IDENTIFYING HAZARD RISK FACTORS AND ASSESSMENT OF THE LEVEL OF AWARENESS OF THE POPULACE OF KPAKUNGU AREA OF MINNA, NIGER STATE, NIGERIA

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***Abstract**: Hazard identification is an essential aspect of disaster management, which has the cardinal objective of ensuring that potential problems are identified and control measures are taken. In attempting to analyze disaster risks, data on hazard are used to estimate the likely exposure of people, infrastructure and economic activities. The aim of the research was to identify disaster hazard factors in Kpakungu area in Minna, Niger State, Nigeria. Specifically, the study examined factors contributing to the occurrence of hazards and assessed the level of hazard awareness possessed by residents, and how it is related to socio-economic status of residents. Structured questionnaire containing multiple choice questions were used to collect the research data. A total of 393 questionnaires were randomly distributed in five sub areas of Kpakungu; 352 questionnaires were filled and returned. Frequency-percentage technique and Pearson product-moment correlation analysis were adopted for data analysis. The research findings showed that 59.19% of the sample identified hazards in Kpakungu to include fire disaster, land pollution, flooding, building collapse and erosion. About 79.3% of the respondents had not engaged in any form of hazard identification within the study area. The study concluded that the link between the socio-economic status of residents (represented by age, occupation, educational attainment and income) and the level of hazard awareness was discovered to be very weak (between 3.1% and 14.75%). This study recommended the adoption of preemptive actions suggested by the residents including; the mounting of a hazard awareness campaign, stricter enforcement of building regulations, and embargoing selling of petrol outside service stations.*

***Keywords:** Disaster Management, Hazard identification, hazard awareness, Hazard/Risk assessment, Community Based Participation*

1. INTRODUCTION

Risk reduction begins with hazard identification and assessment including early warning. The need to reduce disaster in our environment equally calls for risk identification Alexander (2017). However, the practice of hazard identification is limited in Africa, while Kvocka *et al.* (2016) argues that, the main task of risk identification is to assemble the necessary data on hazard exposure, vulnerability and integrate it with appropriate methods to arrive at scientifically grounded explanation of the risk and potential consequent losses. He further emphasizes that the quality and quantity of available risk identification products on material and local scales is an indicator of risk assessment capacity and that the relatively recent trend towards risk management as an alternative to disaster management has advanced at different rates from one country or context to the next. Hazard identification is an essential aspect of disaster management. The cardinal objective of hazard identification is the fact that potential problems are identified and control measures are taken. Many advanced countries have embraced risk identification procedures in curtailing the magnitude of disasters that eventually occurred.

In a similar vein Osti (2017), reported that risk identification was acknowledged as essential for reducing disaster losses at January 2005 World Conference on Disaster Reduction (International Strategy for Disaster Reduction (ISDR), 2005). The two main elements that give rise to risk are the hazards-the potential damaging events or phenomenon, and the vulnerability of populations to these hazards. Natural hazards by themselves do not cause disasters; it is the combination of an exposed, vulnerable and ill-prepared population or community with a hazard event that results in a disaster. Human activity, such as land use changes, environmental exploitation and unplanned settlement, often exacerbates the level of disaster risk (Majaliwa *et al.*, 2018).

Disaster risk identification is highly essential in order to avert disaster or prevent the post disaster impact on lives and properties. Vital information is needed for disaster risk identification (Bradley *et al.,* 2014). Valuable information on hazard can be obtained from data on historical losses. Internationally, the most comprehensive publicly accessible data base on global disaster losses is EM-DAT contains one entry per disaster, with data on the date, location, types of hazards, numbers of people killed and affected, and the information source. Awareness on disaster management is highly necessary and cogent, the knowledge or information of what to do when disaster strikes is very important and necessary. Awareness has been identified as one of most important attributes that will lead to preventive measures against disasters (Apronti *et al.*, 2015). Massive awareness is generally required by the populace to reduce the incidence of disaster in our environment. The need to be conscious of the risk factor is cardinal. Assessment of awareness level of the people will serve as a spring board for other initiatives to be built upon. According to Mochizuki *et al.* (2014), the nexus between disaster awareness and the occurrence of disaster is an interesting one that depicts a direct relationship. Attempting to reduce disaster implies increasing the level or extent of awareness of the group and the country in general. Globally, environmentalist and disaster managers are unanimous in clamoring for massive awareness as a way of curbing disaster in the world.

1.1 Definition of Terms

According to GFDRR (2014), **hazard** is defined as the probability of experiencing a certain intensity of hazard (eg. Earthquake, cyclone etc) at a specific location and is usually determined by an historical or user-defined scenario, probabilistic hazard assessment, or other method. Some hazard modules can include secondary perils (such as soil liquefaction or fires caused by earthquakes, or storm surge associated with a cyclone).

