

**THE EFFECT OF LAND USE PLANNING ON ECONOMIC VULNARABILITY
TO DISASTER MANAGEMENT IN LOW INCOME NEIGHBOURHOODS OF
ELDORET URBAN AREA, KENYA**

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**A Thesis Submitted in Partial Fulfillment of Requirement for the Award of Degree of
Doctor of Philosophy in Disaster Management and Sustainable Development of
Masinde Muliro University of Science and Technology**

OCTOBER 2020.

DECLARATION

This thesis is my work prepared with no other tyran indicated sources and support and has not been presented elsewhere foa degree or any other award

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CERTIFICATION

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DEDICATION

This Research Thesis is dedicated to my late parents, Jashon Ong`anya Osweta and Mama Philister Odaso Ong`anya who brought me on this World, and to my wife Josephine Ounga Ong`anya, my children, Jack Brian, Kendrick Keynes, Naomi Victory and Joy Juneau's for their encouragement, moral, material and spiritual support during this programme.

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ABSTRACT

The urban residents of low income neighbourhoods Worldwide faces economic vulnerability to Disaster due to difficulties to acquire serviced land to enhance their economic resilience by improved human settlements and for commercial purposes. Land use planning seeks to regulate land use in ordly and efficient manner. Thus, it enables low income urban residents in neighbourhoods to access serviced land at affordable prices, access socio-economic services, infrastructure, transportation facilities and good environment. This study sought to evaluate the effect of land use planning on economic vulnerability to disaster management (EVDM), with a view to determine the best urban land use planning strategies and policies that could minimize disaster risk among the urban residents in Eldoret Urban Area (EUA). Specifically the study went out: (i) To examine the influence of urban land use planning regulatory instruments on economic vulnerability to disaster management in low income neighbourhoods in EUA; (ii) To determine the effect of urban land zoning on economic vulnerability to disaster management in low income neighbourhoods of EUA; and (iii)To establish the effects of urban land transit circulation and connectivity on economic vulnerability to disaster management in low income neighbourhoods of EUA. Subsequently, H_{01} , H_{02} , and H_{03} were derived from the specific objectives respectively. Descriptive survey research design was used. The classical spatial economic theory (making room model); and disaster reduction theory (community-based model) was applied in this study. The study targeted the urban residents in Eldoret Urban Areas of (Langas, Kamukunji and Kapsaos). Proportional stratified random sampling was applied for the purpose of quantitative data collection, while purposive sampling was used for qualitative data. A total sample size of 550 respondents was sampled. Questionnaire was the main instruments to collect primary data, alongside key informant interviews (KIIs) and focus group discussions (FGDs). Finally; descriptive, inferential, regression and correlation statistics were applied in data analysis and interpretation. Results indicated that land use planning regulatory instruments have combined influence of 69.0% over disaster management. Test results on H_{01} showed that there was significantly positive relationship between urban land use planning and disaster management. The effect of Land use planning regulatory instrument on EVDM was significant positive ($R=0.878$), the study revealed that Land use planning regulatory instrument accounted for 87.8% ($R^2=.771$) of EVDM. The other variables in the urban areas explained the remaining 12.2%. Urban Land use Zoning (LUZ) had a combined influenced of 73.0% on EVDM. Test results on H_{02} indicated that there was a significant positive relationship between LUZ and EVDM activity level. Circulation and connectivity had a combined influence of 73.0% on EVDM. Test results for H_{03} observed that there was a significant positive relationship between connectivity and circulation and EVDM activity level ($r= .883$). There was an indication that Connectivity and Circulation explained 78.0% ($R^2=.780$) of EVDM. The findings are a pointer to the fact that land use planning and its three dimensions had significantly positive effects on economic vulnerability to disaster management. From these results, it can be concluded that urban land use planning is a critical tool or technique in designing and developing urban areas where hazardous zones are mapped, demarcated and kept off from urban residents' socioeconomic activities. The study recommends that urban authorities must focus on urban land use planning to achieve sustainable development and growth.

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LIST OF ABBREVIATION AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
APHRC	African Population and Health Research Center
BCR	Building Construction Restrictions
CBD	Central Business District
CC	Circulation and Connectivity
DRM	Disaster Risk Management
DRR	Disaster risk reduction
EUA	Eldoret Urban Areas
EVDM	Economic Vulnerability to Disaster Management
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GOK	Government of Kenya
HFA	Hyogo Framework for Action
HIV	Human Immunodeficiency Virus
LURI	Land Use Regulatory Instruments
LUZ	Land Use Zoning
NGOs	Non-Governmental Organizations
PRSPs	Poverty Reduction Strategy Papers
SIDA	Swedish International Development cooperation Agency
SIMPLE	Sustainable Integrated Management and Planning for Local Government Ecosystems

SPSS	Scientific Program for Social Statistic
SRI	Stanford Research Institute
UK	United Kingdom
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	UN Office for the Coordination of Humanitarian Affairs
USA	United States of America

OPERATIONAL DEFINITION OF TERMS

Building Code: - set of ordinances or regulations and associated standards intended to control aspects of design, construction, materials, alteration and occupancy of structures necessary to ensure human safety and welfare, including resistance to collapse, damage and fire.

Cadastre System: -land registry which records the land ownership, the tenure, the precise location, the dimension (area) of individual parcel(s) of land.

Compactness Development: -an urban form that reduces the over exploitation of natural resources and increase economics of agglomeration, with benefit in terms of proximity. It is a built-up area, with high density.

Connectivity: - a process of connecting from one area to another. It makes mobility easy for all means of transportation including walking, bicycles, and will support livelihood activities.

Densification: -the process of increasing the rate of population in urban area, either by encouraging compact development, provision of urban services and urban infrastructure.

Disaster Management: - is the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disaster. It aims at saving lives and reducing human suffering; protect and restore livelihoods and reduce the risks faced by communities when affected by disaster and conflict.

Disaster Risk Management:-- a process of using administrative decision making, operational skills and organization capacities to implement strategies, policies and coping capacities of society, community and households to lessen the adverse impacts of hazards and possibility of disaster.

Disaster Risk Reduction: -- the practice of reducing disaster risks through systematic analysis and management of casual factors of disasters, including reduced exposure to hazards, lessened vulnerability of people and property, wise management of land use and environment, and improved preparedness.

Disaster: - is a serious disruption of the functioning of household, community or society causing widespread human, material, economic, social or environmental losses, which exceed the ability of the affected household, community or society to cope with using their own resources.

Economic Exposure: - is a process where by residents of a neighbourhood or country is exposed to economic shocks. Economic exposure is unexpected changes which are impossible to predict economically.

Economic Resilience: - is the ability of residents of a neighbourhood or country to do something about a shock either directly or in economic terms, such as the ability to use fiscal or monetary stimuli. It could also include governance, and here we include land use governance.

Economic Vulnerability:-is the exposure of groups or individuals to stress as a result of economic factors, where stress refers to unexpected changes and disruption to livelihoods. The economic vulnerability could be conceptualized in three strands-poverty dynamics, sustainable livelihood and food security.

Exposure: -the process whereby the households, community or society comes into contact with an environmental, economic conditions or social influence that has a harmful or beneficial effect

Formal area: - is an urban area under urban planning. It is serviced land within an urban area which covers built-up area of an urban area.

Gentrification: - is the process of renovating and revival or re-development of deteriorated urban neighborhood /areas. It means the influx of more affluent residential/commercial built-up areas which as a result increases property values and likely to displace low-income families and small businesses.

Hazard:-a natural process or phenomenon, or a substance or a human activity, that can cause loss of life, injury, and other health impacts, property damage, loss of livelihoods and services, social and economic disruption or environmental degradation.

Informal Settlement: - refers to urban areas with both low-income and medium income , with high density, inadequate urban services and inadequate infrastructural development. It is also characterized with poor land tenure security and poor quality&quantity housing.

Integrated Plan: -plan seeking to bring a lasting improvement in the economic, physical, social, and environmental conditions of an urban area. It means that all policies, projects and proposals are considered in relation to one another.

Land Administration: -system and processes to administer land; which includes the transfer rights in land, from one party to another, through sale, lease, loan, gift or inheritance; regulating land and property development; the use of and conservation of land; the collection of revenue and taxation of land and the resolving of conflicts concerning the ownership and the use of land.

Land Information System: - is a geographic information system for cadastral and land-mapping. It consists of an accurate and reliable land record cadastre and its associated attribute and spatial data that represent the legal boundaries of land tenure. It allows data stewards to retrieve, create, update, store, view, analyze and publish land information.

Land Tenure Security: - implies enforceable claims on land supported by national regulatory frameworks. It can be freehold, leasehold, trust land, collective (i.e., co-operative or condominium tenure).

Land Use Planning: -process of regulating land use in efficient, equitable and sustainable way, thus avoiding conflicts both in rural and urban development.

Mitigation:- is the process of minimizing the effects of disaster. Examples, building codes and zoning, vulnerability analysis, public education.

Neighbourhood: - is a geographically located community within a larger city, town suburban or rural area. Neighbourhoods are often social communities within considerable face-to-face intergration among members. It is an organization of children and adults in residential areas as a unit of inclusive neighbourhood, aiming at creating safe, resilient and connected communities.

Physical Planning: - is an exercise based on a land use plan used to propose the optimal in infrastructural development for public services, transport, economic activities, recreation and environmental protection for a settlement or area.

Preparedness: - is a process of planning how to respond. Examples, preparedness plans, emergency exercises, training and warning system.

Pre-urban Area: -/land in the fringe of an urban area. It is land in the urban boundary mainly predominated with agricultural activities, but due to high population

growth, the area is being brought under the built-up area of the urban areas and urban socioeconomic activities.

Recovery: - is actions taken after a disaster to restore or improve the pre-disaster living conditions of the affected households, communities, or society while encouraging and facilitating necessary adjustments to reduce disaster risk. Returning the community to normal.

Resilience: - the ability of the households, community or society potentially exposed to hazards to resist, absorb, adapt to, and recover from the stresses of hazard event, including preservation and restoration of its essential basic structures and functions.

Response: - is the provision of emergency services and public assistance during and immediately after disaster to save lives, reduce health impacts, ensure public safety and meet the basic needs of the affected people. Efforts to minimize the hazards created by a disaster.

Slum: - means a compact area of poorly built congested tenements, in hygienic environment usually with inadequate infrastructure and lacking proper sanitation and drinking water facilities. The issue of tenability of slum needs clarification. Untenable slums are located along major storm water drains, railwaylines, major transport alignment, along river banks, other hazardous and objectionable areas, while, tenable slums are allocated on non-objectionable & non-hazardous lands.

Spatial Planning: - the process to determine space structure and space pattern that consists within a region or urban area.

Spatial Structure: -the distribution of space (land) allocation for various development activities, including residential areas, infrastructural network, commercial areas, cultivation, or environmental conservation systems, which function as a support for the society's social, and economic activities.

Sprawl Development: -fragmented development generally characterized by low-density settlements that are car dependent and often lack access to public infrastructure and services.

Vulnerability:-relative lack of capacity of household, community or society or ability of an asset to resist damage and loss from a hazard. It also means conditions that increase the susceptibility of a community, household or society to the

impact of hazards. It also means the diminished capacity of individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard.

Vulnerable Groups: -members of group who are exposed to the impact of hazards, such as displaced people, women, the elderly, the disabled, orphans, children and any group subject to discrimination..

Warning Systems: -means of persuading people and organizations to take actions to reduce the impact of hazards.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Globally, controlling and dealing with economic vulnerability, especially among the residents of low-income neighbourhood in urban areas has been recognised as hard and difficult. In USA, Britain, China, India, Japan, Malaysia, Nigeria, Ghana, Ethiopia and Kenya among others, dealing with socioeconomic and environmental hazards and vulnerabilities is a challenge experienced and whose severity is worrying (Bendimerad, 2008). This has left urban residents to experience devastating outcomes and impacts from inadequate and inequitable socioeconomic and environmental services. Although regulatory policy and planning processes such as development planning, land-use planning, natural resource management planning, poverty reduction planning, are considered critical to disaster management (Action Aid International. 2006; African Union Commission, 2009).

According to UN-Habitat (2008), over a half of humanity globally now lives in cities, where they are occupying only 3% of world space or land and by 2050, almost 70% of the World's population would be residing in urban areas. This means that effective and efficient urban land use planning would be critical for improved productivity of urban basic needs or economic activities. This would enhance provision of green spaces for future expansions and recreations, residential, commercial, and industrial and other land uses critical to urban neighbourhood welfare. The practice and the implementation of land

use planning would also enhance the possibility of the neighbourhood residents accessing the serviced land, hence economic activities and therefore be able to built economic resilience.

Rapidly exploding growth of cities is overwhelming government institutions with the pressures of urbanization. With cities expanding so rapidly, much of the growth is haphazard, far exceeding the cities' capacity to adequately plan and control development. As a result, uncontrolled urbanization often feeds the growth of slums, reinforces poverty or economic vulnerabilities in low income neighbourhoods and diminishes cities' ability to deal with disasters. The urbanization has taken place without regard to protecting against extreme hazard events. Faced with the needs to provide housing infrastructure and services, cities developed haphazardly and often without any formal land use planning process. Whenever, urban land use planning is applied, their application appears to be weak and wanting. Migration aggravates the problem by creating large scale informal construction (Acemoglu, Como, Fagnani, and Ozdaglar, 2013). Migrants also face significant challenges in adapting their past experience and coping strategies or economic resilience to the economic shocks in cities.

In urban planning, land use planning seeks to order and regulate land use in an efficient and ethical way, thus, preventing land use conflicts. It promotes a more desirable social and environmental outcomes as well as amore efficient use of resources (land). Governments use land use planning to manage development of land within their jurisdictions. A land use plan provides a vision for the future possibilities of development in neighbourhood, districts, cities or any defined planning area (Ore Fika, 2016). Goals of

land use planning may include environmental conservation, restraint of urban sprawl, minimization of transport costs, prevention of land use conflicts, and reduction to exposure to pollutants. While, the objective land use planning is to influence, control or direct changes in the use of land so that it is dedicated to the most beneficial use,, while maintaining the quality of the environment and promoting conservation of the land resources (Rabe & Ore Fike ,2015).

Land use planning was introduced by the colonial governments during colonial period to bring order and land use efficient in Africa urban areas. This marks the introduction of the zoning ordinances, the implementation of regulatory instruments. However, the the rapid urbanization appropriate land use implementation is necessary. A propriate implementation of land use in urban areas tends to reduce risk in urban areas. Risk in urban areas is a combination of two factors:- first, location and exposure to hazards; and second, increased vulnerability due to poor local governance, environmental degradation and the overtrenching of resources. Therefore, inappropriate land use planning in a neighbourhood may increase the residents' vulnerability to disaster. According to IFRC (2016), vulnerability is the diminishing capacity of an individual or group to anticipate copewith, resist and recover from the impact of a natural or man-made hazard. Vulnarability is most often associated with poverty, but it can also arise when people are isolated, insecure and defenceless in the face of risk, shock or strss (IFRC, 2016). Vulnarability has been used to describe the state of risk, usually associated with geographical location rather than with individuals or social groups.

However, this study tends to evaluate and examine the economic vulnerability to three neighbourhoods in Eldoret Urban Area, with the fourth one act as a control area of study. In fact this is concerned with the growth and economic transformation pathways which is subjected to a range of shocks that would affect economies in varying ways. Economic vulnerability is the exposure of individual or groups to stress as a result of economic and environmental change, where, stress refers to unexpected changes and disruption to livelihoods. Awang (2001), identifies three strands within the economic vulnerability in terms of either:- poverty dynamics, sustainable livelihood and food security.

Chambers and Conway (1991), emphasize the livelihood approach. Livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. A livelihood is sustainable, when individuals or groups can cope with and recover from stress and shocks, maintain or enhance their capacities and assets, and provide sustainable livelihood opportunities for the next generation.

In most developing countries, legislative and institutional arrangements inhibit rather than enable local action. While it is recognized that disasters are initially local events, accountability, authority and resources are not sufficiently decentralized to enable local governments to assume ownership and take actions to manage disaster risk effectively. Furthermore, politicians, administrators, and community leaders all face conflicting priorities, and household disaster risk management especially, in low-income neighbourhood almost invariably takes the back seat to other needs which may be considered more pressing or easier to solve. Risk is not managed preemptively, but thought

of in terms of something to be dealt with when disaster strikes, through emergency response and humanitarian assistance (Bin, & Landry, 2013).

An additional weakness relates to the project planning processes of government. While concepts are often understood and policies are in place, carrying these policies and concepts to practice is a major hurdle for governments at all level (Christian Aid, 2014; Corbyn, 2010). The process of project planning and execution needs to be recognized as a major weakness if progress in DM has to be achieved. Even among cities which have shown competency in establishing planning processes to control their physical development, carrying these planning processes into project planning and execution remains a challenging step.

DM is a professional practice that still lacks its own set of acceptable standards of practice. This results in a dispersion of effort and an ineffective use of resources. It also erodes the political support for local level action on DM. Providing tools to enable translating national policies into mainstreaming planning processes at the local level would help cities in understanding the options that are available to them for managing risks and for planning and implementing urban DM (Fagiolo, and Roventini, 2012).

It implies that most urban areas prone to hazards and vulnerable to socioeconomic and environmental problems exposing residents of urban neighbourhood to disaster risks. The practice to most urban areas is to build in flood prone areas, set up structures in river banks, on top of electricity lines, under high voltage power lines, deep inside the sea without fear of disasters risks. These urban areas lack adequate practices that prevent hazards and vulnerabilities from becoming risks that cause disasters. This is the case in

slum areas, informal settlements or per-urban areas where income appears to be low and therefore, the residents could not afford serviced urban land.

Globally, the rapid and often growing population together with rising urban areas is recognized as a threat to a greater number of people, environmental health and socioeconomic assets, which are exposed to the risk of disasters. These urban areas lack adequate practices that prevent hazards and risks from causing disasters. Protecting rising urban residents from automatic exposure to high risks whose outcomes and impacts are disastrous is a desired goal but not yet realised. In fact, economic exposure is occurring in urban neighbourhood especially, of low-income settlements of slums, and informal settlements. This has exerted pressure on available urban land sizes whose proportion is smaller compared to the population supported. So building safer and secure cities from land size of 3% to support population size of more than 60% is a concern. The urban authorities together with its household population are worried of the increasing number of disasters most of which are preventable.

Although it has been widely acknowledged that regional economies and land use are highly interrelated, little is known about how a change or intervention in land use may influence the economic vulnerabilities to disaster management of low-income residents in urban neighbourhood in major cities. In the field of urban and regional planning, the interactions between land use planning and economic vulnerability to disaster management have traditionally been considered from a top down perspective; that is, land use planning and economic vulnerability to disaster management structural changes are assumed to have significant effects on land use and the spatial structure of the region. However, bottom up

connections are rarely considered. This lack of appreciation of the bottom up impacts may limit current land use planning practices and decision making. It might also lead to unintended conflicts between land use planning and economic development.

The evidence emerging from recent experience makes a compelling case for a radical shift away from narrowly focused development approaches towards a major new emphasis on community resilience or neighbourhood resilience and disaster management. Floods which are caused by swelling rivers in the catchment areas of neighboring countries, floods from cyclones, storm surges, earthquakes, fires and other such events, when combined with social and economic vulnerabilities, and added to environmental depletion, can multiply the shocks from disasters and lead to crippling economic losses. Moreover, the risks posed by the regional effects of climate change require considerable adaptation by the exposed populations. But at the same time, governments in vulnerable countries are faced by hard budget choices, which make major investments in emergency preparedness usefully very difficult (IFRC, 2012).

