

## **ASSESSING THE ROLES OF TOWN PLANNERS IN DISASTER AND RISK MANAGEMENT OF CLIMATE CHANGE IN BIRNIN KEBBI, NIGERIA**

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### **ABSTRACT**

*This paper is a study on the role of the Town planners in Disaster and risk management of climate change. The aim is to study the participatory functions of town planners in disaster and risk management of climate change. The aims are to; evaluate the involvement of town planners in risk management of climate change; identify factors are undermining town planner's activities in risk management of climate change, and, to undertake spatial analyses of disaster occurrence on buildings within the regions. In this study, primary and secondary data were utilized. Questionnaires were administered for data aggregation. The study employed descriptive statistics based on the ranking of the mean score and the use of ArcGIS for its analyses. The study identified three most significant roles of town planners in disaster and risk management and also three factors undermining the town planning profession in the area. The study also identified Old town area, Rafin Atiku, Nassarawa, Nassarawa II; Go slow and Military barrack as areas with high incidence of disaster occurrence on buildings. The study is recommended to help the government to identify disaster prone areas and their status according to their order of importance.*

### **INTRODUCTION**

Over the years, planning of towns and cities had been a continuous practice, particularly as it connects to the growing populations. Urbanization in the urban centers had further affected the accessibility to land. In fact, most buildings were converted two-story buildings, and at the same time, attachment of commercial shops forms the basis of the encroachment of the residential buildings. This increase in the population further creates slum and squatter settlements in our environment, characterized by the unauthorized building development, deficiency of drainage, the absence of refuse dump, and unkempt surroundings, and so on.

The UNDP (2010) described Cities as the economic drivers within their countries and the kernel of intellectual, political, commercial enterprise and fiscal activities. These functions make an immense potential for influencing improvements in risk management. UNDP (2004) defines disaster a disturbance of the performance of a residential area with widespread human, material or environmental losses which exceed the ability of the affected company to manage using only its resource. According to Ammann (2012), cities face increasing risks of impacts from large-scale disasters. The hazard in urban areas is a compounding of two factors: first, location and exposure to risks; and second, increased vulnerability due to the poor local organization, environmental degradation, and the overstretching of resources (UNDP, 2010). The risk is as a phenomenon which occurs and likely to cause damage and losses in human lives and which can

be avoided or reduced if human activities like the arbitrary urbanization and environmental pollution are checked (Zelloum, 2009). Disasters often occur because risk reduction steps have not been taken or undertaken, despite their former knowledge of existing risks and threats (Bosher, 2014).

At that place is a widespread expansion of urban centers to accommodate the rapid population increase, combined with inappropriate land-use planning and failure of urban authorities to regulate construction standards, contribute to the vulnerability of urban populations. The UNDP (2010) asserts that disasters induced by urbanization increase the vulnerability of people and economic assets to hazards and produce novel patterns of risk, coupled with extreme natural hazards, result in risk accumulation.

Migration patterns and tendencies are associated with the disaster, whether natural or human-made from the surroundings. According to Naik, A. et al. (2007), migration occur in response to both sudden and slow onset environmental events exhibited under varied characteristics which can be organized according to the following spectrum: voluntary – forced; temporary – permanent; internal – international; vulnerability – resilience. The town planners cannot be differentiated from the efficient and effective functions the cities perform and at the same time the risks created by the cities.

In this sense, Patton and Reed (1988), described urban and regional planning as a discipline and profession “that is concerned with the forces that influence the quality of life of the neighborhood in the region, nation and land using a systematic and creative access to address and resolve social, physical, and economic problem of the neighborhoods, cities, suburbs, metropolitan areas, and more significant regions. This paper, therefore, looks at the appraisal of the roles of town planners in disaster and risk management of climate change in Birnin Kebbi, Nigeria.