Vulnerability accounts for the susceptibility to damage of the assets exposed to the forces generated by the hazard (GFDRR, 2014).

Hazard identification is part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm. The term often used to describe the full process is risk assessment. Identify hazards and risk factors that have the potential to cause harm (Canadian Centre for Occupational Health & Safety, 2018).

Disaster risk is therefore considered as the combination of the severity and frequency of a hazard, the numbers of people and assets exposed to the hazard, and their vulnerability to damage (UNISDR, 2015).

Risk assessment is a systematic process for describing and quantifying the risks associated with hazardous substances, processes, actions, or events (Rout and Sikdar, 2017).

1.2 Statement of the problem

Kpakungu area of Minna municipal is characterized by many unplanned and haphazard development and attitude that calls for great concern in order to halt the potential danger in the area. Disasters in terms of fire outbreak, flooding, building collapse; wind-storm and erosion are on the increase in Kpakungu area. It is a fundamental fact that Kpakungu is fast developing, but the unfortunate thing is that, the development is not in tune with global best practices. Reckless and unplanned constructions are carried out without regards to rules and regulations. The ugly trend of development in Kpakungu is frustrating and alarming. Kpakungu has been turned into a slum settlement. Absence of a well-defined drainage system in Kpakungu area calls for great concern. The frequent and constant flash flooding experienced in Kpakungu is a serious indication of more flooding to occur. Some of the houses in Kpakungu are built on water ways or lands that are vulnerable to flooding. Fire Disaster is a common disaster peculiar to Kpakungu and this is attributable to the nature of development and attitude of the inhabitants. Awareness is a veritable tool for fighting disaster. Sequel to this, there is a great need to inform and educate the inhabitants of Kpakungu and its environs. Well-informed educated individual/communities will deal with disaster better than someone who is not abreast with the issue of disaster.

1.3 Aim and Objectives

The aim of the research is to identify disaster hazard factors and to assess the level of awareness of the populace in Kpakungu area in Minna, Niger State. The specific objectives of the research are outlined below:

1. To identify the existing hazards in Kpakungu area of Minna
2. To examine the factors contributing to the occurrence of hazards in Kpakungu area.
3. To assess the level of awareness possessed by residents of Kpakungu on the existing disaster hazard.
4. To examine the relationship between socio-economic status of residents and level of hazard awareness
5. To make recommendations for disaster risk reduction in Kpakungu area.

1.4 Justification

The need to provide an enabling framework for proper identification of hazard or risk factors is paramount and essential. This research work will provide vital and cogent data or information essential for effective disaster management and prevention. Identified hazards are going to be essential reference point for disaster managers in order to make proper projection or simulation. The research work will provide a baseline for future planning and environmental modeling, simulation and for making early warning systems. Kpakungu stands to benefit immensely because, all abnormalities identified will be addressed by disaster management planners and environmental managers, and the outcome of the research will be useful to government. The project will also provide basis for future work. A similar project carried out in Kpakungu about ten (10) years ago was limited in terms of objective of the study. The previous project focused on population density on the environment. Time factor also constrained the project work and part of the recommendation was that further studies should be carried-out. The inability of the project to x-ray the awareness level of the resident calls for a great concern and this research will work assiduously toward finding out the awareness level and how it will affect other phenomena.

2. LITERATURE REVIEW

2.1 Hazard Identification

Alexander (2017) stated that hazards identification is critical in reducing flood disaster in China. The objective and aim of hazard identification is to reduce the occurrence of disasters in our society. Most of the people that suffered tremendously as a result of floods in China lived in buildings constructed along water ways or flood plains, which are all flood prone areas. This increased their vulnerability to flood. In a similar study of floods in China, Osti (2017) was of the opinion that good management entails identification of sites at greatest risk, raising community awareness of the risk, and implementing early warning systems. Also, it is an essential step in reducing disaster and could also assist in developing a framework for mitigating measures. In attempting to solve the problem of flooding in China, hazard identification was employed. Areas highly vulnerable and prone to floods were identified; mapping of identified areas was then carried out with the view to proffering mitigating measures. It is necessary and essential to have an inventory of the hazards in our environment, as this will assist countries to put in place effective hazard identification measures in order to avert or reduce the impact of disaster in terms or extent of damage, loss of lives and properties, as reiterated and emphasized by PreventionWeb (2015). This view was also supported by Ismail-Zadeh and Cutter (2015), when they expressed the need for all countries to put in place effective mechanism for hazard identification in order to reduce the rate and scale of disaster.