Urban land use practices that will attract and woo socioeconomic and environmental activities to create employment opportunities, sources of income, quality and quantity housing, enhanced housing mobility, availability and accessibility to investment and financial credits are missing. Although these are basic important resources any population would require to build its economic resilience, coping ability and capacity to protect, prevent and become resilient to recover from any disaster events whenever they occur. Given that land as a significant socioeconomic and environmental resource, its relationship to man and other development activities must be critically considered. And because of its

scarcity, the rising urban population and increasing urban growth and development highly depend on creating a competition that surrounds human life. It implies that its scarcity requires practices that strategically improve its productivity, adequately, equitably and sustainability (Morales, 2014). This can be source of conflicts and disputes that occur during the space or land use allocation both in rural as well as in urban areas. This becomes even severe in urban areas which have been registering influx of migrants and natural population growth (Rabe, 2014).

The year 2008 marked the first time in history where more people lived in urban centers than in the rural regions. Since the beginning of 2008, more people lived in urban centers than outside of them with majority lacking the basic needs. The anticipated urban population swell to 5.3 billion by 2030, will continue to be potential victims of disasters whose outcomes and impacts are devastating. This means that effective and efficient urban land uses are critical for improved productivity of urban basic needs. This would enhance provision of greenspaces for future expansions and recreations, residential commercial, and industrial and other land uses critical to urban residents welfare. Approaches and tools that study and map, analyse economic, environmental and hazard data; formulation of alternative development decisions; and design of long-range plans for different geographical and administrative scales are critical.

In America for example, many Americans would live nowhere but a city. They consider cities to arouse strong opinions, pro and con, because there are many things both to like and to dislike about cities (Metternicht, 2017). Yet cities are now homes to disasters from risk causing hazards. These hazards lead to disasters whose outcomes and impacts are

extremely devastating to majority of urban residents. This trend is the same in India, China, Japan, Germany, UK, and other countries (Putman, 2010). Nearly all of the population growth in the world will be in urban areas in the next few decades, especially in low-and middle-income countries. It is a move that if not checked, then abnormal population density rates on fixed small urban land sizes will cause further harm than good. Moreover, high economic vulnerability level to disasters of urban population especially in low-income neighbourhoods indicate that more people are prone to devastating disaster outcomes and impacts (Alberto, 2013).

The cause for rural urban migration is in search for alternative and better living standards. But how to strike a balance between desire to achieve socioeconomic and environmental development and other human lives desires is the challenge. Even urban authorities mandated to implement land use practices with buildings, infrastructures, services and management of urban expansion that can automatically cope with any form of disasters, for example storms, fires, busting raw sewer lines, floods or earthquakes have failed to adequately and equitably achieve this. So most urban population, the over 60% are left to face frequent disasters risks. But the migrants end up experiencing employment shortages, with large number of people concentrated on fragile lands, making reduction of vulnerability, and coping ability to disasters in urban areas a mission impossible (*Eerrd, 2008*). The determination to satisfy each expectations of more than 70% of world population that has migrated to urban areas using only 9% available urban land proves difficult This land size in its fixed distribution feature cannot be affected but only improved in productivity, including practices that enhance multiple and balanced uses (Gaube and Remesch, 2013).

Urban land use practices that provide adequate greenspaces, adequate circulation and connectivity, that accommodate primary and alternative transportation modes critical during emergencies are considered important but seems lacking. For example, during emergency evacuations from floods, fire outbreaks, landslides, and collapsing buildings among common urban disasters become difficult. In USA, the terrorist attacks of September 11, 2001, and the televised images of traffic jams stretching for miles as Hurricanes Rita and Katrina of 2004 and 2005 approached the Gulf Coast earlier this year brought home once again the difficulty of evacuating large urban areas (Shekhar, 2005). Mass evacuations are among the most difficult challenges faced by transportation professionals, but planning for a complete evacuation of a specific city is difficult because such evacuations are only rarely necessary. Such damaging hurricane focused attention on the nation's capacity to respond to emergencies and evacuate its citizenry in a safe and timely manner. Transportation professionals are part of emergency management teams in some urban areas, but the potential for transportation in general and transit in particular to play a more significant role in emergency response and evacuation is far from being realized (Shekhar, 2005; TRB, 2008).

Most emerging growing urban areas are densely populated. The disparities in socioeconomic status are visible in disaster management process. Those residents with high income have low densities compared to low income residents. For example, in estates such as Elgon View in Eldoret, Laving'ton, Kileleshwa, Runda, there are four persons occupying an hectare while in Kawangware, Kibera, Kariobangi, Mthare and Mukuru, Kipkaren, Brigadier, Huruma, Langas, and Maili Nne, low income tenements go up to 800 persons per hectare (Khayesi, 2007; Coulombel, 2010). But densely-populated regions are

among the highest at risk of disasters and health-related emergency, yet little is known about risk coping and supportive strategies to urban residents. In such cases households are often ill-equipped to cope with disaster and evacuation, regardless of their susceptibility to threat. Household and individual preparedness is critical to the overall effectiveness and cost-efficiency of national disaster response strategy. Moreover, urban households with the lowest incomes, lack employment, no investment assets, lack high level of housing mobility, live in poor quality housing that face among the highest risks of disasters in urban areas (Chan, Yue, Lee, and Wang, 2016).

These low quality housing are prone to collapsing, frequent fires, floods, bursting and open raw sewer lines, unhygienic features with sizes unsuitable for large number of occupants. In general these buildings have bad conditions not qualified for occupancy yet most urban residents continue to occupy these hazardous facilities. This is true in most informal settlement and slum areas which are considered highly volatile to violence with many hotspots for violent activities. These are behaviours that cannot attract and woo serious large scale investment that would create employment in these areas. While in the informal sector more than 75% are actively involved out of which some 49% of slum dwellers are either regular or casual job seekers. Hence for them to survive in city life, about 19% are household enterprises with 26% considered unemployed. This rate of unemployment account largely on the youth and women where 46% of youth & 49% of women unemployed. This translates into more than 70% of the city's slum dwellers who are living below poverty line; up from 26% (1992). This means that poverty itself is a disaster that needs to be fought in order to deal with poverty related disaster risks and improve urban residents wellbeing (Gunjal, 2016).

According to Baker, (2012), by the middle of the 21st century, the total urban population of the developing world will double, increasing from 2.3 billion in 2005 to 5.3 billion in 2050. It implies that urban space is therefore, an issue which concerns both the rich and the poor. But the poor cannot afford the amount and quality of land uses by wealthy people. However, both the poor and the rich essentially and constantly use space for standing, sitting, walking or putting things on the ground (Davy, 2007). According to Smolka (2012), urban residents need to understand and be aware of space they own exclusively and the one they have rights to use even though they do not own the space. Thus, the issue of urban land accessibility and affordability is a reality to every urban residents residing in city or urban area.

Demographic, environmental, economic, social spatial and institutional are considered as current and future challenges threatening development of sustainable cities (UN-Habitat Report, 2009). These challenges have resulted in emerging new spatial configuration or structure, which includes the spread of risky slums, informal settlements and pre-urban growth in global cities, from hazards exposures leading to eventual disasters. These hazards include floods, landslide, fire, low standard of living, living below poverty line, evictions, unhygienic environment, high rate of illiteracy, unemployment, inadequate credit facilities as well as inadequate business opportunities (Shaw, 2012). The urban land use in these spatial forms are not organized, exposing residents to risky hazard prone zones that threatens the residents in these areas who are likely to experience disaster risks. The lack of infrastructure and services, unsafe housing, inadequate and poor health services can turn natural hazard into disaster. There are also the man-made hazards caused by poor regulation of construction and building practices in urban areas (Reuters, 2000). The most

vulnerable groups, typically living in poverty, tend to settle and build homes in unsafe (informal-slum) neighbourhood and are without adequate provision of infrastructure and critical services. The urban poor are particularly vulnerable to climate change and natural hazards due to their location within cities, and therefore lack reliable basic services (UNISDR, 2015).

Land use planning, in African continent was introduced by the colonial rulers through the urban planning. But in Africa continent, the land use planning, especially, its instruments or tools need re-evaluation (Payne, 2011). This is because all these were introduced by the colonial masters during the colonial rule and therefore, might not be appropriate in directing land use planning in Africa cities or towns today. Different types of production and economic activities require different spaces; thus, more diversified economies will have a wider diversity of economic spaces. Thus, it is through land use planning, that, the urban areas or forms would be able to provide a competitive, quantity and quality suitable space or land in appropriate locations, to match the needs of emerging economy which shall assist the urban residents to manage disaster hazard risks amongst them.

According to (UN-Habitat, 2010), by 2030, the global urban population will be 8 billion, out of which 3.4 billion shall be living in slums and informal settlements. In the three urban forms of slums, informal settlements and pre-urban areas, the main cause of disaster risks is the lack of serviced land, land security which exposes the urban residents to physical and market evictions as well as inappropriate management of urban land spatial structure elements. In the vast majority of sub-Saharan African cities, as well as in Kenyan urban centers, the urban poor as well as large segments of low and middle-income groups

do not have access to land provided by the public and formal Private Sector (Durand, 2005). This has been evidence in many Kenyan urban areas including Eldoret Urban Area (Eldoret Municipal Strategic Development Plan, 2012).

In Eldoret Urban Areas, the slum areas, informal settlements and pre -urban areas are unplanned and therefore, make it difficult to access serviced land, services and infrastructures, thus enhance disaster risk hazards among the urban residents in these spatial forms or structure. Most of urban residents' in these areas do not also have any form of land security. And whenever the serviced urban land is available, the issue of affordability arises. Because of high prices of urban land, most vulnerable households cannot afford them; therefore, the only option available to them is to occupy the unserviced urban land in the slum, informal settlements and pre-urban areas which are fragile and exposed to disaster hazard risks. The land is poor in terms of topography such as wetlands, land under electricity voltage, which are all disaster risk exposed (Eldoret Municipal Strategic Development Plan, 2012).

During disaster occurrences, most urban residents depend on well-wishers whenever, a disaster strikes. When a building collapses, fire breaks out, floods or any other hazards is triggered causing disasters, donations of foodstuffs, beddings, temporary shelters (Tents), are common practices (Putman, 2010; Coulombel, 2010). An indication that most practices still rely on relief distribution instead of providing urban residents with the capacity to develop their economic potential, and attract business and capital. Equally disturbing is that well-wishers without well-organized patterns are disaster of its kind (Hunte, 2010; Khayesi, 2007).

This is because most of urban areas are experiencing employment shortages, with large number of people concentrated on fragile lands, making reduction of vulnerability, and coping ability to disasters in metropolitan areas a critical challenge facing development. The determination to satisfy each expectations of more than 70% of world population that has migrated to urban areas using only 9% available urban land proves difficult This land size in its fixed distribution feature cannot be affected but only improved in productivity, including practices that enhance multiple and balanced uses (Gaube V. and Remesch A., 2013).

The outcomes and impacts of such experiences among the urban residents are devastating and disrupt livelihoods, cause loss of human lives and damages to properties and infrastructure. While this is the common practice, consequence of disasters are felt among urban residents without immediate solutions. In a rapidly urbanising world where population growth has remained high, greater numbers of people than ever before in human history are moving to towns and cities, many of which are sited in hazard prone areas where new residents lack local knowledge (Galland, 2012).

Also human interaction with and other elements determine level of hazard disturbance and risk level interference. So it is upon man and his environmental reactions to minimize hazards and risks from turning into disasters. This has been paralleled in the disaster management sector by a shift from seeing disasters as extreme events created by natural forces, to viewing them as manifestations of unresolved development problems. This has led to increased emphasis on integration of poverty reduction programs with other sectoral issues such as environmental management, better land use, gender and public health.

Instead of designing and developing urban areas where hazards are not triggered to react and risks are minimized leading to no disaster occurrences, many urban residents are commonly with increased disasters. Worrying is the rising urban population indicating that when urban disaster occur, the casualties would also grow. Since 1900 there has been an increase in the numbers of disasters with an even greater increase in the physical, economic, social, environment and human costs of these events (King, Harwood, Cottrell, Gurtner, and Firdaus, 2013). In some countries, the numbers of people affected by disasters have increased comparably, but numbers of deaths have diminished, but this is not the case in most countries such as Kenya, Nigeria, Indonesia, India, and Philippines among others (King, et. al., 2013).

Although the understanding of such provisions, would provide a guide for planning and implementing alternative modes of travel to afford greater accessibility for residents and visitors, mitigate congestions and pollution, and support a more efficient and sustainable land use pattern. Transition to a more complete multi-modal transportation system requires an integrated land use and transportation planning approach which has always been inadequate. The planned transportation system shall support the City's vision for a land use pattern with concentrated mixed-use Village Centers and neighborhoods (Rabe, 2014).

Transportation access is the heart of a successful mixed-use development pattern, where more intense growth occurs around major roadways and transit facilities. Yet most of the urban areas continue to lag behind achievement of improved properly connected and circulated cities with all modes of transportation. Although achievement of this would enhance business transactions increase, its inadequacy denies urban residents chances to

experience rapid business outcomes. A condition that denies them stable sources of income, from which consumption and savings can be derived. This would cause households to be vulnerable, lack capacity and coping ability to disasters (Chambers, 2004).

Furthermore, it is recognized that better connectivity and circulation outside cities. Yet the resultant cities consist of informal and unplanned structures that lacks accessibility is a common trend. Most urban areas consist of slums as that lack accessibility leading to vulnerability and capacity of the urban residents in these areas. Travel in these cities is dramatically very poor and disproportionate with anticipated population growth in the region. These cities have failed to keep pace with growing urban population and desired sustainable growth and economic development. When a disaster such as fire, floods, and any event that require urgent attention, the areas are disconnected, fire fighting engines cannot reach them, leading to unnecessary outcomes impacts. Deaths, property damages, economic losses that would otherwise have been reduced, rises to higher and unimaginable levels.

Sprawling slums and squatter settlements, uncontrolled skyrocketing housing in wrong areas, street family life are common practice. This leads to difficulty of access to essential services such as greenspaces, roads, safe electricity and water and sanitation are inadequate if not lacking totally (Putman, 2010). If the current urban residents are experiencing various challenges now, then only miracle would save the anticipated urban population of 2050 (Putman, 2010).

Changing demographics, changing lifestyles, disaster mitigation, transportation choices, housing choices, energy conservation and green infrastructure are some of the current challenges urban authorities struggle to balance. Balancing urban land use and achieving the coordinated and harmonious development of cities and their environs are becoming difficult to realize. The intention to balance the property rights of owners expanding their use with the property rights of surrounding owners. Further, the intention to promote efficiency and economy in the process of development including, adequate provision for public facilities and services and balancing land use with the transportation system; the promotion of safety from fire, flood waters, and other dangers; adequate provision for light and air, distribution of population, affordable housing; the promotion of good civic design and arrangement; efficient expenditure of public funds; and the promotion of energy conservation.

Although the expectation of any urban region is an area with demarcated residential, commercial, industrial, and agricultural and any other classification useful for the urban residents, most urban areas indicate outcome without any formal direction. One cannot identify an area left for future urban expansion, road reserves, nature and types of housing of specific areas. The outcomes are urban areas without rules typical of permission of a list of land uses. While rules such as a series of specific standards governing lot size, building height, and required yard and setback provisions, are critical to guide the construction of housing, what is experienced in towns does not indicate a guided practice. For example, in Kenya, the requirement is to land owners must not use land reserves and for any land user around road areas, leave 6 meters for any expansion. But the outcomes are buildings or investments in road reserves, or deep inside the road 6 metre rule (Musyka, 2004). SThis

goes against the sole reason of ensuring protection of flights security. Thus in spite of what is often a dire need for proper land use to reduce disaster risks, land use and development planning and practices that support good use are limited or non-existent.

The difficulty faced in urban areas include common practices such as digging up already made facilities, for example roads, to lay additional sewer pipe, power lines, water pipes, fibre optic communication lines. This leads to destruction to already made roads, sewer paths, power lines and houses among others. This is an indication of the high degree of disorderly and phased development patterns that would also be less expensive for urban population cannot be realized. Moreover, desire to achieve public services and low-density (Eldoret Municipal Strategic Development Plan, 2012).

1.2 Statement of the Problem

Urban areas continue to be the hotbed of socioeconomic and environmental disasters. The urban residents in low income neighbourhoods Worldwide, faces economic vulnerability to disaster management due to difficulties to acquire serviced land. The rapid urban expansion, rapid urban population and rapid slum growth and informal settlements are being experienced in the world, as a result of rural-urban migration and natural population growth. According to UN-Habitat, (2008), more than ahalf of World population lives in urban areas by 2005, and by 2030, World population would be 8 billion out whch 70% would be living in urban areas yet 3.4.billion would be living in slums and informal settlements areas. The same is applicable in African cities too, and particularly in Kenyan cities. A study by Obundho (2004) indicates that population in Eldoret Urban Area (EUA)

since 1963 has been growing at 6%, yet urban space or land remains constant 147 sq. km as per 2009 Kenya Population census.

Most slum and informal settlement areas such as Langas, Kamkunji, and Hururma of Eldoret, tends to have low-income, high rates of unemployment, and people lives under hazardous conditions such as poverty, poor health, polluted surroundings, poor waste management, faulty electric installation, destruction of sewer lines and underground telecommunication, power, water and sewer lines, fire destructions, falling and sinking buildings, floods, droughts, are increasing in frequency and severity. This is a poverty developing environment exposing urban residents to all sorts of poverty related disasters. Inability to afford quality and quantity housing, acquisition and ownership of assets that are collateral for financial credit instruments would be lacking in this low-income neighbourhoods. The inadequate and inequitable infrastructural facilities and lack of green space in most urban neighbourhoods discourages socioeconomic and environmental development and growth of investments, linkages to other regions, business opportunities and emergency management, especially in slum and informal settlement areas. These have caused the urban residents to be experiencing economic vulnerability.

Therefore, to curb the rapid urbanization and expanding population in cities, a proper resource management, especially land becomes a necessity, land use planning. The urban land use planning which was introduced by colonial governments in Africa in the nineteenth century, was meant to bring order and efficiency in land use by urban residents in upcoming cities and urban neighbourhoods. However, in Eldoret Urban Area, the authorities and institutions meant to implement these instruments appears to be weak and

inefficient, making even planning in formal structure neighbourhoods rather inadequate. For example Kapsoya a formal area which serves as control or reference point these planning tools have been inadequately implemented. This is evidenced by unnecessary building heights as opposed to Kapsoya neighbourhood. In Eldoret Urban Area, encroachment by private developers into road reserves, recreational spaces, riparian areas, water runoff paths, uncontrolled building heights and sizes among others is rampant. For example, Kapsoya (a formal spatial structure) that was planned to have specific types of housing structures has failed to maintain this plan, and today developers establish their own patterns. This has led to congestion, overcrowding, lack of clean water, access roads, that when fire occurs, total destruction of properties and deaths casualties is expected. The problem in the study area is that the planning authority within Eldoret Municipality or Uasin Gishu County appears to be ineffective and therefore, unable to implement land use regulatory instruments effectively in a manner to influence the economic vulnerabilities of urban residents residing on slums, informal settlements and peri-urban areas of Eldoret neighbourhood. As such this has resulted in urban residents continue to experience low-income, unemployment, inadequate urban services, poor infrastructures, poor quality and quantity housing in these slums and informal settlements in Eldoret Urban Area.

Therefore, this study sort to evaluate and examine the influences of urban land use planning regulatory instruments, urban land use zoning and urban land use transit connectivity and circulations in managing urban land use risks and urban land use hazards to moderate or reduce economic vulnerability to disaster management in Eldoret Urban Area.