## **STATEMENT OF THE PROBLEM**

Granting to the World Bank (2010), although the negative portrait of migration can foster policies that seek to reduce and hold in its incidence and cause little to address the demands of those who migrate, when migration may be the sole choice for those borne on by climate hazards. Indeed, policies designed to restrict migration rarely succeed, often self-defeating, and increase the costs to migrants and communities of origin-destination. Examples of inadequate living conditions of poor populations such as poor health, inadequate nutrition, poverty, illiteracy and lack of sanitation on deficient sanitation-contribute a lasting menace to their physical and psychological security and create “everyday risks” which results in small-scale disasters on an on-going basis (UNDP, 2010).

International Organization for Migration (1992) together with the Refugee Policy Group published a report on “Migration and environment” in which it is stated: “Large numbers of people are moving as a termination of environmental degradation that has increased dramatically in recent years. The act of such migrants could move up substantially as larger countries of the earth become uninhabitable as a consequence of climate change.”(IOM, 1992). According to

IOM (2008), All regions are likely to go through some adverse effects of climate alteration, but less developed regions are especially vulnerable because a significant part of their economy depends on climate-sensitive sectors and their adaptive capacity is down due to depressed levels of human, financial and natural resources, as well as limited institutional and technical capacity.

### **AIM AND OBJECTIVES OF THE STUDY**

This paper aims to study the participatory roles of town planners in disaster and risk management of climate change to assess the functions and make useful recommendations.

The objectives are to:

- i) Assess the involvement of town planners in disaster and risk management of climate change
- ii) Identify factors undermining town planners in the catastrophe and risk management of climate change and lastly,
- iii) Undertake spatial analyses of disaster occurrence on buildings within the neighborhood.

### **THE STUDY AREA**

Birnin kebbi is the state capital of Kebbi State. It is situated in the North-western geopolitical zone of Nigeria. In 1991, the estimated population of 150,520 (National Population Commission, 1991). In 2006, the city had an estimated population of 268,620 (National Population Commission, 2006). Birnin Kebbi projected population for 2015 is 339,480

Birnin kebbi is made up of the ethnic groups. The ethnic group includes Hausa, Fulani, Dakarkari, Kambarawa, Gungawa and a handful of Zabarmawa within the metropolis. The metropolis is likewise characterized by few Yorubas and Igbos who also dwelled in it. Islam is the predominant religion practiced in the area with few Christians living in the area. Birnin Kebbi is connected to Argungu by road in the northeast, to Bunza at the south-west, to Jega at the south-east.

Birnin Kebbi has an average maximum temperature ranging over a rainy season of 120days throughout the year. This period is of significant advantages to agricultural productivity in the field and the farming of fishes. Birnin kebbiis situated on a stony field. The ground condition is sandy with large texture, which is freely drained. The flora of the area is typical of a Sudan savanna, which is a scrub savanna of lone Acacia trees and shrubs with grasses. It encourages continuous farming practices. In that place are few palm trees producing coconuts cultivated in the Sokoto/Rima Fadama. Guava, mango, orange and some papaya are the most common fruits grown.