2.2 Hazard Awareness and Management

According to Ismail-Zadeh and Cutter (2015) hazard awareness is cardinal and crucial for prevention of disaster in our communities; hazard awareness is a critical and veritable for fighting disaster in our communities. Awareness is capable of educating the populace on the need to desist from acts that would facilitate disaster. Aghaei *et al.* (2018), expressed the need for government to make effective use of campaign strategies to inform and educate the masses with respect to disaster management. Bradley *et al.* (2014) explained the nexus between awareness and occurrence of disaster as a critical issue. He stated that disasters are more common and frequent in societies and communities that are less aware or educated on the issue of hazards. It is a good virtue for individuals and communities to be abreast with global environmental issues like hazard and disaster. Hazard awareness and subsequent management is a new concept that has the ability to reduce disaster in all countries. It is when people are aware that they can be more cautious and careful about disaster. Hazard identification can only be possible if people are aware of the nature and existence of the hazards. The need to educate the populace on the issue of disaster is essential (Apronti *et al.*, 2015) enunciated the need for the populace to be well educated, inform and abreast with global best practices is very important.

2.3 Relevance of Hazard Identification

Kvocka *et al.* (2016) states that hazard identification is a critical and crucial measure for monitoring and reducing the rate and extent of disaster in the society. Proper and appropriate hazard identification is a good step in checking the abnormalities and irregularities that abounds in the environment. Hazard identification has been successfully used to monitor and reduce drastically the incidence of flooding in some part of china. Environmentalist has suggested the use of hazard identification and assessment to identify the potential dangers inherent in any particular environment. The need to integrate hazard identification and assessment into disaster management is very important and should be taken seriously (Zhi-Yong *et al.*, 2013).

Teutsch (2012) indicated the need to streamline disaster management technique and process in such a way that hazards are cautiousness and meticulously identified and appropriately dealt with at the right time. The nexus between occurrence of disaster and presence of predisposing factors is relevant because, if the hazards are identified, measures would be taken to forestall the manifestation of such disasters (Muis *et al.*, 2015). Effective identification of hazards is a major component of disaster management, proactive measures are crucial to preventing disasters and that is aim and objective of hazard identification and assessment.

2.4 Hazard identification and Community Based Participation

The local communities are at vantage position to evaluate the impact of hazards because of the fact that some of these hazards affect them directly, the chances that the facts and figures that the local communities will give will be valid and authentic. Some of these experts are only involved in emergency management of disaster. The local people are closer to these hazards because it's their domain and they seem to understand the areas that are at risks of any disaster (Eiser *et al.*, 2012). Identifying hazards and the vulnerable people or areas is a fundamental step in evaluation of hazards, most of these local people are already conversant and familiar with the areas that have high vulnerability, so for them, identifying such areas is easy. In China, communities liable or vulnerable to floods do register their names with government agency and with the cooperation of both parties mitigating or preventive measures are worked out with the local people to avert or reduce the consequences of the hazards of disasters. Local communities are not only essential in hazard identification and assessment but a necessity if the desired success in disaster management is to be achieved. Efforts by government to integrate local communities in disaster management is yielding serious success in developed countries.

The concept of local community participation in disaster management in terms of hazard identification and assessment is also gaining ground in African countries, for example, in South Africa, all communities have been directed to form community disaster management committee, this directive was given when the government realized the immense role played by the local communities in averting the flood that destroyed many farmlands in Soweto region of the country. The relevance of local community participation have been acknowledged and appreciated in South Africa to such an extent that government is seeing them as great stakeholders in the concept of disaster management. The role of local communities in hazard identification and assessment is central to the goal and objective of the ethics of identification and evaluation, the real and actual identification and evaluation can only be valid and accurate if the local individuals and the community at large are directly or indirectly involved. Gossman (2015), established the fact that community participation is key to effective disaster management and emphasized the need for communities to participate in one way or the other in disaster management, he also identified different types of participation that may be available.eg passive, active, nominal, functional and dormant participation.

3. RESEARCH METHODOLOGY

This section examines the different types of data used, the data collection instruments, the sample size and procedure, and finally, the data analysis techniques used in analyzing the data collected.

3.1 Data types, sources and instruments for data collection

Wide range of data is necessary and essential for effective examination of the problem peculiar to Kpakungu. Based on this, both primary and secondary data sources of data were

employed. Questionnaire and personal interview are instruments used to obtain primary data bothering on hazards awareness and measures of prevention. Government information as contained in official publications as well as data on standard hazard identification and assessment which were collected from journals, projects and other related documents served as secondary sources of data.