1.3 Purpose of the Study

The purpose of this study was to explore the urban land use planning practices effectiveness in disaster risk management in Kenyan urban areas, the study focuses on Langas, Kapsoya, Kamkunji and Kapsaos in Uasin Gishu County. These spatial structures, slums, informal settlements and the pre-urban areas challenges and experienced are indicators of suffering urban residents undergo, that probably emphasis the needs of land use planning to change the whole situation for a better urban area land uses and urban residents livelihood. The study uses urban land use transit Circulation and Connectivity, urbanland use zoning, and urban land use planning regulatory instruments as exploratory variables, while urban residents income, employment, investment and credit facilities, socio-economic services and housing quantity and quality as dependent variable.

1.4 Research Objectives

The overall objective was to evaluate the effect of land use planning on economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area with a view to determine the best urban land use planning strategies and policies that can minimize urban residents economic vulnerability to management in low income neighbourhoods of Eldoret Urban Area. The specific objectives of the study were:-

- i. To establish the influence of Land Use Planning Regulatory Instruments on Economic Vulnarability to Disaster management in low income neighbourhoods of Eldoret Urban Area

- ii. To determine the effect of Land use Zoning on Economic Vulnerability to Disaster management in low income neighbourhoods of Eldoret Urban Area
- iii. To examine the influence of Land Use Transit Circulation and Connectivity on Economic Vulnerability to Disaster management in low income neighbourhoods of Eldoret Urban Area

1.5 Research Hypotheses

The three research hypothesis that were tested in this study involved testing the relationship between the effect of land use planning on economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area. In fact, the three aspects of hypotheses indicate only the null.

H₁: There is no significant relationship between urban land use planning regulatory instruments and economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area.

H₀₂: There is no significant relationship between land use zoning and economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area.

H₀₃: There is no significant relationship between land use transit circulation & connectivity and economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area.

1.6 Justification

The Eldoret Urban Area land spatial structure expansion is characterized by inadequate and low quality services in terms of inadequate water facilities, electricity, sewage system, drainage, sanitation facilities, housing, open spaces, inadequate infrastructure and lack of serviced urban land as well as transport facilities. Therefore, majority of urban residents in the low income neighbourhoods are subjected to urban poverty, unhealthy or unhygienic living and environmental conditions, hence, urban residents are exposed to disaster hazard risks. The urban poor, especially in the slum areas, informal settlements and pre-urban areas are subjected to evictions, flash floods, fire, diseases, unhealthy environment, mudslides and poor quantity and quality housing. The urban residents in low income neighbourhoods in EUA, especially, in slums, and informal settlements are also subjected to urban land market distortion and poor urban land spatial structure elements. Subsequently, these urban residents in slums and informal settlements, tends to occupy disaster risk prone areas, which are vulnerable to both natural and manmade disaster risks of flood, mudslide and fire and extra , hence, enhances urban poverty to these residents.

Urban land use planning, therefore, is required to address land issues, especially, land spatial structure, and land planning instruments. This will enables the urban residents to stimulate economic activities of the urban poor, by providing services, infrastructures, open spaces, urban development corridors, urban development nodes, industrial and commercial parks and transport facilities to enable the households build capacity to cope with disaster resilience, hence sustainable livelihood. Therefore, this study is justified to contribute towards generating research data and findings which could be used by the policy

makers to formulate policies, strategies which are likely to improve land use institutions, land administration/ management, land use instruments, to assist in disaster risks reduction among the urban residents in Eldoret Urban Areas, and in turn could be applied in any other urban area in Kenya.

1.7 The Scope of the Study

This research is to investigate and examine urban land use planning regulatory instruments, urban land zoning and urban land transit connectivity & circulation and how these indicators affect the economic vulnerabilities or variables (income & employment, urban services, credit facilities& investment and quantity & quality housing, and housing mobility), of the low income neighbourhoods in Eldoret Urban Area and how this enable them create and build capacity to cope with disaster risk hazards, hence reduced disaster risks and therefore, enjoy sustainable livelihood, enhances their poverty dynamic and food security. The study covered the period from 2000 to 2016. The study was conducted in the former Eldoret Municipality (Eldoret Urban Area), where the research concentrated mainly in the low-income neighbourhoods of informal settlement of Langas estate, slum area of Kamukunji estate, pre-urban area of Kapsaos area, where land use planning were minimal. However, the study also paid due attention on land use planning activities in the formal area of Kapsoya estate as control area.

1.8 Assumptions of the Study

The study assumption is that the urban residents would always attempt to access and occupy serviced land free from hazardous aspect and that the urban authority by

developing and implementing land use planning regulatory instruments, urban zoning and transit connectivity and circulation would enable urban residents to achieve their goal. However, due to weak institutions, and weak land law and poor regulation enforcement by urban authority, urban residents in slums, informal settlements and pre-urban areas end-up occupying hazardous areas, and poor housing, inadequate urban services & infrastructures exposing themselves to disaster risks That the respondents were available to give required information without fear. That the findings of the study would be generalized for the urban and cities land use planning in relationship to economic vulnerability to disaster management throughout the country and other regions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The aim of this chapter was to report on the review of literature related to the research topic, The Effect of Land Use Planning on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area, Kenya. This chapter discusses land use planning regulatory instruments, land zoning, land transit circulation and connectivity dimensions, the relevant theories to guide the study such as the classic economic spatial structure theory (making room model), and disaster risk reduction theory (community based model), as well as conceptual framework. The chapter also discussed the knowledge gap on the subject matter and further reviewed policy documents stipulating the implementation of programmes of interventions to disaster management in urban low income neighbourhoods populations, while discussing the strategies of interventions integrated in disaster management resilience regarding the urban population.

2.2 Planning and Urban Land Use Concept

2.2.1. Planning Concept.

Planning as a concept refers to the process of deciding what to do and how to do it.

Planning occurs at many levels, from day to day decisions made by individuals and families, to complex decisions made by businesses and governments. Planners are professionals who facilitate decision making. Planners do not make decisions themselves; rather, they

support decisions makers (managers, public officials, citizens) by coordinating information and activities. Their role is to create a logical, systematic decision making process that results in the best actions (Payne, 2006).

Good planning requires a methodical process that clearly defines the steps that lead to optimal solutions. This process should reflect the following principles:- comprehensive, efficient inclusive, informative, integrated logical and transparent.

2.2.2. Urban Land Use Concept.

Land use planning is a concept that guides development and re-development in an orderly manner and goes on to ensure a balanced growth with preservation of the community's assets. It should aid and designate the location and utilization of private and public space for example, residential, commercial, industrial and public utilities such as education, health facilities, recreation, open space and at the same time determines the density and intensity for land use categories. The aim is to foster growth in any urban areas' economy with thriving neighborhoods that are integrated with, and highly accessible to, good jobs, stable income, investment opportunities, shopping, amenities and recreation.

According to Trond and Elco (2017) urban land use planning considers managing residential growth, striving for economic development, and influencing thoughtful land use decisions in the urban area and beyond. The urban residents believe in achieving a balanced and accessible urban community with educational excellence, safe neighborhoods, and a strong business community. To this end, the citizenry encourages growth in a pattern consisting of a collection of community villages, each anchored by

mixed-use village centers along transit corridors with concentrated shopping, employment, a variety of housing choices, and amenities.

Land use planning involves activities that man pursues on the environment that determine his destruction or construction on the environment. Land is an important though scarce resource. The wise land uses assure sustainable future survival of man. From the urban development perspective, land is a resource that greatly determines how cities work; it is strategic for improving their productivity, equality and sustainability (Durand-Lessrver, 2014). Hence conflicts and disputes are bound to occur during the space or land use allocation both in rural as well as in urban areas. This becomes more severe in urban areas which have been registering influx of migrants and natural population growth.

According to available literature, controlling disaster risks in urban areas is an experiencing challenge. The desire is to create urban areas with a balanced use, separation of uses, cities where authorities and inhabitants to interact with urban land resource. A balanced land uses, and separation of uses among others, are anticipated from this interaction. The drive is to have prepared urban residents capable to recover, and progress forward when disasters occur. This leads to a desire to build urban areas that provide urban residents with stable income, employment, able to invest in stable and sustainable socio-economic sectors, strong household mobility, have improving quantity and quality housing (Todo, Nakajima, and Matous, 2015).

But disasters have always been experienced in urban areas as a result of human interaction with nature, technology and other living entities. At the same time, the drive to create integrated, inclusive, and reflective urban development remain valid but not pursued.

Although this interaction is anticipated to support current and future urban growth patterns, inadequate resources are normally the challenge experienced. Even establishing measures that if undertaken can promote sustainable development is a difficult achievement in most urban areas. This has denied the authorities having practices that provide the basis for stable and sustainable livelihoods, wellbeing and improved living standards. Likewise, achieving the four fundamental objects of urban areas proves difficult. These fundamental objects or ideals are beauty, convenience, environment and health. Equally important is that these urban areas are rapidly expanding, which presents a host of challenges for urban local bodies. The need to provide more affordable land, infrastructure, and housing; to create economic opportunities for all sections of the population; and to deliver basic services in an efficient and cost-effective manner is equally important but difficult to realize. Most urban areas struggle with the desire to use scarce land resource to provide growing demands for services desired by urban residents. This means that innovative, creative, and sustainable strategies are needed to ensure improved productivity of the scarce urban land compared to the population proportion. Furthermore, these areas are engaged in practices that equip urban areas to be disaster free or safe. The main focus of most of these cities is to ensure urban residents are resilient to recovery, and are not vulnerable to any disasters (Scricciu, Barker, and Ackerman, 2013).

But one of the most enduring physical manifestations of social exclusion in African cities is the proliferation of slums and informal settlements. The outcomes and impacts are high rate of population density, poor sanitation, unclean water, unplanned sprawling structures in form of shacks, malnutrition and high rate of poverty (Taupo, and Noy, 2016). Urban populations living in slum and informal settlements experience the most deplorable living

and environmental conditions, which are characterized by inadequate water supply, squalid conditions of environmental sanitation, breakdown or non-existence of waste disposal arrangements, overcrowded and dilapidated habitation, hazardous location, insecurity, and vulnerability to serious health risks. Slum residents are also excluded from participating in the economic, social, political and cultural spheres of the city all of which create and nurture capabilities (Wisner et al., 2004; Shepard et al., 2013).

Instead of using policy, investments, and capacity to convert urban scarce land into productive and sustainable resource, the outcomes are increased exposure and vulnerability of urban residents and their assets to disasters. For example, in many cases, infrastructure is located in flood-prone areas; schools and hospitals are not constructed according to specifications to be resilient to floods, and new real estate development takes place over wetlands, thereby obstructing their natural drainage-related functions. Although it is understood that urban land use management processes such as land use planning, development control, Greenfield development, and urban redevelopment can play an important role in reducing disaster risk, their inadequate application makes it difficult to prove whether they are effective methods. Moreover, the county governments are denied opportunities to make valid practices to have productive, innovative and creative urban areas.

Practices that pursue understanding interaction between hazards and urban growth patterns are critical. This can provide basis of evaluating how disasters interact with existing and future urban growth patterns enabling designing a combination of measures that minimize such risks, for example, developing spatial growth strategies to direct development away

from inundation-prone floodplains. Apart from that, the drive to discourage development in areas with high liquefaction potential in the event of a disaster will also be possible. Moreover, identifying Greenfield site can disclose disaster risk information. This will allow potential private investors to be better informed of the need to adequately assess the costs and benefits of developing land in certain ways. However, most urban areas experience challenges that indicate lack of such practices (Khayesi, 2007; Coulombel, 2010; Gunjal, 2016).

This means that safety and security of habitats in urban areas is not guaranteed. For example 60 per cent of residents in Nairobi Kenya now live in slums with no or limited access to even the most basic services. According to UNOCHA Report (2011), a ferocious fire has razed to the ground, hundreds of houses in three estates in one of Nairobi's Slums Mukuru Fuata Nyayo, Kayaba and Marigoini estates, leaving one child dead, several people missing and more than 1700 urban residents homeless and stripped of their property and livelihoods. That means urban poverty is set to be Kenya's defining crisis over the next decade if it is not urgently addressed. This means poverty is being urbanized in Kenya, a worry to human security, stability and economic development. The only effort or form that dominates assistance in Kenyan urban areas is food aid that victims receive (Gaube and Remesch, 2013).

According to the ancient philosophical thoughts, nature of universe was divided in three different elements: water, air, and land. Surprisingly, the system of property rights has the same attitude and refers to all above mentioned elements (Epstein, 2012). This part of literature review will focus on the property rights of land, which itself is unique resource,

as it is fixed (Jacobs, 1999). This scholar argues that property rights determine the property ownership. Subsequently, Bromley (1991) and Needham (2006) emphasized that there are different types of property rights: - state property, private property, common property and non-property. The property rights as reveals by the literature review include different elements that are referred as “bundle of rights” (Renard, 2007; Ostrom, 1976). But what are the elements that are included in this bundle and which determine ownership? These Scholars refer to five different elements as follows: - right to access, withdrawal right, right to management, exclusion rights and right for alienation (Blomquist, 2012 & Ostrom, 2009). Property is a thing or things owned (Oxford Dictionary). Private property is an individual right in land and is the strongest tool for distribution of good (Davy, 2009). However, for the purpose of this study, we are concerned with other property rights such as state property rights and common property rights. The controversial elements in property rights touches’ on security. But on contrary, Harvy (2011), states that private ownership may result in less security for the poor as they can be forced to sell their properties as their ability to pay the land taxes is low.

2.3. Legal framework of Land Use Planning in Kenya

The land in Kenya is subdivided as agricultural land, forest, and other; agricultural land is further divided into arable and arid lands. In Kenya, people value land differently where farmers and pastoralists land is property to be owned and a source of livelihood, and access to land and controlling it are key concerns. The elite consider land as a marketable commodity from which to make windfall profits through market speculation mechanisms.

As a nation, the public, politicians and administrators view land as a sovereign entity whose boundaries reflect a social, cultural and political identity.

Kenya has faced major challenges in urban land use, especially the economic and environmental sectors. In the housing sector, land uses have been biased meaning a difficulty for urban residents to access affordable quality standards housing. Moreover, Kenya has been experiencing an annual shortfall of housing, exceeding 250,000 units. There has also been an occurrence of rapid urbanization which is as a result of rural-urban migration and realization of high population growth. Access to both prime and virgin land for housing has provided a perfect opportunity for investors in the sector but with unequal opportunity of land use. Only a few wealthy and well connected investors or individuals have ability of land use of virgin and prime areas. This has led to expansive growth of slums and informal settlements ,distorted access to land, high cost of finance ,existence of rigid building laws and regulations and the deterioration of housing stock due to lack of a maintenance framework.

According to Ministry of Lands report (2017) land use laws and regulations have undergone through a review process. This is meant to keep up with the best global practices and the ever growing demand and challenges, in particular urban areas. Such laws are; the housing policy 2004, housing act, and the building code. Equally, the current housing policy sessional paper NO.3 of 2004 has been reviewed to reflect on the government strategies of wholesomely addressing the challenges faced by the housing sector and any other land use. The focus is to establish housing funds to help in reducing the cost of construction hence low cost of housing, review of building laws of 1968, to

conform to constitution of Kenya 2010. The reviewed laws provide strict penalty and sanctions for any persons found liable for the collapsing of any building. However, most buildings in urban areas are still substandard and continue collapsing in the eyes of the reviewed laws and regulations to support sustainable urban land use.

It means that land use laws in the country has not been adequate and cannot help urban residents to access basic needs such as shelter, education, food and clothing. According to Saunders and Becker (2015) the building stock had been neglected due to the poor maintenance culture and both the public and residential buildings are the most affected in Kenya. Although the ministry established maintenance policy for inspecting all buildings in every 5 years no improvement has been recorded. The country urban areas still experiences a demand of 250,000 housing units per annum and yet it is capable to provide only 50,000 units per annum, a low number inadequate to bridge demand deficit of 250,000 units annually. However, 922 housing units have been completed in Kibera zone through slum upgrading programme and the ministry will commence construction of over 8,000 units under Civil Servants Housing Scheme. Yet due to poor urban land use, the original slum dwellers relocated for the construction of these units do not have direct access to them. This has continued to push further the slum and squatter problem unresolved in Kenya. There are many interested developers such as the World Bank, UN Habitat, SIDA, AFD and Shelter Afrique. These developers have also not been able to bridge the missing link of availability, affordability, low cost housing and social housing and accessibility and balanced land use for all urban residents. But their proper planning has introduced aspect that was lacking and can be replicated in other areas. Their hard work bore fruits as there has been a rapid growth in the number of schools, markets , roads

, lighting programs, sewer lines and dwelling houses hence changing the lives of many Kenyans.

Kenya's national spatial efforts date back to the colonial era when the British administration established various Ordinances aimed at controlling land use in the East African Protectorate. Key among these was the Town Land Ordinance of 1902, and the Crown Land Ordinance of 1915. The former declared all land in the protectorate as crown land, while the latter reinforced it by declaring that all land, including that which occupied by indigenous Africans, as being subject to the Governor's authority and power (National Spatial Plan in Kenya, 2015-2045). The 1931 Planning Ordinance provided legislation on control of development in towns. However, the milestone in Kenya's colonial planning and land use planning and its development were outlined in the Swynnerton plan (1954) and the development and Land Use Planning Regulations of 1961, latter repealed and enacted as part of the Land Use Planning Act Cap 303 of 1968 (Kenya National Spatial Plan, 2015). The power and functions of the National and County Governments are outlined in the Constitution of Kenya (2010), County Government Act of 2012 and the Urban Areas and Cities Act of 2011. Article 185 of the New Constitution (2010), requires that the County Assemblies to pass legislation necessary for effective of those functions. At the same time some functions fall under the jurisdiction of both the national government and the County governments (Kimani and Musungu, 2014; Galland, 2012).

The history of planning legislation in Kenya spans from both the pre-colonial period and post-colonial period. Planning of urban areas during colonial period was largely driven by a segregation policy based on various ordinances, orders in council, regulations and White

Paper (Kiwaniis & Musungu, 2010). However, following independence, the ordinance and laws from the colonial era were repealed and replaced during the 1960s. The planning legislation introduced in the 1960s was reviewed again in the constitution of Kenya 2010. In 2010, Kenya promulgated a new constitution. The key planning land use and development control status include the County Government Act 2012. Urban Area and Cities Act 2011, the Physical Planning Act 1996 and Environment Management and Co-ordination Act 1999. Some of the policy and in that area expected to support this urban development agenda include the County Government Act (2012), the Urban Areas and Cities Act (2011), the National Land Commission Act (2012) and the draft National Urban Development Policy (2012). At policy level, the constitution of Kenya, (2010) and the National Land Policy-Sessional Paper no. 3 Of 2009 without doubt provide an improved framework for planning and land use and development control, (Sifuna, 2009). For instance, Article 66 of the constitution mandates the state to regulate the use of any land, or any interest in right over any land in the interest of defense, public safety, public order, public morality, public health or land use planning (Sifuna, 2009). Before the advent of the devolved system of government, the physical planning Act (Cap 286) and the Local Government (Cap 265) provided clear guidelines on the procedure for plan preparation (physical development plans) and for implementation and development control (Syagga, 2006). The County Government Act (2012) and Urban Areas and Cities Act (2011) enable county governments to allocate land and enforce development control and planning (development implementation) at local level. The Physical Planning Act (Cap286) is still in force- albeit that it is inconsistent with the new laws and spirit of the 2010 constitution (Syagga, 2006).

2.4. Land Use Planning and Urban Growth in Kenya.

Land use planning is the conceptualization, coordination, and encouragement of private and public use of land to satisfy long-term public interest. It provides means of managing human developments to ensure maximum use of limited resource base and to retain for future generations a maximum number of available alternatives (Baldwin, 1985). The dispersal or concentration of pollutants depends upon spatial location of the activities concerned (Njunguna, 2007).