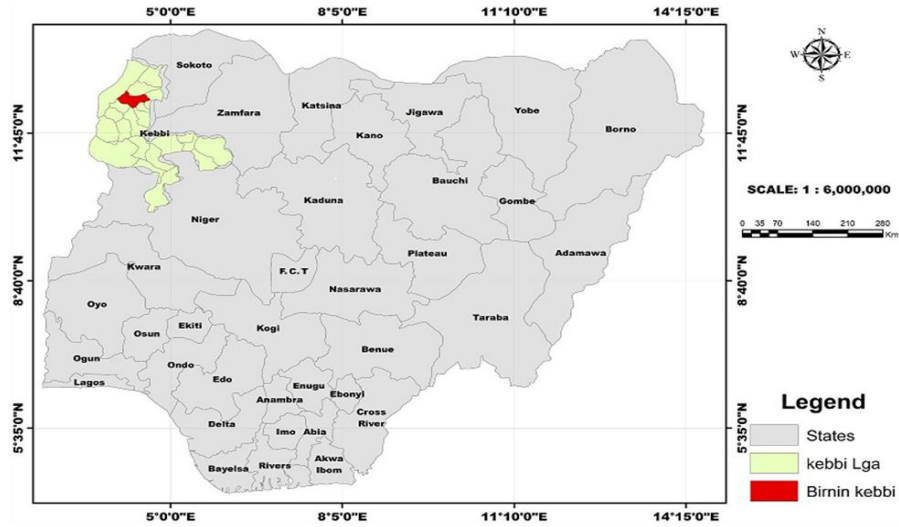


Figure 1. Kebbi state in National Context

Source: Department of Urban and regional planning, Waziri Umaru Federal Polytechnic, Birnin kebbi, kebbi state.

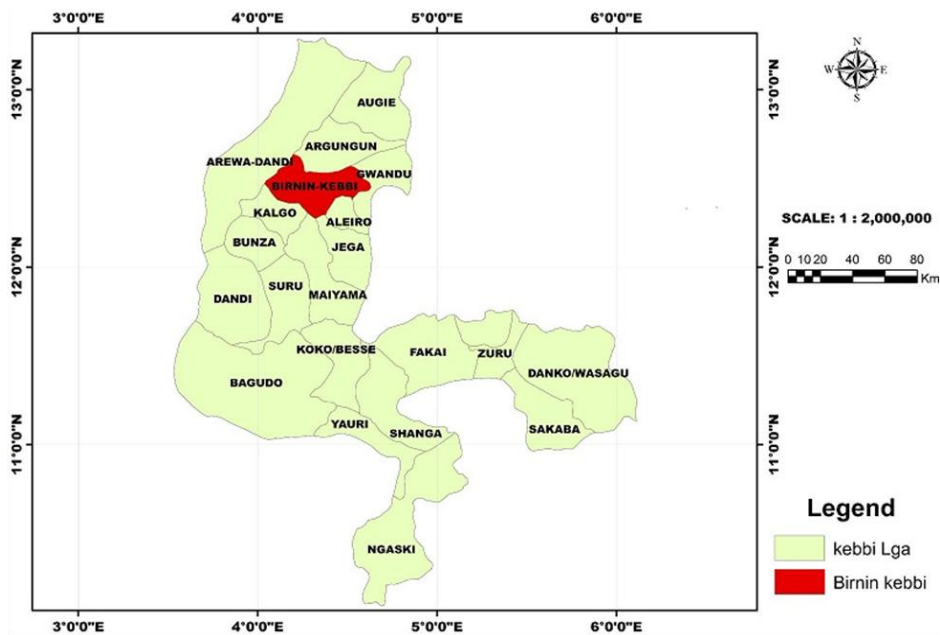


Figure 2. Birnin kebbi Local Government Area in State context

Source: Department of Urban and regional planning, Waziri Umaru Federal Polytechnic, Birnin kebbi, kebbi state.

