood disaster they deployed were very much effective or effective in early rainy season.

Nevertheless, a few respondents attested that they had less effectiveness in their level of preparedness on flood disaster use of plank (serving as walkway), use of concrete embankment, use of sandbags (serving as

walkway and prevention of erosion) and use of vehicle tyres (serving as walkway). Although, some households' respondents in study area have had to device means or coping measures such as clearing of drainage for easy flow of run-off water, followed by local method channelization (by using spade to give way for run-off water in order to prevent their properties from being affected in the event of another flooding epoch), although this has further contributed to flood disaster, perhaps carrying out this method on flood plain might lead to the diversion in the direction of flow of the river, thereby causing the flood to find its way into nearby buildings.

The result of Pearson correlation coefficient (r) is 0.480 with a p -value of 0.000. This implies that there is moderate relationship between the effects of flood disaster and households' preparedness on flood management in the study. For p -value of 0.000 which is less than 0.05 confidence level, findings revealed that there is significant relationship between the effects of flood disaster and households' preparedness on flood management in the study.

Recommendations

From all what have been discussed in this research work, this study has established that there is moderate correlation between the effects of flood disaster and households' preparedness on flood management in the study area. It is therefore, becomes imperative to identify how to conservatively improve households' preparedness on flood management in the study area and to make it innovative and responsive to modern trend and ensure sustainable environment for the residents in the area as well as enhance the ability of the residents to be capable of standing the test of time in ensuring sustainable development and to be able to meet the Millennium Development Goals (MDGs). In view of this, well-argued recommendations are suggested in accordance with the challenges that were encountered in the area.

Improving households' resilience: this might include employment opportunity, access to credit facilities, provision of emergency tools such as first aid equipment in the communities and community development programmes in sensitizing the residents on the causes, effects of flood disaster and how to get prepared for flood disaster. Government must pay attention to local people and engage in public awareness such as educational campaigns about disasters, public consultation through relevant structures such as civic organization, and through media coverage, particularly topics that are related to flood hazards affecting the entire community.

The use of technology will also enhance resilience and assist in preparedness. As a matter of urgency, government should embark on a comprehensive cadastral survey of all lands prone to flood, to determine their quantity, use desirability for various purposes, using the Geographical Information System (GIS) approach. Flood plain areas should be listed and registered to ensure the security of lives and properties and also to boost internally generated revenue. It is only when the quantity and quality of floodplain are known, that it could be classified for various uses such as; agricultural use, recreational use, wildlife and ecosystem conservation and other policies applied to them. There is a need to invigorate planning machinery and land management activity in the study area to incorporate and integrate all land use control and management agencies in the study area and to introduce measures that will guarantee effective and efficient land management in the area. Thus, land use control mechanism and department should be improved by employing more qualified people, workshops and conferences must be provided to disaster management officials to capacitate their knowledge in new found challenges and solutions.

It is very crucial to conduct Environmental Impact Analysis (EIA) prior to any development and set up mitigating measures for any project that is perceived to cause environment hazard. Structures which are already located in the floodplains should be engineered to withstand flood forces and designed with elevated floors to reduce damage by flood disaster.

Government should review the gazetted setback for Major Rivers and Streams in Oyo State as against the 1980 gazetted setback in accordance with international standard, because the rate of development as of that time cannot be compare to what is observable in contemporary times. More so, climate change is a vital element to be into consideration. The problem of improper waste management must be solved to eliminate this cause of flooding. The government should make provision for adequate disposal facilities within the study area. Monthly environmental sanitation should be enforced and sustained as also recommended by Aderogba (2012), that the exercise may be observed at more regular intervals to rid homes and work environments.

Government should step up rehabilitation activities that would ensure major roads, access roads and drainage channels across the study area are free of encumbrances and serviceable. The government must therefore embark on dredging and re-dredging of river channel and stream. The government should provide alternative routes to communities prone to flooding, especially for those with only one access road linking them with nearby communities.

In response to flood disaster, households in study area must imbibe the habit of planting trees, shrubs, and other plants that will reduce soil erosion and natural exposure of the earth surface to direct sunlight and heavy down pour in order to increase it water-retaining capacity.

From the foregoing there is need for more research to provide better understanding of the required preparedness which could positively influence households' preparedness as to developed globally effective measures to limit the growing chance and consequence of flooding thereby mitigating disaster in future occurrence.

Conclusions

Households' preparedness to flood disasters varies in scope and magnitude depending on the effects of events and on the vulnerability of the households to flood disasters. The findings indicate that some households in the community lacked confidence to rely on cooperative solutions or to depend on government for defensive strategies and actions as tested from the research hypothesis that there is moderate relationship between the effects of flood disaster in the study area and households' level of preparedness on flood management. Hence, a more effective pro-active planning approach involving the affected households and the community is necessary to improve their understanding of the situation and to enable them to make informed decisions. Overall, the findings highlight a strong need for capacity building within government agencies on environment, planning agencies, and local communities.

In conclusion, physical planners, policy makers, communities and households should know that natural disasters such as flooding has destructive power; it could be very sudden or occasional. For the cities and towns, and Nigeria generally to achieve the goal of improving flood management and accelerate development for sustainable growth and development of the cities, towns and the nation at large, effort must be redoubled to scale-up flood management, climate change mitigation and preparedness initiatives.

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