Land use planning focuses on development pattern, housing element, rehabilitation & redevelopment, special planning areas and neighborhoods' preservation and revitalization. County governments envision carefully planned and well-designed urban area that is amenity driven with balanced development in all sectors. It seeks to regulate land use in an efficient and ethical way, thus preventing land-use conflicts. Different governments use land-use planning to manage the development of land within their jurisdictions. This is focused to create diversity of current and new business and industry start-ups, well-planned open spaces, and integrated amenities. Without directly speaking, rapid urban population desires to grow with an emphasis to create a more sustainable development pattern that appeals to urban residents and a broad demographic for longer generations to come (King, Harwood, Cottrell, Gurtner, and Firdaus, 2013). At that time, a goal or objective of urban land use planning is to establish dispersed employment areas and balanced mixed use activity centers which aims at creating jobs opportunities and generates high income to the urban residents, hence their ability of the urban residents to invest.

There are clear reasons for cities to believe that good planning now will result in better economies and revenues later. The importance of cities to viable regional economic growth and development, to preserving the environment, and to meeting emerging market needs is becoming clearer every year. It is well recognized that successful regional economic development is dependent upon the existence of successful cities as centers of commerce, transportation, culture, education, and medical services, among other important services. Developers are increasingly attracted to cities, which lead other municipalities in becoming development ready that is by removing unnecessary obstacles to approving development projects. Development that occurs in existing urban centers, particularly compact, mixed use development near transit and other services and infrastructure is much more cost-efficient and environmentally sound than development at the urban fringe or sprawl development.

Planning includes managing continued residential growth, striving for economic development, and influencing thoughtful land use decisions in the cities and beyond. Urban residents demand a balanced and accessible urban area with educational excellence, safe neighborhoods, and strong business continuity. It implies that growth in a pattern consisting of a collection of community villages, each anchored by mixed-use village centers along transit corridors with concentrated shopping, employment, a variety of housing choices, and amenities are encouraged.

The urban land use planning is seen as a blue print that guide urban authorities vision of developing as a collection of multiple village areas each with balanced and separated mixed-land use village center cores anchored with commercial and employment centers

served by business parks, industrial parks, commercial and residential parks, restaurants, retail shopping and cultural opportunities such as art theatres and galleries, regional economic hubs.

In Kenya, this can be critical tool for realization of vision 2030 and beyond. It can enable Kenya to plan for village centers that represent higher intensity areas within a distinct geographic area along transit corridors and are a cluster of community oriented neighborhoods character areas with local commercial, office, and mixed use spaces. These centers are equipped with public gathering spaces with civic uses, such as schools, libraries, and parks and have a distinct identity and village theme. Uses will be integrated to the maximum extent possible in order to encourage a pedestrian-oriented design and transit ridership. The future Village Centers will be served by a robust transit system and provide a variety of housing types appealing to a broad demographic. The Village Center development pattern offers a more sustainable land use strategy, a strong sense of community, pedestrian oriented commercial nodes, mixed-uses, employment, entertainment, and local services. It also appeals to people who cannot or prefer not to drive as a primary means of transportation, such as the senior urban citizens and younger generations.

These planned villages represent smart growth strategy with a proper job-to-housing balance, a neighborhood and community-based system, a synergy with the urban areas that improve communication and a successfully operating multi-modal transportation network. It would offer planned opportunities for urban residents to live, work, and play. This development pattern centers on what the local residents love about their neighborhood

while setting measures to ensure those special characteristics are enhanced and preserved. Guided by smart growth principles, land uses should be concentrated within a 1/4 to a 1/3 of a mile from the primary transit stop of the Village (Putman, 2010). Ideally, land uses become less intense moving away from the village center with low density residential, large lots and agricultural uses around the fringe of the village. This could help alleviate urban households with high density rates problem currently threatening dream for overcrowding, pollution experience (Spence, Annez and Buckley 2009 and Strange 2008).

Furthermore, balanced planning for mixed-urban land use developments incorporates residential units, commercial properties, and employment uses. These areas may also contain cultural amenities such as performing arts centers, entertainment venues, museums, education and training centers, and community gathering places. This would allow urban residents to minimize and shorten trips by clustering multiple services and activities and by supporting alternatives to automobile transportation. Planning for development on activity centers can reduce sprawl, conserve open space and protect irreplaceable natural resources on the urban fringe. It lead to less land space use since compact community and building design require less land for construction. Also reduced is energy needed for transportation, transporting water and providing other services, while reducing the carbon footprint, urban heat island effect and environmental impact.

Apart from that, land uses and development supportive of an aging population is critically important to urban areas. In developed countries, aging population is larger than the youthful one. But in developing world, it is the reverse. This means that urban land use must integrate the understanding that the youthful population requires planning towards

old age. Since most residents have chosen to retire in urban areas and seasonal residents may become permanent, placing a high demand for senior related services such as health and medical care, living assistance, quality affordable housing, transit, and human services (Paton, Mamula-Seadon, 2013). Urban residents envision the future to include diverse opportunities for end-of life planning and services. To meet the needs of this population, the county governments will require fully integrated medical healthcare services at convenient locations, rehabilitation and therapy facilities and end-of-life preparation such as funeral and mortuary services, a cemetery or interment facility. A place to bury and lay persons to rest completes the circle of life and creates a permanent sense of home among residents and so are critical.

Cities and Urban Areas play a crucial role as engines of development as well as centers of connectivity, creativity, innovation, and as service hubs for the surrounding areas. According to Saunders, Beban, and Coomer, (2014) service-based land uses and commercial uses are lagging behind residential construction. Growth and development requires building materials for everything from streets and landscaping to buildings. Ensuring that urban areas have adequate resources to provide these necessary materials should be one of the main reasons behind a new requirement that cities begin to plan for sources of aggregate and incorporate into their general plans. It creates land use designations, transportation corridors, and village core and resort designations. In Kenya land use planning could play a significant role for the success of the four big agendas of the Kenyatta's administration, that is the provision of adequate housing, food security, free education and the universal healthcare.

Academic Scholars of land use planning worldwide have attempted to analysis urban spatial structure, (Alonso, 1964; Muth, 1967 and Brueckner, 1987). According to Bruckner, (1987), spatial structure of city or urban area refers to systems, methods and approaches used by the public and private sectors to influence the distribution of people and socio-economic activities in urban land available spaces of various scales within that city or an urban area. Yen, (2012), argues that spatial planning can be defined as the coordination of practices and policies affecting spatial structure. In her words, spatial planning is synonymous with the practices of urban planning. In fact, urban spatial structure systems, tends to determine the urban forces and factors which tend to influences the urban expansion and the direction it takes.

However, Cities have a spatial structure which is not always visible from the ground but which appears when analyzing data. Many cities which appears very dissimilar from the ground share the same spatial structure. The two outstanding urban structures in the modern cities are urban sprawling and compact cities. Most cities are characterized by low population density, leapfrog or fragmented development, scattered suburban linear patterns and overdependence on private transport. The sprawling cities has been fueled by rural-urban migration, unaffordable housing in city-centers and land administration rigidities. Thus sprawling development reinforces unsustainable development. Likewise, some urban areas are characterized by high population density, centralized development, spatial mixed land uses and functions and well developed public transportation. Compactness and connectivity generally have produced more sustainable urban pattern and forms. Compactness is also an element of densification of a city or urban area.

Therefore, Angel, (2011), basing his argument on the two above characteristics of the urban spatial structure, point out that, the spatial structure of cities could be described by two superimposed patterns: the spatial pattern of population distribution within the built-up area, and pattern of population movement around the city during the day.

He further, said that, to describe urban spatial structure, one must make use of basic data on land uses. In this case, to analysis spatial structure of an urban area, we are interested in the degree of spatial concentration of urban population and employment. At the city-wide level, activity may be relatively centralized or decentralized depending on how concentrated it is near a central business district. On the other hand, Brueckner, (2014), argues that, understanding the spatial structure of a city allow urban planners to:- predict the main direction of future development , develop strategies which are compatible with current spatial structure ,and influence the evolution of the current structure in a manner consistent with Municipal or urban authority objectives.

Urban growth alters not only the pattern of land use and land values, but also the intensity of site use. As supply of land in urban area is fixed in short term, this will create scarcity. Thus, in the short-run the supply of urban land is inelastic. The medium and long-term supply of urban land is elastic provided that there is an absence of constraints such as green belt controls and use restrictions, and assuming the availability of transport. Profitability and utility are largely determined by accessibility. The greater the accessibility of a location, the greater the comparative advantage and the greater the demand for property or urban land at that location (Brueckner, 2012). In the case of business use,

general accessibility refers to nearness to transport facilities; for example, rail, bus stations; and motorways, labor, customers and service facilities such as banks and post office.

Bertaud (2012) argues that Land spatial structure or urban spatial structure is the arrangement of urban public space, the way the urban land is arranged. According to the scholar, urban spatial structures are shaped by market forces, with regulations, primary infrastructural investments and taxes. This affects many aspects of how cities function and has implication for accessibility, environmental sustainability, safety, social equity, social capital, cultural creativity and economics (Genesis, 2008). Subsequently, this scholar points out that the demand for and access to land for residential purpose was the main drivers for spatial growth within the city/urban area. According to Dowall (2010), urban structure in brief is the arrangement of land use in urban areas. The spatial structure of urban area can be defined by its: land consumption, spatial distribution of population and pattern of daily trips. Rates of urbanization can fluctuate rapidly and be hard to predict. This makes planning for urban growth a challenge, especially in developing countries, where more than 90 percent of urban growth is occurring. There are linkages of urban spatial structure and household transit, pollution due to transport and disaster risk management. Thus, urban spatial structure tends to have influence on households disaster risk management.

The built-up form of a city can be represented both as asset of spatial elements; for example, green space, central business districts, high rise residential, transportation corridors, gentrification, urban development nodes (Angel, 2011). But Yuen (2013) and Angel (2014), point out that other factors such as: non-economic factors, especially,

population growth and migration; government interventions in form of policies; regional socio-cultural and political factors all account to the spatial structure urban areas growth. In Eldoret Urban Area, centripetal forces, especially the rural-urban migration, population growth, need for employment, availability of urban services and good infrastructure have attracted many into the urban area of (EUA), especially after the attainment of political independence in 1963, causing urban expansion or growth.

2.5. Urban Planning Dynamics which influences Urban Land Use Planning

Urban planning is available force for City leaders to achieve sustainable development. Urban planning is a technical and political process concerned with the development and design of land use and the built environment, including air, water, and the infrastructure passing into and out of urban areas, such as transportation, communications and distribution networks (Bruckner, 2009).

Urban planners, direct the development of Cities and Towns. A well developed, effective urban plan requires thorough research and input from numerous stakeholders, including citizens, landowners, and government staff. Urban planners should think about their plans from the perspective of all who will be impacted by their efforts.

The Local Government perspective, urban planning touches on numerous City-life elements: - new and pre- existing land, buildings, roads, communal spaces, transportation, economic development, infrastructure, and the environment, among others. These aspects are categorized into different conceptual areas or dynamics as below:-

2.5.1. Spatial Development Planning

In the urban land planning, spatial planning systems consist of methods and approaches used by the public and private sector to influence the distribution of people and activities in spaces of various scales. Spatial development planning is therefore the coordination or practices and policies affecting spatial organization. It is practiced in the urban planning. This infers that it involves planning efforts in urban areas. The planning through spatial is focused towards land use, urban, regional, transport and environmental planning. All these are believed to create environment favoringby socioeconomic developments.

According to Cox, and Perry (2011) this is a public sector planning tool used to influence the future spatial distribution of activities, distribution of people and activities in spaces of various scales in order to improve the built, economic and social environments of communities. It aims to create a more rational territorial organization of land uses and the linkages between them, to balance demands for development with the need to protect the environment, and to achieve social and economic objectives. Spatial planning tries to coordinate and improve the impacts of other sectoral policies on land use, in order to achieve a more even distribution of economic development within a given territory than would otherwise be created by market forces. Spatial planning is therefore recognized as an important lever for promoting sustainable development and improving the quality of life (World Bank, 2014). Spatial planning in both urban and rural areas is a key instrument for working towards sustainable development at the local level. More specifically, urban planning is a potent tool both for reducing the overall impact of settlements on the regional environment and for improving conditions within settlements.

2.5.2. Strategic Development Planning

Strategically, urban planning has a critical role to play in improving people's wellbeing and the quality of life. International conferences on sustainable development have highlighted this message; from the United Nations Conference on Environment and Development in Rio de Janeiro in 1992 to the United Nations Conference on Human Settlements (Habitat II, the City Summit) in Istanbul in 1996 even the (Habitat 111) in Ecuador 2016. According to Baker, (2013), Strategic Development Planning is an initiative that provides a basis for coordinating and targeting development efforts and interventions in urban and rural areas. Experience has shown that lack of spatial frameworks in the form of up-to-date urban development plans clearly indicating recommended land use, land ownership, land tenure, and the planned urban expansion for the towns in which interventions are taking place, can lead to unsustainable location of facilities and services. This in itself not only diminishes the impact of the interventions but also results in wasteful application of resources.

Urban areas development needs to be more consciously planned. This would make them able to address sustainability appropriately. Therefore strategic development planning practices also need to be changed to reflect a new awareness and to integrate environmental, health, economic and social concerns of the 21st century.

2.5.3 Integrated Development Planning

Integrated development planning is a strategy to prevent socioeconomic, environmental and climate impacts on the population. In urban areas this is used as mitigated intervention

tool that focuses on tackling flooding, drought, water scarcity and heat stress, as well as to avoid exposure of valuable elements to risks. Climate impacts can be prevented when changing land use in a way that it positively affect the regional water balance, which influences the evapotranspiration process through infiltration, the soil water redistribution process, and surface roughness, which controls overland flow velocity and floodplain flow rates. Afforestation, forest transformation, sustaining wetlands, avoiding bare soil during precipitation season, modified vegetation cover, and introducing drought/flood-tolerant crops can also reduce flood and drought risk.

Land-use planning is also useful in case of snow avalanches, as for instance is used in Switzerland, where zoning restricts new building areas at risks. Three zones are established: red where building is strictly prohibited, blue where building is possible but designs have to take impacts into account, and yellow with no restrictions. The use of maps and plans provide information regarding these restrictions and negative impacts are considerably avoided. Some areas are more prone to flooding than others. Africa is currently experiencing significant economic growth and associated demographic changes, including rising urbanization. But without the requisite infrastructure, spatial and settlement planning. In urban areas, the requirements of social, economic, and ecological sustainable development are usually intertwined with the problems of land-use intransigence, fragmentation, and deterioration of quality of natural systems.

2.5.4. Sectoral Development Planning

Each sector in the economy is generally required to formulate their annual or five year plan. For instance, the agricultural sector, education sector, health sector, or tourism sector.

These entire sectors are supposed to develop their own development plans. It is these sectoral plans that are generally combined to develop the integrated development plans of a country or a region. The medium plans in Kenya, especially, the five years development plans are both sectoral and integrated development plans.

2.5.5. Physical Planning

Mankind derives his livelihood and survival by exploiting the three physical matters on earth, namely soil (land), water and air. Although those matters appear to be in abundance, they are finite and over exploitation without proper planning might lead to mankind extinction. The rising population has exerted pressure on the little productive land available forcing people to cultivate on steep slopes and riverbanks thus causing soil degradation and erosion.

This has resulted in crop failures, food deficiency and poverty thus pushing people out of rural areas to seek the elusive greener pastures in urban centers. Availability of well-paying jobs, business opportunities, electricity, clean water, entertainment, efficient transport and other amenities attract people to urban areas. This has led to rapid urbanization and industrialization. However, the slow economic growth coupled with demand for urban lifestyles overwhelm supply leading to mushrooming of illegal and uncontrolled development that negates the pull factor.

Planning is needed to ensure the population is having access to basic incentives including urban services. These populations also require proper human settlements, organized transport, proper infrastructure, economic development, good governance and harmonious

living with nature and proper physical planning must be achieved. Physical planning is deciding in advance what to do, where, when, with what and how, in, under and above land. It is a thought process that guides land use thereby has to be guided by a set of rules, regulations and standards. This is a process through which a planning authority prohibits and regulates use, sub-division and development of land and buildings within its area of jurisdiction.

The main goal of land use planning is to divide land uses to meet the economic and social needs of people while safeguarding the future resources. Land use planning is basically the public policy exercise that designates and regulates the use of land to improve a community's physical, economic, social efficiency, and well-being of the people with considering socioeconomic trends as well as physical and geographical features. Physical planning can be designed as an exercise that uses the land use plan as a framework to propose the ideal physical infrastructure for a settlement or area, including infrastructure for public services, transport, economic activities, recreation, and environmental protection. A physical plan may be prepared for an urban area or a rural area. A physical plan for an urban region can have both rural and urban components, although the latter usually predominates.

A physical plan at a regional scale can also deal with the provision of specific regional infrastructures, such as a regional road or a bulk water supply system. Both the Land use plans and physical plans are not necessarily mutually exclusive. Laws, regulations, plans, and institutional frameworks should form the basis of reconstruction planning. If existing instruments are not realistic or are contributing to informality, use the reconstruction

process as an opportunity to improve them; the planning process should join active collaboration among the reconstruction agencies, the affected community, the private sector, and other stakeholders, thereby engendering their ownership of the planning process. The planning process should respond to issues of land rights and titling and to discrepancies in the administration of land records, address the needs of informal occupiers of land, and work with them to find viable alternatives. It is common practice in many countries to prepare comprehensive development plans that address both land use zoning and the provision of physical infrastructure.

2.5.6. Urban Master Plan

According to Yen, (2012), Urban Master Plan is a blue print and reference framework charting overall configuration and direction of future urban growth. It is based on forecast and assumptions about urban population growth, economic dynamics, social factors and urban land use needs of a specific city or urban area. Durand- Lesserve, (2010), argues that Urban Master Plan if not formulated and implemented well, then likely to be restrictive regulation instrument and even increases transport costs and further inflate urban land prices/ housing prices unduly. This scholar pointed out that this is a case in most African cities/urban centers. However, Master planning was introduced in African cities by colonial governments in Africa. The purpose of master plans was to create orderly, pre-approved development using regulatory mechanisms this form of planning is now widely seen as aggravating urban challenges. Master plans have been criticised for being ill equipped to deal with the realities of fast growing, informal, and heterogeneous African cities, the governments of which are often riddled with corruption and capacity constraints, the

diversity of tenure arrangements that characterize these cities, and for rationalizing oppressive slum clearances in the name of orderly development (UN ECA, 2014; Clarke Annez & Lin, 2010). Therefore, Master planning, currently, especially, in African Cities, have be criticized to be out of step with urban realities and that does not serve interests of the poor.

2.5.7. Infrastructural Development Planning

Land use, transportation and infrastructure planners prepare plans and policies that affect the growth and appearance of neighborhoods, cities, and urban regions. Their work affects the siting and sizing of new development at the urban scale as well as the physical design of specific sites. The site planning process itself involves site selection, program development, and site analysis and design, and plan implementation.

Their work may also protect historic buildings and special design districts in the urban core, as well as open spaces and agricultural lands affected by unwanted or premature urban growth in rural areas. Integrated land use and transportation plans have emerged in recent years to promote new concepts, such as: “transit-oriented development,” “complete streets,” and “safe routes to schools,” and to reverse the negative effects of urban sprawl and decay. These planners often use geographic information systems (GIS), population projections, economic base studies, and land suitability analyses based on roadway and infrastructure capacities and environmental factors to determine the quantity and location of new industrial, commercial and residential development in towns and cities. They also forecast the impacts of new urban development on communities, roadway networks, and the environment. They may

also prepare plans and strategies to make our use of natural resources in land use and transportation systems more efficient. In general, their work seeks to make our neighborhoods, cities and regions more livable, sustainable and resilient for everyone.