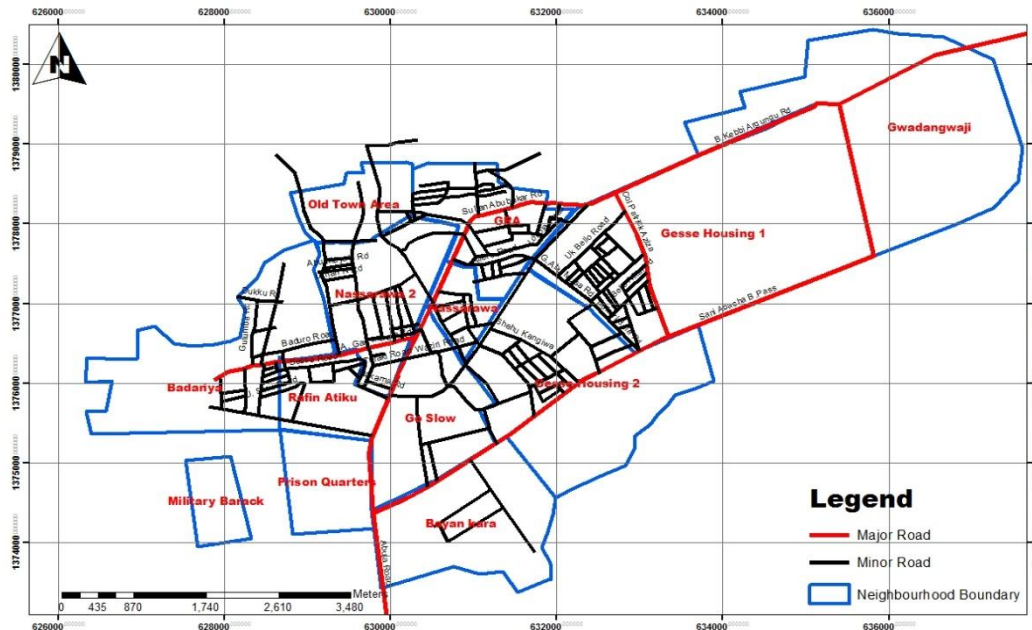


Figure 3. Birnin kebbi within the context of its neighborhoods

Source: Department of Urban and regional planning, Waziri Umaru Federal Polytechnic, Birnin Kebbi, Kebbi state.

## **THE CONCEPT OF DISASTER AND RISK MANAGEMENT**

According to UNDP (2004), Disaster is a consequent disruption of the functioning of a society with widespread human, material or environmental losses which exceed the ability of the affected community to cope using only its blessed resource. Wahab, B., Atebije N. And Yunusa, I (2013) observed that disaster happens when natural events and standard human bodily functions are affected by significant and sudden adverse events that have detrimental impacts on human lives, property, and the environment.

Disaster impacts may include loss of life, injury, disease and other effects on human, physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disturbance and environmental degradation (UNISDR, 2007b). Disasters often occur because risk reduction steps have not been taken or undertaken, despite their former knowledge of existing risks and threats (Bosher, 2014).

UNISDR (2012) described disaster as a catastrophic disruption to the operation of a company with widespread human, materials, or environmental losses which exceed the ability of the affected community to manage using only its resources. Also, the risk is described as the combination of the probability of an event and its harmful effects.

Zelloum (2009) asserts “Risk is as a phenomenon which occurs and likely to make various damage and losses in human lives and which can be avoided or reduced if human activities like the arbitrary urbanization and environmental pollution are kept away. According to Zelloum (2009), the risk is characterized by the magnitude, volume, and frequency return point. The danger is an inert and natural phenomenon, neither good.

Disaster management is a procedure which requires the coordination and consolidation of all activities necessary to build maintain and improve the capability (of people) for disaster prevention, mitigation, readiness, response and recovery (Khan et al. 2008). Disaster risk management is the systematic process of using administrative, organizational and operational skills and magnitude to implement strategies, policies and improved coping magnitude to lessen the adverse impact of hazards and the possibilities of disasters (UNISDR, 2012). In general, the risk is valued as a compounding of the probability of an event and its effects.

According to Carter et al. (2007), in a climate change impacts, adaptation and vulnerability (CCIAV) context, risk management can let in:

- A scoping exercise to identify the overall approach to be habituated;
- Risk identification to find the emplacement of the risk, what and who is in jeopardy, climate-related and non-climate-related stresses contributing to the hazard, and points of acceptable risk, as considerably as the scenarios needed for further appraisal;
- Risk analysis, with a scope of methods employed in mainstream risk assessment and CCIAV assessment; the assessment of climate change impacts, adaptation, and vulnerability (CCIAV) involves a diversity of accesses that can provide a conceptual and methodological foundation for assessing the environment–migration nexus. Conceptually, such assessments include ideas of vulnerability, adaptation, adaptive capacity, thresholds and criteria of risk, and coping ranges that are transferable to migration– environment studies.
- Risk evaluation for the prioritization of different adaptation and mitigation measures;
- Risk treatment, whereby the adaptation and mitigation measures selected from the process above are applied and monitored and progress reviewed.