3.2 Field Survey

A reconnaissance survey of the study area was done in order to ascertain the real problems peculiar to the area. This survey provided a framework for identifying hazards in the area. Vital and useful information or data were derived from the survey. For example, it was discovered that there are no standard drainage system in the whole study area, waste disposal is carried out indiscriminately and houses are constructed haphazardly thereby increasing their vulnerability to hazards.

3. 3 Sample size

The sample size was determined using the technique employed by the National Population Commission for sampling households in Nigeria. A household is considered to be made up of 6.7 persons, and the population of any locality can be divided by this figure in order to derive the number of households (Tunde, 2011). In the case of the study area, the relevant computation is given below, bearing in mind that the population of Kpakungu is 26,340 based on the 2006 National Population Census.

Number of households in the study area= Population of Kpakungu=26,340=3,931.34
Average size of household 6.7

The study population was thus estimated to be 3,931.3 households. A sample size of 10% of the population was decided. A total of 393 structured questionnaires were randomly distributed to the respondents in the five sub areas of Kpakungu. Out of this number, 352 questionnaires were filled and returned.

3.4 Data Analysis

A frequency- percentage technique was adopted as one of the techniques for data analysis. The analysis of frequency of responses is one of the first techniques used for analyzing research data that was collected through the use of questionnaire. The frequency-percentage technique is relatively easy to present, analyze and interpret. For the purpose of objective number 4, the Pearson product-moment correlation analysis was run in order to determine the relationship that existed between socio-economic status and the level of hazard awareness of respondents.

4. RESULTS AND DISCUSSION

This section presents results obtained from the questionnaires distributed to respondents. Descriptive and inferential analysis was carried out on the information collected through the administration of the questionnaires.

4.1 Identification of Existing Hazards in Kpakungu

The existing hazards in the study area were identified through a series of questions that the respondents were asked. The result of the analysis of these responses is presented as Table 1 About 59.19% of the sample was able to identify hazards in their environment, while 40.81% were not able to identify hazards. Respondents are more easily able to identify fire outbreaks,

building collapses or windstorms as hazards. Flooding and land/water pollution were the hazards that respondents were least able to identify.

Table 1: Hazards Identification by Respondents in Kpakungu Area of Minna

Hazard	Aware		Not aware	
	Number	Percentage (%)	Number	Percentage (%)
Flooding	184	8.71	168	7.95
Wind-storm	216	10.23	136	6.44
Fire outbreak	243	11.51	109	5.16
Building collapse	229	10.84	123	5.82
Erosion	195	9.23	157	7.43
Land & Water pollution	183	8.66	169	8.00
Total	**1250**	**59.19**	**862**	**40.81**

Source: Authors Field Survey, 2011.

4.2 Factors Contributing to the Occurrence of Hazards in Kpakungu Area

The fieldwork in this section was to test the researcher's opinion that factors that contribute to the occurrence of hazard in general include weak commitment by government to improvement of the environment, poor sanitation habits of inhabitants, slow pace of change of entrenched negative attitudes, and low level of awareness. About 79.3% of the respondents had not engaged in any form of hazard identification. Such poor involvement in hazard identification could serve as one of the factors that contribute to the occurrence of hazards. By way of example, involvement in hazard identification might take the form of meetings called by ward heads to brainstorm on potential hazards that could confront the locality. This would also serve to sensitize the residents to the existence of hazards in their locality.

4.3 Assessment of Level of Awareness of Potential and Existing Hazards

From Table 2 majority of respondents (58.8%) were aware of potential and existing hazards in their environment, 18.70% claimed to be unaware of any hazards in the study area, while 22% were undecided.

Table 2: Level of Awareness of Hazard by Respondents in Kpakungu Area of Minna

Awareness Level	Number of respondents	Percentage (%)
Highly unaware	6	1.7
Slightly unaware	60	17.0
Undecided	79	22.4
Slightly aware	119	33.8
Highly aware	88	25.0
Total	352	100

Source: Authors Field survey, 2011.

Given the fact that 41.1% of the respondents in Table 2 claimed to be unaware of or undecided about hazards in the study area, Table 3 shows the different ways suggested by the respondents to increase hazard awareness in the area. Some respondents (32.6%) suggested that seminars could be organized as a way of increasing hazard awareness, 28.9% suggested that announcements intended to sensitize residents about hazards in their environment should be made in the prevalent local language(s). A further 38.4% recommended that the services of disaster management experts should be obtained as a way of increasing hazard awareness while 18.2% suggested that religious leaders could be employed in disseminating hazard awareness information.