2.5.8. Environmental planning.

Environmental planning is a process of facilitating decision making to carry out land development with consideration given to the natural environment, social, political, economic and governance factors and provides a holistic framework to achieve sustainable outcomes. A major goal of environmental planning is to create sustainable communities which aim to conserve and protect underdeveloped land (Conacher, 2010).

From environmental planning assessments encompasses areas such as land use, socio-economics, transportation, economic and housing characteristics, air, pollution, noise pollution, the wetlands, habitat of the endangered species, flood zones susceptibility, coastal zones erosion and visual studies among others, and is referred to As an integrated environmental planning assessment. It is ability to analyse environmental issues that will facilitate critical decision making. Many environmental planning actions currently revolve around the reduction of emissions and material reuse, not adaptations in order to lessen future climate change impacts (Beer, 1977).

2.5.9. Transportation Planning.

Transportation planning is the process of defining future policies, goals, investments, and designs to prepare for future needs to move people and goods to destinations. As practice to day, it is a collaborative process that incorporates the input of many stakeholders

including various government agencies, the public and private businesses. Transportation planners apply a multi-model and or comprehensive approach to analyzing the wide range of alternatives and impacts on the transportation system to influence beneficial outcomes (Wegner, 2012). According to Wegner, (2012), transportation planning which is commonly referred to transport planning involved with the evaluation, assessment, design and siting of transport facilities (generally) streets, highways, bike lines, and public transport lines.

Transportation planning as indicate above is to be determined by the availability of land. Thus, transportation planning has a direct influence to land use planning. The earth's surface, called the land scape, is a unique and valuable resources. Land use (also called Land Development and Spatial Development) refers to how the landscape is treated, including the location and design of buildings, transportation facilities, parks and farms.

2.5.10. Sustainability Planning.

Sustainability planning emphasizes the integrated nature of human activities and therefore, the need to balance economic, social and environmental objectives. Interest in sustainability can be considered a reaction to overly specialized decision-making focused on easily measured goals and impacts, while ignoring those that are indirect or more difficult to measure. According to American Planning Association, sustainability planning require comprehensive analysis that accounts for all significant impacts, including those distant in space and time. It strives for development (increased quality) rather than growth (increased quantity), and recognizes resource constraints and ecological risks such as fossil fuel depletion, habitat loss and climate change. Conventional planning asks "Does it

work”, sustainability planning tends to ask “Does it fit?” That is, whether individual decisions fit into overall long-term goals. The sustainability issues from the economic perspectives are- efficient mobility, local economic development, and resources operational efficiency; from the social aspects- social equity,(fairness), human safety and health, affordability and community cohesion; and from the environmental perspective, the major issues are- air, noise and water pollution reduction, climate change emissions, resource conservation and open space.

2.6. Urban Land Use Planning and Disaster Management

Land use planning mechanism allows for resource management and the reconciliation of diverging interests for example, creation of areas with specific development goals and restriction to expansion and reserve areas. It is therefore supports countries to reduce and manage the risks of natural and manmade disasters. It is theorized that good administration and management of land is crucial to poverty reduction, conflict transformation, improvement in the quality of local governance and ultimately sustainable economic growth. But lacking is the approaches integrated into land use planning for disaster risk management. According to Hailu,(2013), most towns lack mitigation awareness, forecasting preparedness, and make respond to disaster recovery process difficult. In fact majority of urban households depend on relief support without which their coping strategies are weak and inadequate. Moreover most of them fail to improve on infrastructural rebuilding; they end up reconstructing same structures as the ones destroyed. Their vulnerability and exposure to hazard risks that lead to disasters are high.

This group is excluded from participating in the economic social, political and cultural spheres in urban areas all of which create and nurture capabilities (Barrett, 2002).

According to Schustereder, Hohfeld, Lech and Leppert (2016) study done in Philippines did not find any indication that there was impact regarding the long-term effects of Sustainable Integrated Management and Planning for Local Government Ecosystems (SIMPLE model of Philippines) on Household disaster risk management and household well-being. On the likelihood of people living in hazard areas in the control sites, it was found to be lower than in the SIMPLE sites by 7.3 percentage points, yet the findings indicate that they are aware but are still living in disaster risky zones. This implies that there is need for mechanisms to eliminate the current problem that is still holding them to disaster risky zones even if they are aware. Although it appears counterintuitive, a possible explanation is that respondents in SIMPLE sites are more informed and aware that they are living in hazard zones than their matched counterparts. At the same time, households in SIMPLE sites are significantly more aware of initiatives such as tree nurseries, tree planting, and seedling provision than the inhabitants of the control sites. Municipal officials also report having more initiatives such as tree nurseries, tree planting, mangrove nurseries, and seedling provisions in the program areas. Hence, based on municipal officers' and household reports find some evidence in support of greater reduction of disaster risk. It is important to make proper planning for urban land uses to enhance use of such initiatives to make households disaster risk free (Kimathi, 2013).

It implies that there is a higher presence of zoning officers and zoning ordinances among SIMPLE municipalities in Philippines. Also results suggest that the SIMPLE program

contributed positively to improving household awareness about disaster-relevant issues such as reported hazard zones, the risks involved in living in hazard areas, and disaster preparedness; although there was no impacts related to welfare improvements. This indicates that the donor-assisted intervention process has contributed to some of the crucial land-related issues in the selected rural municipalities and cities of Philippines. More importantly, however, is the point that the program's potential long-term impact will remain limited as long as the two core issues of unequal landownership and land rights are not resolved.

Some cautions should be noted, however: it is possible that the impacts are confounded by factors that are difficult to measure. The success of SIMPLE can also be affected by the mayor's all-out support to the program, external resources and other donor funding, as well as frequency of disasters in the areas. It is also important to note that although households are aware of disaster risky areas but still live in such areas. This is an indication that some unknown pressure for instance economic pushes them to risk their lives to expose themselves to such areas. It is critical to have proper planning that develops urban land uses in ways that eliminate risk exposure.

2.7. Land Use Plannig Regulatory Instruments

Lack of common guiding principles in planning and coordination among different sector such as agriculture, livestock, industry, transport, forestry, wildlife, urban development and social services had results in competing and uncoordinated land use practices. As part of land use planning, regulatory instruments is fundamental in development pattern changes and spatial structure reformation, land market efficiency improvements, supply constraints

and price increases in property markets, and labor market shifts that suggest the possibility of countervailing effects. The economic consequences of land use policies may highly depend on context and that institutional settings as well as substantive policies are essential for achieving more systematic coordination of land use planning and economic development practices.

The regulatory framework is based on philosophy of economic productivity, social responsibility, environmental sustainability and cultural conservation. The aims of the instruments are for efficiency, access to land use information, equity, elimination of discrimination and public benefit sharing. This study pursued various studies undertaken by the research teams in their respective countries to help identify planning tools and regulatory instruments. The process of identifying these planning tools and regulatory instruments included desk-based research of documents relevant to the national and regional contexts and the case studies and initial interviews with actors in the case study areas. They also relate to different levels of governance: national, regional, local at case study levels. These planning tools and instruments were identified as being potentially relevant to accountability and interest of national and county governments. However, at this point there was no attempt to assess the significance and role of these planning tools and instruments. As a result it may be expected that some of those initially identified will be discarded as not being relevant to the proposed study. These instruments identified after literature search include land use policy, legislation, land use planning and land reforms.

Land use regulations play an important role as basis for negotiation among public sector and private stakeholders. For instance, a developer might be allowed a FAR increase

pertaining to a project site in a return for designating a green space on the site or allowing a wider right- of- way for road that would encroach on the site. And in Kenya, after a protracted land policy formulation process stretching between February 2004 and December 2009, the country obtained a comprehensive national land policy. Key features of this policy were subsequently anchored in the Constitution of Kenya 2010. For the first time in history, the policy and constitutional frameworks provided Kenya with a unique opportunity to undertake comprehensive land reforms to respond to contemporary land issues.

In a country like Kenya, land distribution has been largely in favor of loyalists of the executive and political leadership through history. This indicates that land reforms are critical for upsetting this status quo. Land reforms are also seen to threaten the interests of those who benefitted from irregular allocation of public land who, in a majority of cases, are citizens with reasonable political influence. Such forces placed overt and subtle roadblocks to the process of formulating the land policy and reviewing the constitution whose chapter on land enables the implementation of key proposals in the land policy. The delivery of Kenya's national land policy and the embedding of its key features in the chapter on land in the constitution must therefore be seen as the great epochal achievements they indeed are. However, only the effective implementation of these documents that can cascade the intended benefits to the citizenry. It was therefore necessary to expeditiously develop enabling land laws resonant with the policy and the constitution.

Land-use planning instruments are designed to alter land use which in turn shall determine the urban form and land utilized by the public sector, private sector and community actors (Moreles, 2013). The study shall concentrate mainly on the informal settlements, slums and per-urban areas, but will also explore the situation in formal settlement of Eldoret Urban Area. In essence, the Kenyan constitution requires that among other principles, land be managed in an equitable, nondiscriminatory, efficient, productive and sustainable manner. The constitution further requires that community-based dispute resolution mechanisms be applied in resolving conflicts.

The legal and institutional framework of land, land use, and the system of acquisition and disposition of land rights which have been in place since the colonial times has brought about tension, strife and litigation in land matters in Kenya. The structural framework and principles for the management and administration of land inherited from the colonial times and developed over the three decades since independence has largely failed to instill confidence in the land market. Some of the problems within the land sector in Kenya may be attributed to its colonial history, a proliferation of statutes governing ownership and use of land, broad socioeconomic patterns and demographic trends that have exerted pressure on usable land. Other issues that have taken a center stage in the land debate in Kenya include the optimal economic use of land, rural and urban development, squatting, the quality and security of protection of the environment.

Some of these instruments provide the details of relevant legislation, regulation, and guidance relating to planning, land reforms, land use plans, heritage, and the environment; for example, pollution, air, smoke, waste, habitats, water, and energy. In Kenya, land

reforms that have far-reaching implications for securing the land rights of rural people (upward of 42 million in 2011), and promoting political stability and economic development has taken center stage. The absence of a clearly defined land use regulatory framework in Kenya after years of independence has resulted in a haphazard approach to managing the different land use practices and policy responses. Land use continues to be addressed through many uncoordinated legal and policy frameworks that have done little to unravel the many issues that affect land use management. It means that what can provide legal, administrative, institutional and technological framework for optimal utilization and productivity of land related resources in a sustainable and desirable manner at national, county and community levels has been missing.

Whenever, a household or any other institution, individual, urban authority or building societies are planning on building a building, it's important to become familiar with the various restrictions, as well as the purpose of those that may apply. Selecting a parcel where the house will be constructed is the first step. From there, familiarity with national and county building construction restrictions could enhance cost saving.

Every building constructed requires a building permit and inspections. Building code restrictions ensure the home is properly constructed and meets current energy-efficiency requirements. This would be useful in managing collapsing houses in major cities in Kenya. While these may vary somewhat with a locality; building codes are consistent with regard to sound construction practices and adequate structural support systems, as well as plumbing, electrical and heating-air conditioning installations. Obtaining energy-efficient

specifications allows determine the type of windows, insulation and heating/air conditioning for the house.

The standard distance sideways must also be understood of its importance to a dividing fence or block wall is approximately five feet. In Kenya, those building along the road must ensure a six meter distance reserved for road expansion. This is known as property-line setback, that ensures the fire engines and fighters have access to any part of the lot. In addition, the front of each house is the same distance from the curb or edge of the street. This distance falls into setback restrictions regarding a clear line of sight for the fire department. Knowing the setback restrictions is essential in determining the dimensions of the house with regard to the lot.

The restrictions for those who build in hillside parcel also must understand that the limit the height of a roof to ensure that the view of neighborhood residents is not obstructed. Moreover, for those living in the bed of rift valley such as Nakuru town, the tallest building allowed used to be two story building. Becoming familiar with any height restrictions allows in designing the new building. Some localities and home communities have restrictions regarding overhead power lines, which require installing underground conduits. In addition, many suburban localities restrict the use of septic tanks. Unless the water source is a well, the local public utilities board must sign off on the home building project, approve a sewer connection and install a water meter. A gas company installs a gas meter, and the electrical provider installs a meter in a panel provided by an electrician.

2.7. The Indicators of Land Use Planning Regulatory Instruments

Planning regulation is the control in the manner in which land is used and developed, mainly in urban areas (Sutcliffe, 1980). In urban planning, the publicizing of the need for observance of planning regulations in land development is an important function that the law performs. The main sources of authority for land use development control in Kenya are the various laws and regulations such as zoning regulations, building codes, by-laws and several statutes usually prepared by the central government, local authorities or their agencies. According to Delafons, (1973) zoning limits the rights of private individuals since it involves the regulation by zones under the enforcement of various ordinances power.

2.7.1. Minimum Lot Size.

The essence of fixing minimum lot sizes or areas is to prevent overcrowding, to ensure adequate light and ventilation and to facilitate easy movement of people, vehicles and goods. The actual amount of plot will depend on the type of land use activity, recommended densities and plot coverage ratio.

2.7.2. Floor Area Ratio.

Floor Area Ratio is the ratio of a building total floor area (gross floor area) to the size of the piece of land upon which it is built. It is often used as one of the regulations in City planning along with the building to land ratio. The term can also refer to limits imposed on such a ratio through zoning (Moreles, 2012). As per formula FAR is equal to gross floor area over area of the plot. Floor Area Ratio is sometimes called floor area space ratio, floor

space index, site ratio or plot ratio. The Floor Area Ratio is the building should cover in relation to the total area of the plot. The essence of fixing plot coverage is to ensure a healthy environment and allow for the expansion and improvement of infrastructural facilities and social amenities.

The Floor Area Ratio (FAR) can be used in zoning to limit urban density. While it directly limits building density, indirectly it also limits the number of people that a building can hold, without controlling the building external shape. FAR has a major impact on the value of the land. Higher allowable FAR yields higher land value (Andres Duany et al (2000). For the purpose of promoting health, safety, morals or the general welfare of the community, the legislative body of every municipality is hereby empowered to regulate and restrict the height, number of stories and size of buildings and other structures, the percentage of lot that may be occupied, the size of yards, courts, and other open spaces, the density of population, and the location and use of buildings, structures and land for trade, industry, residence or other purposes (Williams,1935).

According to Smolka, 2014), FAR, is the measurement of a building's floor area in relation to the size of the lot / parcel that the building is located on. FAR is expressed as a decimal number, and is derived by dividing the total area of the building by the total area of the parcel. FAR is most often used to express development intensity of non-residential land uses, and integrated into community's zoning and other land development controls. FAR can be used to either limit the intensity of land use to lessen the environmental impacts of development or control the mass and scale of development.

2.7.3. Building Code /standard

A building code which is also known as building standard, building control, building regulations, is a set of rules that specify the standards for constructed objects such as buildings and nonbuilding structures. Buildings must conform to the codes to obtain planning permission, usually from a local council. The main purpose of building code is to protect the public health, safety and general welfare as they relate to construction and occupancy buildings and structures (Wegner, 2014). Building codes are supposed to be applied by architects, engineers, interior designers, contractors and other regulators, but are also used for various purposes by safety inspectors, environmental scientists, real estate developers, subcontractors, manufacturers of building products and materials, insurance companies, tenants and others.

The practice of developing, approving and enforcing building codes varies considerably among nations. The purpose of building codes is to provide minimum standards for safety health and general welfare including structural integrity, mechanical integrity (including sanitation, water supply, light and ventilation), means of egress, fire prevention and control and energy conservation. Building codes, generally includes:- standards for structure, placement, size, usage and assemblies, size/location of rooms, foundation, floor assemblies, roof structures, energy efficiency, stairs and halls, mechanical, electrical, plumbing, site drainage. Lighting fixtures standards, occupancy rules and swimming pool regulations; rules regarding parking and traffic impact; fire code rules to minimize the risks of fire and to ensure safe evacuation in the event of such an emergency; requirement for specific building uses; energy provision and consumption; minimum and

maximum room ceiling heights, exit sizes and location and qualifications of individuals and corporations doing the work.

2.7.4. Building Permits

Obtaining building permits and planning approvals is mandatory in Kenya and it is the land use regulatory instrument. A developer, or contractor whenever he or she intends to construct a building one is required to seek building permits and building must be approved by municipal authority. A planning permit, as in some instances, it may not be necessary. To get a planning permit, a registered and practicing Physical planner submits the application on behalf of developer to the country or sub- country authority, while building permit a registered and practicing architect submits both architectural and structural drawings on behalf of the developer (Payne, 2012).

Building permits are typically required for any construction in improvement, repair, alteration, construction, or demolition, project, including pool or spa installations, sand blasting, most excavation and the erection of temporary power poles? Permits are also required for re-roofing projects and improvements to plumbing, mechanical and electrical systems.

2.7.5. Open/Green Space.

Open / Green space is any piece of land that is underdeveloped (has no building or other built structures) and is accessible to the public. Open space can include:- green space which is land partly or completely covered with grass, trees, shrubs or other vegetations. Green space includes parks, community gardens, and cemeteries. Broadly, open space

includes green space as well as school yards, playgrounds, public seating areas, public plazas and vacant lots (Yen, 2014).

Open space provides recreational areas for residents and helps to enhance the beauty and environmental quality of neighbourhoods. Lack of community and public access to safe open and green space is a critical area of concern for urban residents in any city or urban area of the world. Using vegetation to reduce the energy costs of cooling buildings has been increasingly recognized as a cost effective reason for increasing green space and tree planting. Plants improve air circulation and provide shade. This provides a cooling effect and help to lower air temperature..

Lack of green spaces leads to higher air temperatures and more ground level ozone, with fewer trees and plants to clean the air and provide oxygen. Additional tree and vegetative growth provides shade and lowers urban temperatures reducing the demand for air conditioning and energy costs. Urban green space, such as parks, playgrounds, and residential greenery can promote mental and physical health and reduce morbidity and mortality in urban residents by providing psychological and stress alleviation, stimulating social cohesion and supporting physical activity, and reducing exposure to air pollution (Moreles, 2014). Green space encourages exercise, provides spaces for socialization, decrease noise and air pollution, and improve immune function by providing exposure to beneficial microbiota. It also can help with psychological restoration, that is green space provides a respite for stimulated minds. Urban green spaces such as parks, sport fields, woods, lakesides, and gardens give people the space for physical activity relaxation, peace,

and an escape from heat. Green spaces are also associated with better air quality, reduced traffic noise, cooler temperatures and greater diversity.

Open spaces have significant importance in the life of the settlements or neighbourhoods. The areas with high green coverage rate have ecological and environmental importance. These green spaces can improve the urban climate, abate the urban heat-island effect by their ecological balancer function and reduce environmental damages. The green space would also facilitate water management and promotes biodiversity in built-up areas, and can help reduce the effects of noise pollution. Greenery also helps to raise the property value of homes and offices.

2.7. 6. Green Buildings.

A green building is synonymous with a sustainable building, a green building is a structure that is designed, built, renovated, operated or reused in a resource efficient manner. Green buildings are designed to meet certain objectives such as protecting occupants health, improving employees, productivity, using energy, water, and other resources more efficiently and reducing the overall impact of the environment. Green Buildings includes- sustainable sites and development, water conservation and efficacy, energy and atmosphere, material and resources, indoor environment air quality, innovation and operation and maintenance.