Wahab, B., Atebije N. and Yunusa, I (2013) identified few examples of Disaster induced by Climate change as follows;

1. Oil spills in the Niger Delta
2. Pipeline vandalization in western Nigeria part of the country
3. Building collapse in Lagos
4. Desertification/Drought in the North
5. Loss of community land due to erosion in the South East
6. Windstorm in the North
7. Floods in some part of the country
8. Atmospheric pollution and water pollution in the urban and rural areas
9. Power or telecommunication outage due to thunderstorms or Tornadoes
10. Road accidents due to the impact of climate change on road design
11. Epidemics and diseases
12. Fire outbreak, due to the ignition and overheating of electrical

### **The Contribution of Urban and Regional Planning in Disaster and Risk Management**

Alan and Jorge (2013) observed that the Intergovernmental Panel on Climate Change (IPCC) 2012 report acknowledges the importance of urban planning being integrated with risk reduction practices (p. 460), but developing ways of achieving this integration remain challenging.

The role of urban planners relates to the outlook for the environment. The persuasion of the term “Physical Planning” is by Keeble (1969). He defined physical planning as an activity concerned with the spatial ordering of land use.

Roberts (1974) observes planning as making choices among the options that appear open for the future and then securing the implementation, which depends on the allocation of the necessary resources. Urban and regional planning, thus help in decision making to avert and control possible consequences such as non-conformity of land used, unapproved structures, regional imbalance, and regional inequality among others. While urban planning encompasses a range of action modes and the development of knowledge or intelligence sets, its underlying attention to *spatial* relationships, between physical, social, economic and ecological systems provides a potentially powerful base for disaster risk reduction (Alan and Jorge, 2013).

Burby and Beatley et al. (1999) pinpoint the power of land use planning to deal with disasters, particularly regarding ways that social and organizational aspects are pulled out into planning approaches. According to Alan and Jorge (2013), land use planning can reduce losses by (1) “affecting both the location and the design of urban development” and by (2) “helping create a knowledgeable constituency of citizens who support hazard mitigation programs.”

### **Physical planning measures and Tools used In Disaster and Risk Management**

Planning for disaster risk reduction typically takes place before a disaster, at the mitigation or preparation and prevention phase, but planners also have a role in post-disaster recovery and reconstruction (Donovan 2013). Planners have three main areas through which they may reduce hazard risk or reduce vulnerability to risk. These are the zoning of current, and future land uses development controls and building codes are applied as appropriate and its structures, urban infrastructure and settlement design, and information and mapping. These activities primarily take place within the jurisdiction of local governments which experience the constraints of resources and capacity. Local governments also inherit the legacy of past planning decisions which usually were not concerned with disaster risk reduction (King et al. 2013).

According to Kotter (2003), it is necessary to use the instruments of spatial planning contributing to the prevention of the risks and mitigating the effects of natural disasters. In the context of catastrophes spatial planning and land management have to support the following essential functions as described by Kotter (2003):

- *Early warning system*: Spatial planning needs a detailed database, to get sound information about the spatial development. In practice monitoring systems have to be extended systematically to inform about nature and environmental risks. The efficient data acquisition needs measurement methods that have to be investigated and implemented.

- *Risk assessment and mapping:* Prevention of disasters need comprehensive information and data about the reasons and effects of hazards. Therefore a systematic framework for the assessment and mapping of disasters is needed. Geological and hydrological information, such as thematic hazard maps, has a very high potential for reducing fatality rates and losses due to natural disasters.
- *Prevention and reduction:* Spatial planning has to analyze interrelations between the spatial influences and the environmental disasters. On base on that, new models of spatial development have to be discussed, improved and established.
- *Risk Management:* In the case of environmental disasters specific infrastructure (evacuation routes and spaces) and a database are needed to realize the emergency plan and risk management.
- *Reconstruction:* Spatial planning has to provide innovative models for regional development, which don't limit themselves to the status quo. Not only the damages have to be eliminated, but also the future prevention of disasters has to be taken into account with priority.