Table 3: Suggested Ways of Increasing Hazard Awareness by Respondents in Kpakungu Area of Minna

Options	Frequency	Percentage
Seminars could be organized	53	32.6
Announcement made in the prevalent local language(s)	78	28.9
Obtain services of disaster management experts	104	38.4
Community leaders employed in disseminating hazard awareness information	53	15.1
Religious leaders employed in disseminating hazard awareness information	64	18.2
Total	**352**	**100**

Source: Authors Field survey, 2011.

4.4 Relationship between Socio-Economic Status of Respondents and Level of Hazard Awareness in Kpakungu

Cross tabulations as well as correlation analysis using Spearman's Rank Correlation were carried out to examine the relationship between the level of awareness of respondents and their socio-economic status, using indicators such as age, occupation, level of educational attainment and income. Generally, the cross tabulation results showed that the bulk of respondents were only slightly aware of hazards in the study area (33.81%). Respondents that were unaware of hazards in the study area, whether slightly or highly made up 18.75%. Respondents that were undecided comprised 22.44% of the total sample. These broad classifications of level of awareness were then examined in the light of the socioeconomic status of the respondents.

Respondents that were older than 50 years constituted about 25% of entire research sample, of which about half were highly aware of the hazards in their environment. The same situation obtained for respondents that were aged 31 to 40 years. The age of respondents was significantly correlated with their level of awareness; however only about 14.75% of all variations in level of awareness of respondents could be attributed to variations in age of respondents, as attested to by the data in Tables 4 and Table 5.

Table 4 Cross-Tabulation of Age and Level of Awareness by Respondents in Kpakungu Area of Minna

Level of awareness	Age (Years)					Subtotal (%)
	Below 20	21 – 30	31 – 40	41 – 50	Above 50	
	No. %	No. %	No. %	No. %	No. %	
Highly unaware	1 (0.3)	0 (0.0)	1 (0.3)	4 (1.1)	0 (0.0)	1.7
Slightly unaware	2 (0.6)	29 (8.2)	9 (2.6)	10 (2.8)	10 (2.8)	17.05
Undecided	2 (0.6)	8 (2.3)	36 (10.2)	19 (5.4)	14 (4.0)	22.44
Slightly aware	1 (0.3)	18 (5.1)	21 (6.0)	60 (17.0)	19 (5.4)	33.81
Highly aware	0 (0.0)	5 (1.4)	12 (3.4)	26 (7.4)	45 (12.8)	25
	6 (1.7)	60 (17.0)	79 (22.4)	119 (33.8)	88 (25.0)	352 (100%)

Notes: Values in parentheses are percentages of the total sample (352)
Source: Author's analysis of research data, (2011)

Table 5: Results of Spearman Rank Correlation of Age and Level of Awareness by Respondents in Kpakungu Area of Minna

Variables		Spearman r – value	R^2 value (%)	Significance value	Inference
X_1	X_2				
Age	Awareness	0.384	14.75%	0.000	Significant

Source: Author's analysis of research data, (2011)

5. CONCLUSION

This research work was conducted in an urban settlement, which in contemporary times has become more vulnerable to threats from natural, environmental and technological hazards. Risk accumulation is more severe in urban environment as urban processes occur rapidly. Rapid urbanization, uncontrolled land use, unplanned urban growth, inadequate urban governance, and unregulated urban development have created vast areas of densely populated human settlements that are highly exposed to forces of nature and vulnerable to hazards. This is a fairly accurate description of Kpakungu, the study area. This research has identified some existing hazards in Kpakungu area as fire disaster, land pollution, flooding, building collapse and erosion. It has reported that the residents of the study area perceive their locality as being vulnerable to hazards and that about 79.3% of the respondents did not engage in any form of hazard identification. The research has also shown that close to three-fifths of respondents (58.8%) were aware of potential and existing hazards in their environment. The link between the socio-economic status of residents (represented by age, occupation, educational attainment and income) and the level of

hazard awareness was discovered to be very weak (between 3.1% and 14.75%).Inexplicably, the research found that 69.2% of persons with non-formal education were highly aware of hazards; the study was unable to advance suitable explanation for this observation, based on the data collected. To address the issues revealed through analysis of the fieldwork data, the study recommended measures to assist in increasing the level of hazard awareness in the area and improving the capacity of the study area in disaster prevention including stricter enforcement of building regulations and embargoing the selling of petrol outside service stations.

Based on this conclusion, it's recommended that there is an urgent need to improve community based action in forestalling environmental disasters. With a large portion of the population ill-prepared in the event of a disaster occurring, agencies concerned with disaster prevention and management should increase the level of hazard awareness through organizing of seminars, delivering enlightenment campaigns about hazards in the environment in the prevalent local language(s), and through religious leaders.

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