2.7.7. Building lines/set backs

This refers to the distance between the front and back property lines and the distance from the side property lines respectively to any structure of the property. The rationale Setbacks

can also be placed between buildings for similar reasons. Building lines or setback is the minimum distance between buildings and lot lines. In land use, a set back is the minimum distance which a building or other structure must be set back from a street, or road or other stream a shore of flood plain, or any other place which is deemed to need protection. Depending on the jurisdiction, other things like fences, landscaping, septic tanks, and various potential hazards or nuisances might be regulated and prohibited by setback lines.

Setbacks along state, provincial or federal highways may also be set in the laws of the state or province or the federal governments. Local governments create setbacks through ordinances, zoning restrictions, and building codes, usually for reasons of public policy such as safety, privacy, and environmental protection. Building lines are utilized by communities principally to achieve planned street patterns. They help insure that buildings will not be erected in the bed of projected streets or of potential street widenings. Building lines may also be established for the purpose of preserving residential and commercial front yards.

2.7.8. Buffer Zones

These are zones that separate incompatible land uses and try to prevent conflicts and reduce possible inconveniences. Zones with planted strips of trees, major routes of transportation or the use of natural features such as rivers and wetlands are often used as buffer zones between incompatible land uses. According to Yen (2012), a buffer zone is a zonal area that lies between two or more areas (often, but not necessarily countries), but depending on the type of buffer zone, it may serve to separate regions or cojoin them. Common buffer zones are demilitarized zones, border zones and certain restrictive

easement zones and greenbelts. Buffer zones have various purposes, political or otherwise. They can be set up to prevent violence, protect environment, shield residential and commercial zones from industrial accidents or natural disasters or isolate prisons, and have uses in several other scenarios.

2.7.9. Way leaves or Right of Way Protections

These are rights of way over or through land for carrying sewers, drains, water pipes, electricity cables or wires on pylons into, though, over or under any land whatsoever. Such rights are provided under Way leaves Act, Cap 292 of 1962, Laws of Kenya. According to Moreles, (2012), governments Worldwide, especially, in developing countries should undertake the regulatory reforms, aiming at removing the regulatory bottlenecks. He argued that Mexico took the lead in identifying key regulatory bottlenecks at the local level and designing reforms that structure local incentives to remove these bottlenecks.

Smolka, (2014), identified the key bottlenecks as including building codes, unnecessary high building standards for electrical and sanitary connections, large minimum lot sizes and oversized roads, building licenses, and titling procedures. According to this scholar, the burden of misregulation is currently heavy—estimating that an average of 25% of the cost of new residential construction is attributable to clearly excessive local regulation. The two scholars pointed out that removing regulatory bottleneck would be more applicable in slum areas, informal settlements and perhaps in pre-urban areas, where urban planning is limited.

Right of way is the legal right established by usage or grant to pass along a specific route through grounds or property belonging to another “a path or thoroughfare subject to such right”. A similar right of access also exists on land held by government, lands that are typically called public land, state land, or crown land. When one person owns a piece of land that is bordered on all sides by lands owned by others, an easement may exist or be created so as to initiate a right of way through the bordering land (Yen, 2016).

A further definition of right of way chiefly is as a type of easement granted or reserved over the land for use for transportation purposes; this can be for a highway, public footpath, railway lines, and oil and gas pipelines. The term may also describe priority of traffic flow, the legal right of way of pedestrians, vehicle, or ship to proceed in a particular situation or place. Therefore, a right of way (ROW) is a right to make a way over a piece of land, usually to and from another piece of land. A right of way is a type of easement granted or reserved over the land for transportation purposes, such as highway, public footpath, rail transport, canal as well as electrical transmission lines, oil and gas pipelines. A right of way is reserved for the purposes of maintenance or expansion of existing services with the right of way in the case of an easement, it may revert to its original owners if the facility is abandoned.

2.7.10. The enforcement of Property Rights.

The property rights component is an assessment of the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by state. It measures the degree to which a country's laws protect private property rights and the degree to which governments enforce those laws. It also assesses the likelihood that private property will be

expropriated and analyzes the independence of the judiciary, the existence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts (Baker, 2011).

The property rights are theoretical socially enforced constructs in economic for determining how resources or economic goods is used and owned. Property rights can be viewed as an attribute of economic good. This attribute has four broad components and is often referred to as a bundle of rights:- the right to use the good; the right to earn income from the good; the right to transfer the good to others, alter it, abandon it, or destroy it (the right to ownership cessation); and the right to enforce property rights.

2.7.11. Construction or Building Materials and Technologies.

There are a number of items which are used in construction of buildings and other rural infrastructures some of them are naturally available and some of them are artificial. Many construction materials are used for same purpose but each of them has their own quality, durability, and stability, we have to choose construction materials according to purpose and resources available, items, materials supplied or consumed in construction work.

Types of construction materials are:- stone, bricks, lime, cement, metal, ceramics, timber, sand, aggregate mortar. The construction materials can be further divided into two categories, first naturally available materials and second industrial made materials. Naturally available materials are_ clay/earth/soil/rock; wood/timber; sand, while the artificial or industrially made materials are:- cement, bricks, steel, tiles, ceramic, paints and varnishes, glass, plastic, stone, lime and extra.

UN-HABITAT's Shelter Initiative for Climate Change Mitigation and Adaptation aims to encourage the use of low-cost energy –efficient sustainable building materials and construction technologies and green building and neighbourhood design in order to mitigate and adapt to the new conditions of climate change. The initiative is developed within the framework of UN-HABITAT's Sustainable Urban Development Network, and accordingly with the Kyoto Protocol.

Local governments, developers as well as building and construction industry will be encouraged to use materials and products with identifiable recycled content. The industry will also be advised to use natural, plentiful or renewable materials, such as earth, sand, gravel and extra. Use of locally available, locally produced materials will be promoted as they minimize the use of energy or pollution caused by transportation of materials. Finally, materials that have longer lasting or are compatible to conventional products with long life expectancies will be highly recommended for building and construction use.

According to Sustainable Urban Development Network, (2016), energy efficient and sustainable building materials and technologies offer many benefits to building owners, building occupants, which includes positive impact on local economy, energy conservation and improved occupant health and productivity. Using green building materials and products promotes conservation of the declining non-renewable energy resources worldwide resulting in the reduction of negative environmental impacts associated with extension, transportation, processing, fabrication, and installation, reuse, recycling and disposal of building materials.

2.8. Land Use Zoning

Zoning regulation is defined as collective property right (Fischel, 2012), or as municipal property right because it is one of the most important regulation in land use which is undertaken by local governments (Fischel, 1998). Baldwin, (1985), pointed out that zoning means prohibition of certain developments or activities in designated area, and undoubtedly the most common deliberate control wielded over land use. Land zoning divides the entire urban locality into land use zones that specify the uses permitted in that zone and the applicable regulations. The role of land use planning in Household disaster risk management is one of the most challenging issues to implement because of conflicting values held about land by different segments of the population. Deciding how to use land is demanding enough. It is even more challenging if there are competing views about the role that land should play in reducing collective exposure to risk. All land use activities are expected to comply with the zoning ordinance in order to protect health and safety of communities. This compliance must be demonstrated prior to establishing utility service, obtaining a building permit, or securing a privilege license.

Most urban cities can record success in attracting jobs in high tech light manufacturing and services, information technology, food processing, hospitality and entertainment, printing and publishing, retail and wholesale businesses, educational institutions and clusters, health care service and provision, medical and biotech research and manufacturing, and construction, including green development. There are synergies among these economic activities, with hospital and medical clusters attracting once and service space, retail, and some educational activities, such as training home health aides.

In addition to permitted uses, the zoning by-law regulates the height, location and size of buildings; establishes minimum lot areas and frontages for new building lots; and establishes the minimum number of parking spaces and the minimum amount of landscaped open space that must be provided for various uses. It allows uses and improvements, requirements on the location, size and coverage of structures and improvements, design specifications for particular uses, improvements and types of development, environmental protections and procedural requirements.

According to Fischel (1998) zoning regulation puts different constraints on land development as most of the classifications in land use can be changed without asset of land owners who are affected with changes (Fischel, 1998). Zoning regulations can include use of the plot; for example, residential, commercial, agricultural, or industrial, can define maximum building height, as well as number of units on the parcel, boundaries for building towards the neighbors' and street, requirements for parking and finally, demand paid by developers for related infrastructure such as sewer and roads (Fischel, 1998).

Sandroni, (2011), in his article states that land scarcity is the result of the zoning restrictions together with bad accessibility and because of owners' ability to keep the serviced land vacant. And zoning regulations also define, as mentioned, maximum FARs in different part of the city, but as Brueckner, (2009) argues these limits are not big constraints on development as FARs often tend to follow the market to operate efficiently. Zoning can be used to direct the location, type and scale of development as long as the market demand exists to support the type and scale of land use planned. Six elements of zoning can be identified: - incentive zoning, inclusionary zoning, natural hazard zoning,

intensity zoning, functional zoning and form –based zoning(Sandroni, 2011). Incentive zoning, provide developers with rewards in exchange for including certain public amenities or meeting other public objectives. For example, incentive zoning can include density or floor area bonuses, which allows a developer to build to greater densities so long as they include certain public amenities, such as parks and open space that benefits community at large. Density bonuses act as an incentive because developers generate higher return by reducing the marginal cost of development by building greater densities.

Inclusionary zoning is a policy which requires housing developers to include a certain percentage of affordable units in their projects to create mixed-income communities. In United States, the United Kingdom, the Netherlands and South Africa inclusionary zoning policies have been applied. In fact this inclusionary zoning is appropriate in developing country cities like Eldoret Urban Area, to incorporate the urban poor in the formal spatial structure or estates.

However, zoning is one of the most commonly used regulatory tools to plan, control, and separate urban land uses in developed and developing countries. It is a method by which a development plan such as Master Plan and or Zoning Ordinance segregates parcel of urban land ascribes broad classifications of appropriate uses, such as residential, commercial, height, density, plot ratio, adequate daylight, air, open space and privacy within each zone. The common practice is for zoning to be complemented with other control mechanisms, such as plot ratio, land subdivision and building regulations. The primary intension is to separate incompatible uses, preserve the character of a neighborhood and implement planning goals, while building new development (Sandroni, 2011).

Most land use zones are single-use prescriptions. However, it is possible to allow a combination of compatible uses such as residential and retail or subcategories within specified zones; for example, a residential zone may have subcategories indicating residential occupation at various densities. Critics have increasingly pointed to: the delays and cost creating regulations involved in zoning; its tendency to be static and rigid and segregate uses (Morales and Smolka, 2013). The needs and conditions of development in developing countries are often different from those in developed countries, and require a more flexible set of standards than what has been introduced based on European or American experiences (Sandroni, 2011). Asian Cities, for example, are frequently in use of all types of mixed activities, including residential and commercial (Banerjees, 2014). Urban Planners that support new urbanism have advocated replacing single use zones with mixed land use environments which foster heterogeneity of City life and healthy communities by providing opportunities for social integration and community life that do not exist in single use, suburban-style development (Banerjees, 2014).

Natural hazards zoning refers to the designation of flood plains, land slide zones, etc. With climate change impacts becoming increasingly evident in developing country cities, there is an increased need to incorporate these impacts into local natural hazards zoning (Sandroni, 2011). Regulatory natural hazards zoning should also be combined with other types of instruments, such as: economic instruments, an awareness instruments, for example, making local people aware of the severe danger they face by living in hazard zones; and investments instruments such as providing relocation areas (Sandroni, 2011).

According to Nolon (2011) by 2039 US urban population would increase by 100 million, however, over one-third which translates into forty million new households members would live, work, and shop in these urban buildings, traveling from one area to the other and beyond, largely by car. Where the buildings that house and employ these additional people are located, how energy conserving they are, and how far these new Americans must travel from one area to the other would greatly affect the emission of CO₂ and how vulnerable new development would be to sea level rise and natural disasters that accompany climate change. Many of these new Americans would be attuned to urban living; many of them are young households looking for residency in vibrant places, others are immigrants whose skills are needed in urban places, and a large number are aging couples and individuals among whom there is a growing market for urban places to retire.

2.8.1. `Functional Zoning.

Functional zoning or functional city zoning is a method used for dividing land use by its function. According to Fischel, (2012), land use is divided in two ways by its function and by its physical characteristics. An example of functional zoning would be an area that has designated zones based on function such as an industrial zone, a recreational zone and residential zone. An example of an area zoned by its physical characteristics is defined in terms of characteristics like development density, minimum lot size, and building coverage, placement and height. Functional zoning tends to create or increase car dependency, while mixed use zoning tends to enable walking, making it more sustainable. It has been criticised for causing the squandering of land, energy and time (Fischel, 2012).

2.8.2. Formed Based Zoning.

Zoning was created in the early 20th century as a response to problems associated with overcrowding in central cities and the intrusion of heavy industry into retail and residential areas. Developed in the later years of the industrial revolution, zoning sought to address these problems through separating incompatible uses and limiting residential density.

The New Urbanism movement (1980 to present), has attracted a great deal of interest in re-creating walkable, mixed-use neighbourhoods. As an outgrowth of this movement, form-based codes or zoning are the latest technique to re-examine the underlying zoning principle of separating uses and instead provide new means to develop vibrant mix-use communities. This is accomplished by placing a strong focus on the creation of proper urban form, wherein mixtures of uses can flourish.

2.8.3. Intensity Zoning.

Intensity zoning is defined as land use zones of permitted intensity, such as the number of residential units per unit of surface or allowed commercial surface. Such regulation enables a level of flexibility in urban development since it permits developers to select which types of development they place as long as this development abides by density constraints. Intensity zoning, emphasizes the high density, average density, low density and no development. In fact, the low income residents in the neighbourhoods of Eldoret Urban Areas appear to be high density.

2.8.4. Incentive zoning.

Incentive zoning is a tool that can be used to grant provisions that developers want in exchange for desired public improvements, needs, and goods. Incentive zoning contributes to strong public-private partnerships and provides flexible, performance based tool that replaces “sticks” with “carrots” for smart growth and economic development. Jacobs, (2012), argues that one of the first application of incentive zoning was in New York City, where increased floor area was provided to office building development in exchange for the provision of public plaza space accessible to the public at the base of the building.

Jacob (2012), said that incentives can come in many forms:- density bonus, reduced parking requirements, and other permitting and financial bonus. Those public goods sought by community in exchange for incentives should be defined through the comprehensive plan or sector plans and might include public space or greenways, new connecting streets, work force housing or historical preservation. Thus some important considerations for incentive zoning include: - economic stimulus, public/private partnership, amenities selection, incentive selection, administration, coordination and extra.

The Gwinnett County Unified Development Ordinance (2014), discusses both advantages and disadvantages of incentive zoning. From the advantages perspective, incentive zoning is one way to ensure that a community continues to preserve or enhance desirable public amenities as it experiences increased growth pressure. This incentive can help reduce opposition to development projects by providing needed public amenities such as parks or public art in exchange to project that developers finds most appropriate for the a location. Incentive zoning provides a legal trail and clear process by which developers can achieve

development that they see as more beneficial to the bottomline. However, the ordinance, highlights incentive zoning disadvantages as that incentive zoning may be met with resistance from some local community members. For instance, a new street connection may be a traffic improvement that is needed area wide, but nearby residents or businesses may not receive it well, hence raise concern about through traffic.

2.8.5. Natural Hazard Zoning.

Natural hazards zoning refers to the designation of flood plains, landslide zones, wetlands, forest zones, oceanic/lakes and river banks. These zones are high- hazard risks areas that need to be protected, minimum or classified development should be allowed in such areas, therefore, the natural hazard zoning aims at protecting these fragile lands from general development. In fact, it is this type or classification of land use zoning which is significant in disaster risk reduction management.

2.9. Urban Land Transit Circulation and Connectivity

This focuses in ensuring that regional connections and roadways, pedestrians and bicycle circulation, transit and circulation plan are well calculated designed and developed. This makes it possible for movement in and outside cities. Lack of circulation and connectivity can be cited as critical to access to and outside disaster scenes. This can lead to more property destructions and more lives lost. It also helps in access to market and business centers as well as industrial areas for job-related activities. In some places, difficulties of circulation and connectivity cause households to move to and from work places on foot slowing down economic activities. Moreover, areas with poor circulation and connectivity

would be slow in business start-ups and growth as catalyst to quick transactions would be lacking.

The vast majority of all trips in urban areas are made by automobile and most of this travel is on two state highways, County roads, and a series of section line roads. The transportation system serving urban areas is and will continue to be challenged by substantial physical constraints such as major drainage features, land, and mountain ranges. There are also non-physical constraints to developing a regional roadway network. Previousl) approved planned household zoning applications and the greater planning area precedes the regional transportation plans now in existence. In some cases, prior zoning approvals do not adequately address regional transportation needs and compatible land uses. Transportation infrastructure needs to access every corner of where households would want to go and at the time they want to go there. The most common responses for why the public transportation options were lacking were because they do not exist, they do not travel where residents need to go, or they do not travel at the times residents need to travel.

Urban households desire better connectivity to areas outside of their regions. This would connect them with other cities and regions, recognizing that transportation routes in and out of their urban areas are essential for increased economic development and regional partnerships. This infers that inter-regional connectivity is critically important to the social and economic welfare for urban households and their continued future growth and prosperity, particularly access to the major metropolitan areas and connectivity with proposed economic zone routes that would give access to neighboring communities.

Urban areas with guidance for establishing future planning corridors for major roadways needed for regional connectivity to support projected growth and travel demand. Likewise, transit studies and regional connectivity plans have occurred and the urban areas have adopted a master trails plan for urban areas planning purposes. According to Birkmann (2006) infrastructure is critical factor in determining investment location, nature of business and security of a given area. Physical infrastructure is seen as an essential precondition for industrialization and economic development (Mahmud, and Sawada, 2014). Studies show that the development of physical infrastructure improves an economy's long-term production and income levels of an economy in both the macroeconomic endogenous growth literature.

The pressures on urban transport systems are increasing in most developing countries as part of the process of growth. Motor vehicle ownership and use are growing even faster than population, with vehicle ownership growth rates of 15 to 20 percent per year common in some developing countries. The average distance traveled per vehicle is also increasing in all but the largest, most-congested cities. This growth exceeds the ability to increase road space, and the major impediment to the efficient working of the urban economies in large-size cities, and particularly in megacities, is the level of road traffic congestion.

Travel speeds are decreasing and the travel environment for pedestrians and people-powered vehicles is deteriorating. Downtown weekday traffic speeds are reported to average 10 kilometers per hour (km/h) or less in Bangkok (Thailand), Manila (Philippines), Mexico City (Mexico), and Shanghai (China); 15 km/h or less in Kuala Lumpur (Malaysia) and São Paulo (Brazil). It is estimated that congestion increases public

transport operating costs by 10 percent in Rio de Janeiro (Brazil) and 16 percent in São Paulo. Of the 16 developing-country cities with populations of more than 4 million, 5 of them (Bucharest, Romania; Jakarta, Indonesia; Kinshasa, Republic of Congo; Lagos, Nigeria; and Manila) cited average one-way commute times of one and one-quarter hours or more (UNCHS 1998). Growth of measured gross domestic product (GDP) is also reduced by freight congestion, delays and unpredictability, difficulties of conducting business, and increasing signs of disarticulation of the labor market in some large cities such as São Paulo, Mexico City, and Manila. All this is occurring despite the fact that motorization is still at a relatively early stage in most developing and transitional economies; most developing countries have fewer than 100 cars per 1,000 people, compared with 400 or more per 1,000 people in the richer industrialized countries.