### **Relationship between Climate change and Disaster**

Climate change had been told not to displace people directly but produces environmental effects that move people because it exacerbates current vulnerabilities that make it difficult for people to survive where they are. According to King et al. (2013), two processes require an engagement of land-use planners in disaster risk reduction; an increase in population and migration to the cities and coastal settlements that places more significant numbers of people at risk and Climate change that is predicted to increase the severity and frequency of climate generated natural hazards.

According to International Organization for migration, Climate change is expected to make the world hotter, rainfall more intense, and result in more extreme weather events such as droughts, storms, and floods. These changes, in turn, will likely result in further population movements. According to the UN International Strategy for Disaster Reduction (UNISDR) – storms, floods, and droughts – have increased threefold over the past 30 years. In relation to the migration effects from climate change induced disaster, Shurke (1993) pointed out that the research literature on environmental migration has tended to fall into two broad categories; (i) work done by “minimalists” who suggest that the environment is only a contextual factor in migration decisions; and (ii) work done by “maximalists” who claim that the environment directly causes people to be forced to move.

In 1992 IOM together with the Refugee Policy Group published a report on “Migration and environment” in which it is stated: “Large numbers of people are moving as a result of environmental degradation that has increased dramatically in recent years. The number of such migrants could rise substantially as larger areas of the earth become uninhabitable as a result of climate change.”(IOM, 1992).According to International Organization for Migration (IOM, 2009); climate change could affect the movement of people in at least four different ways: the



intensification of natural disasters; increased warming and drought that affects agricultural production and access to clean water; rising sea levels make coastal areas uninhabitable and increase the number of sinking island states. (44% of the world's population live within 150 kilometers of the coast); and competition over natural resources may lead to conflict and in turn displacement.

## **METHODOLOGY**

This study employed both primary and secondary data. The primary data made use of questionnaires within the study area. The secondary data used include the use of relevant literature such as Journals, textbooks, and maps. The estimated population of Birnin kebbi is 339,480. In Birnin kebbi, there are thirteen neighborhoods identified in the entire land area. They are namely Gesse housing estate 1, Gesse housing estate II, Gwawangwaji, Badariya, Bayan Kara, Prison quarters, Government reserve area, Military barrack, Rafin Atiku, Nassarawa, Old town area, Go slow, and Nassarawa 2. 30 questionnaires each was administered to the various neighborhoods and these add up to a total number of 390 questionnaires within the study area administered in the neighborhoods to identify the building conditions in each neighborhood and the administration of 20 questionnaires to the registered members of the Nigerian Institute of Town planning/Town Planning Registration Council named the Kebbi state study group, to identify the roles of town planners and factors undermining their function in disaster and risk management. The data were analyzed using mean values of the descriptive statistics, and on that basis, ranking correlation was employed on the identified roles and factors. The analyses also employed the use of Arc GIS in assessing the level of disaster occurrence on buildings within the neighborhoods.

## RESULTS AND DISCUSSION OF FINDING

**Table 1: the roles of town planners in disaster and risk management**

<b>ROLES OF TOWN PLANNERS</b>	<b>Mean score</b>	<b>Ranking</b>
1. Town planners are directly responsible for planning resilient city	1.55	11th
2. Town planners are involved in disaster and risk management of climate change	2.10	1st
3. Town planner have regular programme of awareness that updates their profession	1.75	4th
4. Town planners go for annual training and equipping to handle environmental issues	1.30	14th
5. Town planners provide research and dissemination of information to handle climate change	1.50	12th
6. Town planners are recognized for the provision of infrastructure in the city	1.70	7th
7. Illegal or unapproved plans are future disaster for the nation	1.75	4th
8. Town planners functions aid provision of a safer city	1.90	2nd
9. Building plans are useful instruments for disaster and risk management	1.75	4th
10. Layout plans are useful tools used in disaster and risk management	1.85	3rd
11. Master plans are useful tools used in disaster and risk management	1.70	7th
12. Town planning education will avert possible disaster occurrence in our environment	1.65	9th
13. Town planners promote community development that aids sustainable development	1.60	10th
14. Town planners employ Geographical Information system in disaster-prone areas	1.30	14th
15. Town planners help in disaster and risk management through zoning	1.45	13th

Source: Kebbi NITP/TOPREC Study Group Survey, 2016

Table 1 presents the roles of town planners in disaster and risk management. The average scores of the members of the study group help to weight these rules in accordance with their importance, and then ranking assessment carried out. Table 1 identified the first ranking to be Town planners are involved in disaster and risk management of climate change. The second is for the factors undermining town planners' functions, and the third-ranking is that Layout plans are useful tools employed in disaster and hazard management.

**Table 2: factors undermining town planning profession in disaster and risk management**

<b>FACTORS UNDERMINING TOWN PLANNERS</b>	<b>Mean score</b>	<b>Ranking</b>
1. Inadequate funding	1.85	6th
2. Lack of base-map and location plans	1.75	
3. Political interference in planning matters	1.85	6th
4. Inadequate planning tools and convenient operating environment		
5. Absence of adequate population data	1.75	10th
6. Poor planning, implementation, and enforcement	1.85	6th
7. Lack of operational infrastructure	2.10	5th
8. Government inconsistencies in policy preparation	1.80	9th
9. A change in regime/political party which thus results in project abandonment	2.30	1st
10. Town planners violation of the codes and conduct of their profession	2.15	4th
11. The town planning profession lacks public involvement and participation of the masses	2.30	1st
	2.30	1st

Source: Kebbi NITP/TOPREC Study Group Survey, 2016

Table 2 reflects the factors undermining town planners in disaster and risk management. The presentation of the kebbi NITP/TOPREC study group identified factors of Town planners' violation of the codes and conduct of their profession. The town planning profession lacks public involvement and participation of the people, and Government inconsistencies in policy preparation, with a mark of 2.30 as the first-three factor undermining the town planning profession. Adjacent to this score is Change in regime/political party which thus result in project abandonment accounting for a tight score of 2.15 followed by poor plan implementation and enforcement which account for 2.10.



**Table 3: occurrence of disaster on building in the neighborhood**

<b>Neighborhood</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
Gesse housing estate I	6	20	4
Gesse housing estate II	4	22	4
Gwadangwaji	6	19	5
Badariya	2	24	4
Bayan kara	9	3	18
Prison quarters	5	3	22
Government reserve area	3	8	19
Military barrack	20	4	6
Rafin Atiku	19	3	8
Nassarawa	19	5	6
Old town area	16	8	6
Nassarawa 2	16	6	8
Go slow	16	8	6
<b>TOTAL (%)</b>	<b>141(36.15)</b>	<b>133(34.10)</b>	<b>116(29.74)</b>

Source: Field survey, 2017

Table 3 described the occurrence of disaster on buildings inside the neighborhood using cross tabulation. 36.15% of the respondents concurred that the occurrence of disaster on building in the neighborhood is high, 34.10% of the respondents concurred that the occurrence of disaster on building in the neighborhood is moderate while 29.74% of the respondents reflect the occurrence of disaster on building in the neighborhood to be depressed. This means that the occurrence of disaster on buildings is high. The figure below is the neighborhood mapping of the incidences as shown in table 3.