Furthermore, most transport-originated air pollution, as well as nonbusiness time lost to congestion, is efficiency reducing but is not directly reflected in GDP statistics. The safety and security of travelers is also diminishing in many large cities. Some of these impacts can be, and have been, valued in monetary terms. Table 2.2 presents a summary of some estimates of external costs of road transport at national and regional levels. Recent World Bank estimates suggest that the total economic damage of air pollution represents up to 10 percent of GDP in polluted cities such as Bangkok, Kuala Lumpur, and Jakarta. For six developing-country cities with a total population of over 50 million (Mumbai, India; Shanghai; Manila; Bangkok; Kraków, Poland; and Santiago, Chile), World Bank estimates show the costs of particulates and other vehicle emissions (excluding lead) as equivalent to 60 percent of the import cost of gasoline and over 200 percent of the import cost of diesel.

Parking is an important component of the Circulation & Connectivity's overall transportation network and influences various aspects of any urban area's character including urban design, walkability, traffic circulation, and economic development. County and local government services, including the Judicial Center, the Courthouse, the Lake County Administration Building, and the City Hall are the primary parking generators in Downtown Tavares. During the visioning sessions conducted by City Staff in 2017, lack of parking on the east side (mainly due to the Pavilion on the Lake and/or special events) of Downtown was an issue identified by the participants. The dimensions of land transit circulation and connectivity are;-

2.9.1. Traffic Calming.

High traffic speeds are frequent problem in the neighbourhood. The Institute of Transportation Engineers defines traffic calming as changes in the street alignment, installation of barriers, and other physical measures to reduce the traffic speeds and/or cut through volumes, in the interest of street safety, livability and other public purposes. The changes may include creating illusion of less space or reduction of roadway width.

The traffic calming guide for neighbourhood streets provides a guidance and procedures for local community to pursue traffic calming in their neighbourhood streets. The purpose of traffic calming is to lower vehicles speeds on neighbourhood streets without restricting access. Traffic calming measures may also alleviate other issues such as cut-through traffic or through –truck traffic, where motorists or truckers use neighbourhood streets to avoid and bypass other nearby roads. Traffic calming tends to concentrate on existing streets.

Whereas safety, maintenance, or operational issue arises following installation of traffic calming devices, may adjust, relocate or remove the relevant traffic calming devices as necessary to address the issue, with the same funding source used to install the device originally. The traffic calming devices include the guide which is characterized as non-intrusive or vertical, horizontal and narrowing devices. Non-intrusive measures include administrative measures such as a public information campaign, posting certain types of signs to promote speed reduction, and utilizing pavement markings to reduce the number of lanes or pavement travelway widths. Wegner, (2014), argues that the non-intrusive devices offer the advantages that they do not physically constrain vehicle maneuvers and thus are less invasive. This is particularly desirable for streets that serve as emergency and bus routes. Other desirable aspects of non-intrusive devices are that they involve standard signs and pavement markings easily recognized by motorists and can generally be less costly overall than the vertical, horizontal, and narrowing measures. The non-intrusive measures included in the traffic calming are community education, community gateways, pavement marking measures, speed display signs and additional \$200 fine signs. However, critics point out that some non-intrusive applications are not as effective because they do not physically constrain vehicles to reduce speed.

The vertical, horizontal and narrowing devices of traffic calming are devices constructed and installed on the street pavement surface to narrow the travelway or create vertical, horizontal shifts on the roadway. These devices can be particularly effective in slowing vehicles because they physically constrain vehicles to pass over, through or around physical obstructions on the roadway. Speed humps are the most commonly used traffic calming devices. Speed humps are among the most recognizable traffic calming devices

which may promote a quicker response by motorists to reduce their speed. The other vertical, horizontal and narrowing traffic calming are speed hump, speed table, raised intersections, raised crosswalk and extra.

2.9.2. Street Section.

A big part of urban design is the street. And a big part of designing the street is the street section, which is the drawing that illustrates widths (right-of-way, driving lanes and sidewalks), heights- building projections, trees and uses- cars, bikes, pedestrians. The drawings are extremely helpful tools for designer, and it is especially useful to see sections of existing street that one has experienced or seen in photos, quantify the qualities of street space (Jacobs, 2010).

Tree preservation and replacement is partly an element of street section. Large mature trees play a major part of shaping the visual character of the neighbourhood. Construction of new streets and the addition of curbs and sidewalks to existing streets can mean removal of trees from the right-of-way. Walkways are a combination of paths, trails, and sidewalks intended to help increase safe transit, circulation and connectivity throughout the neighbourhood and to the adjacent areas and to help preserve neighbourhood character and environment. Walkways strengthen connectivity to open spaces, parks, and other green features as well as to homes, schools, and businesses. Walkways identify pedestrian needs:- there is need for a continuous pedestrian system; removal of barriers that restrict pedestrian travel is needed; many existing neighbourhoods need pedestrian facilities.

Sidewalks and trails serve as critical links in the transportation network by providing pedestrians access to commercial districts, schools, businesses, government offices and recreation areas. Because sidewalks and trails provide such fundamental services to the public, they should be designed to meet the needs of the widest possible range of users. People with disabilities are better able to participate in the community if it is easier for them to reach their destination. More accessible sidewalks and trails also mean better pedestrian facilities for every one. Neighbourhoods with well designed pedestrian facilities are generally safer because more people are out walking. Unfortunately, many sidewalks and trails do not adequately meet the needs of people with disabilities, who make up one fifth of Kenyans population.

2.9.3. Bicycle Accommodation.

Bike lanes and bike routes are the two main types of bicycle transportation facilities. A bike lane is portion of roadway dedicated for bicycles use and designated with striping, marking and signage. A bicycle route is part of bicycle system that is designated with signage to encourage use of the route to provide continuity of the system where separate bicycle lanes are not present or may not be possible due to inadequate right-of-way width.

2.9.4. Accessibility Index.

Accessibility is linked with an array of economic and social opportunities, but congestion can also have a negative impact on mobility. Accessibility is the measure of the capacity of allocation to be reached by or to reach different locations. Therefore, the capacity and

arrangement of transport infrastructure are key elements in determining the accessibility of locality. All locations are not equal because some are more accessible than others, which implies inequalities. Thus, accessibility consequently relies on two core concepts: - location whereby each location has a set of referential attributes, such as its population, or level of economic activity; the second is the distance, which is derived from the physical separation between locations. Distance can only exist when there is possibility to link two locations through transportation.

According to Wegner, (2012), there are two spatial categories applicable to accessibility problems, which are interdependent: - the topological accessibility which relates to the measuring accessibility in a system of nodes and paths that is a transportation network. This spatial category assumes that accessibility is a measurable attribute significant only to specific elements of a transportation system, such as terminals- airports, ports or subway stations. The second type of the spatial category is known as contiguous accessibility and involves measuring accessibility over a surface. Under such conditions, accessibility is an accumulative measure of the attributes of every location over a pre-defined distance, as space is considered in a contiguous manner. Accessibility is a good indicator of the underlying spatial structure since it takes into consideration location, as well as the inequality conferred by distance to other locations.

2.9.5. Parking Standard.

Parking as part of an overall transportation system is one of the crucial issues of our times. As the number of automobiles increases exponentially around the world, the need to house them in close proximity to destinations creates a challenging design problem. Therefore,

designing the parking facilities or lots requires an integrated design approach of many professionals. The parking facilities is typically an exposed structure and must be designed to withstand all aspects of environmental conditions. The constant use of parking facilities as an expected part of our infrastructures and as revenue generating , requires unique maintenance and operational needs. Operating parking facilities requires interactions with general public and many legal rules and regulations. Safety and security of the people using parking lot are of paramount importance (Yen, 2012).

2.10. Disaster Management

A disaster is defined as a serious disruption of the functioning of a community or a society causing widespread human, material, economic, or environmental losses that exceed the ability of the affected community or society to cope using its own resources. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability, and insufficient capacity or measures to reduce the potential negative consequences of risk (UN/International Strategy for Disaster Reduction, 2004). Therefore, disasters are not unpredictable and unavoidable events but rather unsolved problems of development.

Disaster management (DM) refers to the systematic process of using administrative decisions, organization, operational skills, and capacities to implement policies, strategies, and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This includes all forms of activities, including structural and nonstructural measures to avoid (prevention) or to limit (mitigation, preparedness, and response) the adverse effects of hazards (adapted from

UN/ISDR, 2004). Disasters, both natural and manmade, have the potential to lead to significant human and economic losses (Paul & Hariharan, 2012). For the disaster to occur, it has to be triggered by hazards, exposure and vulnerability. While hazards have been viewed as any dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Such hazards arise from a variety of geological, meteorological, hydrological, oceanic, biological, and technological sources, sometimes acting in combination. Vulnerability entails circumstances, community, or systems or asset that makes it susceptible to the damaging effects of hazard. Vulnerability could arise from physical, social, economic, and environmental factors. Therefore, knowledge of the relationship of development, land use and disaster risks provide urban planners with deeper understanding of what drives people to locate themselves in high risk areas.

Disasters include such emergencies as fires, severe weather, tornadoes, earthquakes, floods, pandemic events, and life threatening situations, equipment failures, cyber-attacks or terrorist attack. They can strike anywhere at any time with little or no warning (Akeyo, 2010). Existing records, while less reliable, shows a relentless upward movement in the number of disasters and their human and economic impacts (Ze-fu & Chuan-liang, 2012). According to Altay and Green (2006), the main categories of disaster types consist of hurricanes, cyclones, typhoons, floods, drought, earthquakes, volcanic eruption, epidemics, famine, food insecurity, man-made disasters, population movement, and technological disasters among others.

In many European cities, demographic growth is rather moderate or even negative and mainly due to migration. The most significant factors affecting urban spatial growth are the growing number of smaller households and the increasing space consumption by households. The composition of household types within European cities changes from a mixture of one-person to more than five-person households to a dominance of single and couple households within the city and an allocation of family households into the suburban area. This process is based on residential location decisions of individual households. Concerning such residential location decisions Dieleman, (2001), Coulombel (2010), Knox and Pinch (2010) each give a comprehensive literature overview. Rossi, (1980) shifted the focus from an aggregated level to the individual household and its motivation to seek another dwelling and pointed out the influence of the life-cycle on residential decision-making. Wolpert, (1965) and Brown and Moore (1970) refined this approach into a stress/resistance model.

Various versions of this model exist in the literature (Robson, 1975; Wong, 2002 and Benenson, 2004). Households may move due to a large number of reasons mainly related to economic, demographic and behavioural causes. Concerning possible classifications of households, Coulombel, (2010) comes to the conclusion that a unitary vision of the household keeps on prevailing in the economic literature on housing as well as in applied modeling (Coulombel, 2010).

According to Altay and Green (2006), disaster event occurs when resources become stressed, when non-standard procedures are implemented to save life or when special authorities are invoked to manage the event. On the other hand, a routine or daily

emergency is typically managed with the resources of a single governmental agency, or partial resources from several, using standard procedures, and with minimal dislocation. According to Akeyo (2010), the most recurrent disasters in Kenya include floods, drought, landslides, fires, HIV/AIDS, terrorism among others. While Cutter, Burton and Emrich (2010) suggest that government should promote resilience and less vulnerability by developing capacities that can be fostered through interventions and policies to help build and enhance a people's ability to respond and recover from disasters. But Comfort (2005), maintains that protecting citizens from harm is the ideal role of government.

Equally, disaster risk management has attracted global attention. Many researchers in various sectors including computer science, environmental sciences, health sciences and business (Hristidis, Chen, Li, Luis, & Deng, 2010). Researchers argue that disasters can cause businesses to reduced profits and revenues, customer loss, reduce market shares. These can happen from brief business interruption and major business interruption that threaten a community's or a company's survival (Kaushalya, Karunasena, & Amarathunga, 2014). The national and county governments are challenged to formulate and implementing actions designed to anticipate risk, prepare citizens to manage risk, and assist them in recovering from damaging events (Prater & Lindell, 2000). Moreover, it is important to create mitigation awareness and forecasting, preparedness and coping strategies to ensure any such eventual, victims are in better place than previous disasters. However, most of the time recurring disasters find people more unaware of coping strategies unlike before. For example, fires that destroy slums and shacks structures.

In Kenya, this has been experienced in Kariobangi, Sinai, all the Maker slums, Gikomba, and recently Kijiji in Southlands. Again fires from fuel carrying tankers keep killing Kenyans who fetch fuel from the fallen tanker. This happens as if it is the first time such disasters are occurring. The preparedness was only witnessed when fire disasters were destroying buildings blocking users inside. There the law was enforced on buildings to have fire fighter devices, fire assembly, and exit routes from such buildings. However, their effectiveness is yet to be established since people still experience major casualties when fire strikes. In addition to that, collapsing buildings disasters are yet to have functioning strategies to mitigate, create awareness and preparedness and recovery approaches. It is left for users to instantly devise their mechanisms to evade such disasters. And according to Karunasena and Amarathunga (2014) most slum and squatter dwellers hardly seek more information on building safety for occupation. They end up occupying buildings that could be collapsing in the next minute. Moreover, even if they are warned to vacate a building because it could be collapsing soon, they rarely respond to such warnings (Cox, and Perry, 2011).

According to Altay and Green (2006), disaster management has four phases comprising of mitigation; preparedness; response; and recovery. The first two phases involve pre-disaster hazard adjustments while response and recovery are associated with post-disaster actions. Hazard mitigation provides passive protection at impact; for example, land use and building construction practices that prevent property destruction (Prater & Lindell, 2000). Disaster preparedness supports active response after impact, for example, warning systems, emergency response plans, and mutual aid agreements that allow emergency personnel to respond more quickly and effectively. Response involves efforts to minimize the hazards

created by a disaster such as search and rescue and emergency relief while recovery usually meaning the restoration of lifelines and basic services (Waugh & Streib, 2006).

From a global perspective, annual losses from natural hazards alone are staggering. For instance, in 2001, 700 disasters were identified, resulting in 25,000 deaths, \$36 billion in economic losses, and \$11.5 billion in insured losses (Godschalk, 2003). The damage caused by disaster depends on climate, the geographical location and the type of the earth surface/degree of vulnerability and disasters adversely the mental, socio-economic, political and cultural state of the affected area in general (Caymaz, Akyon, & Erenel, 2013).

Often, developing countries suffer more losses as compared to their developed countries counterparts. For instance, In March 2011, a 9.0-magnitude earthquake struck Japan and resulted in more than 20,000 people considered either dead or missing. The 2004 Indian Ocean tsunami that was caused by an earthquake killed approximately 230,000 people in Southeast Asia while more than 60,000 people were victims of the 2008 Sichuan earthquake in China (Iwata, Ito, & Managi, 2014). Even where economic losses in the developing countries tend to be more when considered relative to the country's Gross Domestic Product (GDP).

Further, when disasters strike in developing countries, relief s may face additional challenges. The local government does not always cooperate with the international relief s, security problems impede access to the victims, and a population's extreme poverty increases its vulnerability (Kunz, Reiner, & Gold). Recently, though, there has been a paradigm shift from traditional relief approach to disaster management incorporating a

more holistic and long term approach as part of the development planning process (Caymaz, Akyon, & Erenel, 2013). According to Claudianos (2014) the millennium heralded a paradigm shift from vulnerability towards resilience as a lens through which exposure to risk has been explored. The focus moved from weakness to strength.

Nakuru County is one of the 47 devolved governance units in Kenya. It therefore forms a focal unit for disaster risk management, besides having key characteristics that are associated with disaster proneness such as rapid human population growth, urbanization, and increasing concentration of property contributing exposure to greater losses should disaster occur (Mayunga, 2009). According to Ze-fu and Chuan-liang (2012) the exposure of economic assets to emergency incidents and disasters in cities will also grow. The seeming randomness of impacts and problems and uniqueness of incidents demand dynamic, real-time, effective and cost efficient solutions, thus making the topic very suitable for study in the County (Altay & Green, 2006). In addition, the County government performs numerous other functions that have a direct bearing on planning and particularly on hazard identification and post-disaster recovery and acts as sites for implementing numerous national programs (Schwab, 2014).

While these areas of activity are often referred to as separate “phases” or components of disaster management for administrative funding and programming purposes, in reality they overlap and affect each other.

Disaster risk reduction is founded on the principle that the adverse impacts of hazards can be managed, reduced, and sometimes even prevented by taking appropriate actions to decrease people’s exposure to hazards and their susceptibility to hazard impacts.

Conversely, understanding and increasing people's capacity to anticipate, cope with, resist, and recover from hazard impacts is an essential component of reducing vulnerability. DRR aims to enable societies to be more resilient to natural hazards and to ensure that development does not inadvertently increase vulnerability to those hazards. Therefore, recovery activities should do more than merely return disaster-affected people and institutions back to the situation that existed before a disaster. In particular, the recovery phase of a disaster response also offers opportunities to strengthen the capacity of communities and their governments to cope with the impact of disasters and to reduce their vulnerability to future hazards and shocks for instance, through restoring destroyed mangroves as protection against storm surge, increasing fishing opportunities, or developing the disaster management skills of local government authorities. Likewise, DRR should be incorporated into regular development planning and programming to reduce or avoid the negative impacts of future hazard events. DRR is implemented using DRM approaches.

Disaster-affected populations initially will require critical life-saving support. At the same time, their communities, institutions, and livelihoods will have been physically destroyed or weakened by the impact of the crisis. Many households and communities will begin a process of self-recovery as soon as possible after a disaster, out of practical necessity. The vulnerabilities that turned a hazard into a disaster in the first place often get recreated in the process. For example, homes may be reconstructed using the same building techniques that caused them to collapse. Poor households may resort to selling off their scarce productive assets in the immediate aftermath of a disaster in order to meet their basic needs and become even more vulnerable to future shocks. International experience also has

demonstrated the close links between relief and recovery. The choices made regarding the kinds of relief assistance to be provided, and how it is provided, can facilitate or hinder the recovery of affected communities (Christoplos, 2006a). For instance, following the 2005 Pakistan earthquake, instead of distributing expensive winterized tents with a limited lifespan, the Pakistan Poverty Alleviation Fund (PPAF) provided affected communities with corrugated galvanized iron sheets and tools. The tools and materials were used by communities to build themselves temporary shelters using wood and other materials salvaged from the rubble. They could be used later in permanent home reconstruction.

The choices made regarding the provision of relief also can have positive or negative impacts on reducing disaster risks—for example, undertaking a rapid environmental impact assessment to identify whether toxic substances have been released into the environment following an earthquake (e.g., the chemical leaks from factories damaged by the May 2008 earthquake in China¹) and then mounting a campaign to reduce the threat to nearby communities. For these reasons, relief needs to be carried out with a view to supporting and reinforcing the early recovery and risk reduction of disaster-affected populations.

When a natural disaster strikes in a poor community, not only does it cause serious loss of life and property, it often takes away or threatens the livelihoods and futures of those who survived. This is especially the case where productive household members have been lost or permanently disabled. For many households, not only will their short-term economic and social vulnerability be increased, but their ability to cope with future shocks may also be eroded. These pressures can contribute to increased poverty and marginalization in a

society. They can aggravate tensions or conflicts that may have already existed within or between communities prior to the disaster. In the case of slow-onset or regularly recurring hazard events or shocks, many poor communities live in a constant state of recovery, where temporary relief has become a permanent coping strategy. For example, in Malawi drought occurs with such frequency that people have little time to recover before another drought hits. This has resulted in deepening poverty, chronic food insecurity, and aid dependency. Thus, in order to be effective and sustainable, recovery initiatives must be linked to the national and local development context and processes, as well as an understanding of the economic, social, and political conditions that existed prior to the disaster. Some of these are likely to have been contributing factors to the risk and vulnerability that turned the hazard event into a disaster; others for instance, underlying structural issues may have an impact on the strategies adopted for recovery. Lack of understanding of these processes can lead to poorly targeted and inappropriate assistance. This is equally the case for infrastructure rehabilitation and reconstruction. There are many examples of schools and health centers rebuilt after natural disasters that could not afford ongoing maintenance costs or the staff to run them.