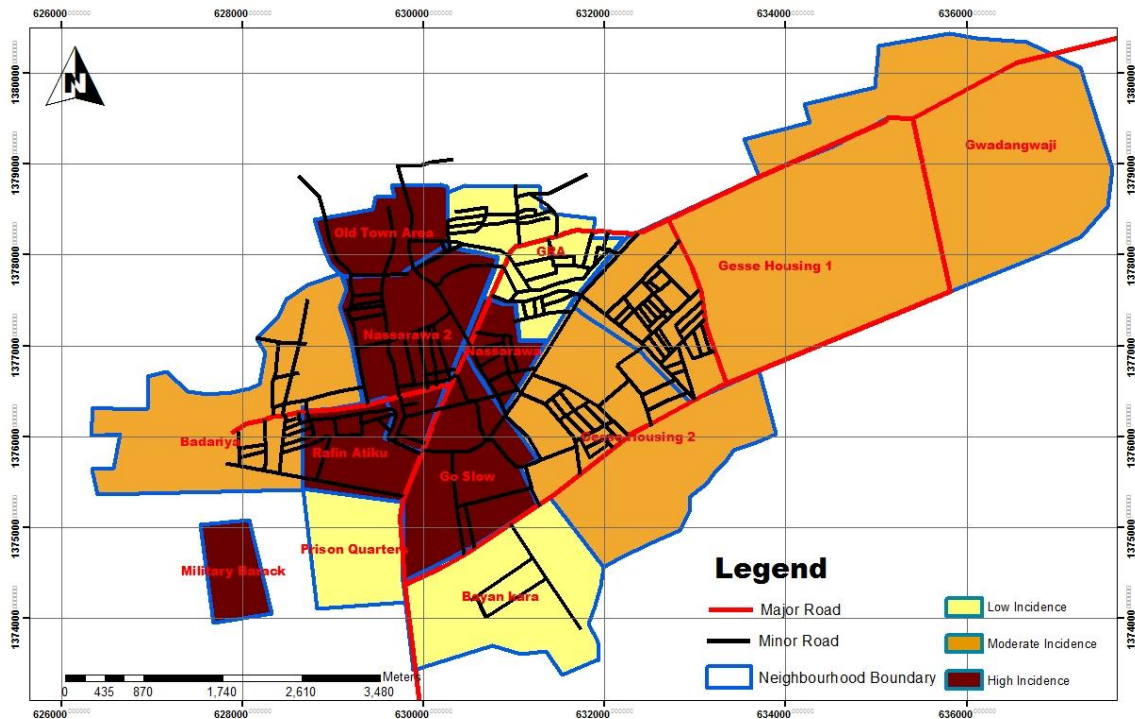


Figure 4: spatial analyses of disaster occurring in buildings using the Arc GIS  
Source: Spatial analysis using ArcGIS on field survey, 2016.

Figure 4 shows the assessment of a disaster occurring in buildings. The neighborhoods with a low incidence of the disaster occurring in buildings are Government reserve area, Bayan Kara and Prison quarters. The moderate incidence of the disaster occurring in buildings can be seen in Gwawangwaji, Gesse housing I, Gesse housing II and Badariya while the neighborhoods with high incidence of the disaster occurring in buildings are Old town area, Rafin Atiku, Nassarawa, Nassarawa 2, Go slow and Military barrack.

**CONCLUSION AND RECOMMENDATIONS**

The survey discovered that 36.15% of the respondents concurred that the occurrence of disaster on building in the neighborhood is high, 34.10% of the respondents concurred that the occurrence of a disaster on building in the neighborhood is moderate while 29.74% of the respondents reflect the occurrence of the disaster on building in the neighborhood to be the lowest in the survey region. The study identified Old town area, Rafin Atiku, Nassarawa, Nassarawa 2; Go slow, and military barrack has areas that call for emergency care regarding the building bringing about the high incidence of a disaster occurring in the buildings. It can be inferred that “Town planners usefulness in disaster and risk management of climate change, Town planners’ functions aid provision of a safer city and the layout plans are useful tools employed in disaster and risk management” are the three most significant functions of town planners in disaster and hazard management. The survey disclosed that “Town planners’ violation in the codes and conduct of their profession, Town planning profession lacks public



involvement and participation of the people a Change in regime/political party which thus result in project abandonment and poor plan implementation and enforcement are the three most important factors undermining the town planning profession.

The study is recommended to all stakeholders in the field of disaster and risk management. It will likewise assist the government and policymakers to identify disaster-prone regions and their condition according to their order of importance. Identified gaps for further research are the assessment of the town planning tools in disaster and risk management of climate change; effectiveness of town planning profession in vulnerability and adaptation to climate change; and urban planning and migration induced from climate change might be further explored.

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