Disasters of all kinds happen when hazards seriously affect communities and households and destroy, temporarily or for many years, the livelihood security of their members. A disaster results from the combination of hazard risk conditions, societal vulnerability, and the limited capacities of households or communities to reduce the potential negative impacts of the hazard. The recognition of vulnerability as a key element in the risk context has also been accompanied by growing interest in understanding and enhancing the positive capacities of people to cope with the impact of hazards. The existence or absence

of appropriate socio-economic and institutional systems to mitigate or respond rapidly to hazards determines a society's or a community's susceptibility or resilience to the impacts of hazards. In other words, the coping capacities ensured by these systems translate directly into enhanced resilience.

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Natural hazards can be classified according to their geological (earthquake, tsunamis, volcanic activity), hydrometeorological (floods, tropical storms, drought) or biological (epidemic diseases) origin. Hazards can be induced by human processes (climate change, fire, and mining of non-renewable resources, environmental degradation, and technological hazards) Hazards can be single, sequential or combined in their origin and effects.

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk.

The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

The purpose of Disaster Management is to reduce the underlying factors of risk and to prepare for and initiate an immediate response should disaster hit. The Disaster Management Framework (DMF), considers conceptually, DM as a continuum, and thus as an ongoing process of interrelated actions, which are initiated before, during or after disaster situations. The framework is aiming, in particular, at countries and regions, which face recurrent exposure to natural hazards. DM actions are aimed at strengthening the capacities and resilience of households and communities to protect their lives and livelihoods, through measures to avoid (prevention) or limit (mitigation) adverse effects of hazards and to provide timely and reliable hazard forecasts. During emergency response, communities and relief agencies focus on saving lives and property. In post-disaster situations, the focus is on recovery and rehabilitation, including, however, the concept of “building back better”. This implies to initiate DRR activities also during recovery and rehabilitation. The paradigm shift to conceptualize DM as continuum (and no more in phases) reflects the reality, that the transition between pre- during and post disaster situations is fluid, in particular in countries, which are regularly exposed to hazards. The elements of the framework⁷- further elaborated - include both structural (physical and technical) and non-structural (diagnostic, policy and institutional) measures.

2.11. Dimensions of economic vulnerability to Disaster Management

Interest in assessing the sustainability of socio-ecological systems of urban areas has increased notably, with additional attention generated due to the fact that half the world's population now lives in cities. Urban areas face both a changing urban population size and

increasing sustainability issues in terms of providing good socioeconomic and environmental living conditions. Urban planning has to deal with both challenges.

Urban residents of low income neighbourhoods play a major role by being affected by urban planning decisions on the one hand and by being responsible among many other factors for the environmental performance of a city (e.g. energy use). We here present an agent-based decision model referring to the city of Vienna, the capital of Austria, with a population of about 1.7 million (2.3 million within the metropolitan area, the latter being more than 25% of Austria's total population). Since the early 1990s, after decades of negative population growth, Vienna has been experiencing a steady increase in population, mainly driven by immigration.

The positive correlation of income and energy use is long established in the traditional energy literature (Vringer and Blok, 1995; Pachauri and Spreng, 2002; Cohen et al., 2005; Wier et al., 2001; Lenzen et al., 2006; Dey et al., 2007; Weber and Matthews, 2008). Demographic factors such as population growth, household size, average household age and migration influence urban energy usage. Household size plays an important role in energy use: above two persons per household, economies of scale can reduce the energy consumed per capita (Pachauri et al., 2004; Lenzen et al., 2004, 2006; Weber and Matthews, 2008). Urban populations may have significantly smaller household sizes than rural populations, due to smaller family sizes and a larger generation gap as well as smaller dwellings, and are thus less likely to shelter extended families or many generations under the same roof. The evidence for age is mixed. The most important impact of age may be through changing household sizes and changing income level.

2.11.1. Urban Residents Income, Saving and Consumption in low income neighbourhoods

From the economics perspective, an individual income, consumption and saving, is a factor which would determine one's welfare or standard of living, hence is an economic variable which would influence his/her vulnerability to disaster management. All these would be determined by the disposable income of an individual. However, the disposable income is an element of national income or GDP of a country. National income is a broader national level economic measure than is personal income. National income includes payments to individuals (income from wages, and salaries, and other income), plus payments to government (taxes), plus retained income from the corporate sector (depreciation, undistributed profits), less adjustments (subsidiaries, government and consumer interest and statistical discrepancy). Personal income measures national level income to persons and non-profit corporations. Personal income includes payments to individuals (income from wages, and salaries, and other income), plus transfer payments from government, less employee social insurance contributions. Disposable income measures the after tax income of persons and non-profit corporations. It is calculated by subtracting personal tax and non-tax payments from personal income amount of money that households have available for spending (consumption), and saving after income taxes have been accounted for. Low income residents in the urban neighbourhoods tend to have low income, hence, low spending (consumption), and low saving, hence, low economic capacity to build economic resilience to cope up with the urban neighbourhood vulnerabilities to enable them reduce disaster in their settlements.

2.11.2. Urban Residents Employment Opportunities in low income neighbourhoods.

Economists use the term natural unemployment rate to refer to the unemployment rate exists when the economy is either in a neither recession nor boom and real GDP is equal to potential GDP. It has been observed that the actual unemployment rate rises above the natural unemployment rate when the economy goes into recession and real GDP falls below potential GDP. And unemployment rate falls below the natural rate when the economy goes into boom and real GDP rises above potential GDP.

From the economists' perspective, unemployment refers to number of unemployed, those who are of working age, who are without work, but who are available for work at current wage rates, but are unable to acquire any. Unemployment cause much hardship to those who experience it. Beyond the obvious hardship of economic loss, unemployment can have more devastating effects on people. If unemployment persists, people may fall into poverty. Thus, the urban residents in the neighbourhood settlement areas tend to have low income to spend, consume, or save and then invest.

In low income neighbourhoods, majority of residents faces unemployment and this is an economic vulnerability among them and therefore, makes their economic resilience to disaster management weak. This is a factor also which made the urban residents in these low income neighbourhoods to occupy the unserviced land which is hazard prone and again occupying poor quality and quantity housing.

2.11.3. Credit facilities/Loans to Urban Residents in Low Income Neighbourhoods.

Urban Residents just like other residents in the Country need credit/loan to acquire properties, to improve their existing residential areas, or to start or expand their businesses. A credit facility is a type of loan made in businesses or corporate finance context. It allows the borrowing business to take out money over an extended period of time rather than re-applying for loan each time it needs money (Sachse, 2012). On the other hand, loan is a form of debt incurred by an individual or other entity. The individual borrower directly or indirectly, approaches the financial institutions or banks for secured or unsecured loans. The lender may require collateral and the borrower must agree to be re-paying the principle amount and interest,

Credit facilities may be of the following forms;- a retail credit facility, a revolving loan facility, and a committed facility. Robinson (2012), defines credit as an arrangement between a bank and business that allows the borrower – person, or business to borrow a particular amount of money, and then to borrow more money if part of the original loan is paid back. Credit facilities are utilized broadly across the financial market as a way to provide funding for different purposes, for instance, businesses, residential improvements, property and extra.

2.11.4. Urban Residents Investment in low income neighbourhoods.

Many people just like you turn to the markets to help buy a home, send children to college, or build a retirement nest egg. But unlike the banking world, where deposits are guaranteed by federal deposit insurance, the value of stocks, bonds, and other securities fluctuates with

market conditions. No one can guarantee that you will make money from investments, and they may lose value. Protecting investors is important.

A few people may stumble into financial security. But for most people, the only way to attain financial security is to save and invest over long period of time. You just need to have your money work for you, that is investing. In the modern economy, there are various kinds of investment products such as :-stocks, bonds, municipal bonds, mutual funds, exchange, annuities, certificate of deposit, money market funds, real estate investment trust, international investing and extra.

According, to Robinson (2008), knowing how to secure your financial well-being is one of the most important things you will ever need in life. But if you get the facts about saving and investing and follow through with an intelligent plan, you should be able to gain financial security over the years and enjoy the benefits of managing your money. However, the ability to invest, to a larger extent would be determined by the level of investment in low-income neighbourhoods, with low level education. Another factor, likely to determine the level of investment is the ability to acquire security in terms of collateral, which is to be deposited to banks or any financial institutions. In developing countries, the land titles or land tenure security forms the main collateral for credit or loan security. Yet in most cases this is lacking mainly among the low income residents in urban neighbourhoods. From the economic perspective, investment would also be determined by the level of individual saving, consumption and the level of disposable income as well as the availability of employment opportunities.

2.11.5. The Provision of Urban Services and Green Infrastructure to Urban Residents in Low Income Neighbourhoods.

Urban services delivery is growing priority as poverty is urbanizing. Densely populated urban areas especially in the low income urban neighbourhoods, place pressure on service delivery systems resulting in numerous, often uncoordinated and unregulated providers. Therefore, as argued by Rabe (2014), improving service delivery for urban poor is a priority, especially among the low income residents neighbourhoods of slums and informal settlements. The urban services are mainly the water supply, electricity, waste product management, urban transportation, housing provisions, parking facilities provisions as well as open spaces, including recreation facilities provisions and the green infrastructure facilities.

Communities across the Country including the urban communities, want to protect their water quality, while also getting the greatest possible benefits out of every investment they make. Many are conserving, restoring, or enhancing natural areas while incorporating trees, rain gardens, vegetated roof, and other practices that mimic natural systems into developed areas to manage rain water where it falls. Krabben, (2016), states that green infrastructure can improve water quality, attract investment, revive distressed neighbourhoods, encourage redevelopment, and provide recreational opportunities, and help achieve other social, economic, public health, and environmental goals.

In developed areas, much of land is covered by buildings, pavement and other impermeable surfaces that prevent rain snowmelt from soaking into the ground. Instead this water runs off, often flowing directly to streams, rivers and other water bodies. It can

carry pollutants such as oil, chemicals, and lawn fertilizers. In addition, the quantity and speed of flow can cause soil erosion, flooding, and damage to aquatic habitat, property and infrastructure.

Green infrastructure includes a range of approaches for managing stormwater near where it falls. Most of green infrastructure uses the natural processes of soils and vegetation to capture, slow down and filter runoff water, often allowing it to recharge ground water, but some practices collect and store rain water for future use (Krabbe, 2014). Some techniques including using permeable pavements, bioswales, raingardens, vegetated or green roofs, rain barrels, and cisterns, work at the site scale and can fit into individual development, redevelopment. Large-scale management strategies, including preserving, or restoring flood plains, open space, wetlands, and forests can be used at the watershed level.

Thus, green infrastructure aims at the attainment of sustainable communities. The Smart Growth Institute (2010), state that sustainable communities are places that balance their economic assets, natural resources, and social priorities so that residents' diverse needs can be met now and in future. These communities prosper by attracting businesses and people and offering individuals of all incomes, races and ethnicities access to the opportunities, services, and amenities they need to thrive. Consequently, green infrastructure is an integral component of sustainable communities primarily because it can help communities protect the environment and human health while providing other social and economic benefits.

2.12. The Effects of Land Use Planning on Economic Vulnerability to Disaster Management in Eldoret Urban Area.

This section of literature review, aims at discussing the influences of the independent variables (dimensions), mainly floor area ratio, building codes or standards, building heights, building construction materials, maximum/minimum lot size, right-of way or way leave, open space and agricultural land conservation, functional zoning, form based zoning, incentive zoning, and intensity zoning, street section, traffic calming, accessibility index, bicycle accommodation, and parking lots on dependent variables (dimensions)-urban residents disposable income, saving and consumption; urban residents employment opportunities, the urban residents credit/loan for low income neighbourhoods; investment opportunities for low income neighbourhoods residents and urban services and green infrastructures. All these, variables are discussed in relationship to unplanned urban settlements of low income urban areas areas of slums, informal settlements and per urban areas of Kamukunji, Langas, and Kapsaos in Eldoret Urban Area. Kapsoya area, in this case would be appoint of reference or control area.

2.12.1. Effect of Land Use Planning Regulatory Instruments on Economic Vulnerability to Disaster Management.

The Land Use Planning Regulatory Instruments indicators includes the floor area ratio, plot ratio, way leave or right-of-way, building permits, building codes or standard, building heights, building or construction materials, maximum or minimum lot size, open or green space, enforcement of property right, and agricultural land conservation and extra. The process of implementing the above indicators within a planning neighbourhoods or area

like municipality, county, country or community lies on the hands of planning implementation authority which could be either a local government or municipality, or county or country planning authority. Bruckner, (2012), highlighted the aims or goals to be achieved by implementing the above indicators in a particular neighbourhood as:- to enable urban residents access the urban services, green infrastructures, increased land value, achieve affordable housing and serviced land, parking facilities, safe roads and streets ensuring proper connectivity and circulation, reduction in road accidents or to ensure safety and security for the urban residents, ensure public health and environment, to check of neighbourhood population density, check on urban sprawl and encourage urban compactness as well as urban growth and quality, quantity housing and reduction of residents disaster risks such as floods or fire.

Paynee (2012), argues that planning institutions and authorities responsible for implementing the land use planning regulatory instruments, especially in the developing countries in African cities, appears to be weak and ineffective, thus, unable to enforce these instruments, making instruments goals unachievable. This explains why building keeps on collapse in cities. For instance, in Nairobi city this is the case, and many have lost their lives. In Kapsoya estate, a formal spatial structure in Eldoret Urban Area, which is a point of reference or control for this study, the implementation of these instruments appears to be lacking, this is evidenced by tall buildings which have cropped up in the area and have failed to check on the area density and crowding, putting pressure on the available urban services and green infrastructure in the area.

Again, the goal of agricultural land conservation and open space has also been facing a challenge due to poor or weak implementation on regulatory instruments. This can be seen in the Kapsos, a pre-urban area, on the Eldoret Urban Area outskirts, which is being encroached by the dense urban population which has brought large pieces of land into urban set up. Many pre-urban areas around Eldoret Urban Area such as Illula, Kapsaret, Kiplombe, areas under pressure, and more land has been transferred from agriculture to urban transferred from agriculture to urban built-up, threatening food security issue in the town as well as in the country. This is also true to the open/green spaces within Eldoret Urban Area which has been targeted by land grabbers.

In the words of Carlos Morales, (2012), land use planning regulatory instruments, are not applicable in the low income settlements like slums and informal settlements, like Kamukunji and Langas in Eldoret Town. In the first place, land use regulatory instruments are implementable in these neighbourhoods, since, they are out of planning authority. Although, their implementation in the low income neighbourhoods, are likely to have influence on economic vulnerability to disaster management in Eldoret Urban Area. The applicability, of the land regulatory instruments in Eldoret Town, low income neighbourhoods included, are likely to generate employment opportunities in the building and construction sector. The created employment opportunities, in construction industry would enhance, urban residents' disposable income, hence, saving and consumption, thus improving on poverty level, among the low income urban residents in Eldoret town, and therefore, enable them to build economic resilience to manage disaster in their settlements. The enhanced income among the urban residents would enable them to acquire

credits/loans to involve in investment in improving their housings and even start new businesses.

2.12.2. Effect of Land Zoning on Economic Vulnerability to Disaster Management.

Fischel, (2011), identified the land zoning, indicators as functional zoning, formed based zoning, incentive zoning, and intensity zoning. He argued that all the four zoning indicators may have influence on economic vulnerability to disaster management in low income neighbourhoods of urban spatial area. For instance, the functional zoning which tends to analysis land use oof spatial area in terms of its functions such as, the residential, industrial, commercial, recreational zones, would determine the urbanresidents ability to acquire income, employment, credit/loan facilities, investment as well as urban services and green infrastructure. The industrial areas, commercial areas, are the two functional area where job opportunities are created and sustained. In Eldoret Urban Area Langas, the informal settlement and Kamukunji the slum areas developed as result of the development of Rivertex industry for the case of Langas and light industries for the case of Kamukunji. Therefore, the functional zoning tends to increase the demand for serviced land and land value in the area.

On the other hand, Yuen, (2010), pointed out that, incentive zoning is a tool that can be used to grant provisions that developers want in exchange for desired public improvements, needs and goods. Thus, those public goods sought by the community in exchange incentives should be defined through the comprehensive plan or sector plans and might include public space or greenways, new connectivity streets, or historical preservation. All these are needed by the urban residents, of EUA, including managing

disaster risks in their settlements. Policy makers, mainly, in the urban jurisdiction, need the intensity zoning to make decisions with regard to development in various settlement areas of municipality. With regard to housing, and urban services as well as green infrastructure, the issue of high density, average density, low density and no development are all important.

2.12.3 Effect of Land Transit Circulation and Connectivity on Economic Vulnerability to Disaster Management.

Wegner, (2014), identified the indicators of land transit circulation and connectivity as traffic calming, street section, bicycle accommodation, accessibility index, and parking lots. These indicators tend to have influence on economic vulnerability to disaster management among the urban residents. The urban resident uses urban streets, parking, bicycle lines, walking lines, to access and move to other places or points. Therefore, the proper use of the above indicators to a larger extent has influences on the number of accidents that occur in a particular street. In fact, these indicators would determine the urban resident's level of safety while using urban streets.

The provision of bicycle lines and walking lines are two circulation and connectivity transit indicators which are useful for the urban residents to encourage walk and bicycling, hence, tends to promote urban residents health and safety. Parking lots tends to generate income to the municipality or local government which could be used to develop other urban infrastructure as well as urban services. These indicators could as well reduce urban congestion and pollution to the urban residents.

2.13. Evaluation of Land Use Planning Strategies on Economic Vulnerability to Disaster Management.

Urban areas suffer greater fatalities and economic losses than rural areas. This is due to compactness nature of urban areas. Africa and Asia, which have the highest rate of urban growth globally, are also experiencing the fastest rate of increase in the incidence of natural disasters, over the last three decades (UN-HABITAT, 2007). Given these trends, without change in the management of disaster risks and urbanization, risk to cities residents will increase in the future as population grows. Eldoret is a medium town with a population growth exceeding 6 percent per annum (Eldoret Municipal Strategic Plan, 2012). The current population is 497,449 (GOK Census, 2009), covering an area of 147 square kilometers. Rapidly growing town of Eldoret has been subjected to influx of emigrants, high population, rapid infrastructure development and rapid commercial activities, all these have exposed the town residents, especially, and those in low income neighbourhoods to high risk of disaster, hence need for land use planning strategies.

2.13.1. Sum Up Grading Strategy.

A slum household is a group of individuals living under the same roof in an urban area who lack one or more of the following five conditions:- access to water, access to sanitation, secure tenure, durability housing, and sufficient living area (Durand-Lasserve, 2012). According to Cities Alliances, (2012), the word slum is often used to describe informal settlements within Cities that have inadequate housing and squalid miserable living conditions. They are often overcrowded with many people crammed into very small living spaces. These settlements lack basic urban services such as water, sanitation, waste

collection, storm drainage, streetlighting, paved side walks and roads for emergency access. Most also do not have easy access to schools, hospitals or public places for community together. Informal settlements generally occupied poor urban lands- riparian, swampy, reserved land for garbage collection or dumps, steep slope land and refilled quarries. However, slums have spilled over to serviced lands or reserves like railway safety zones, land under high voltage power lines and road reserves; hence households living in slums are widely exposed to disaster risks.

Slum upgrading is a process through which informal areas are gradually improved, formalized and incorporated into the city itself through extending land tenure security, and urban services to slum dwellers. According to Acioloy Junior (2012), it involves, providing slum dwellers with the economic, social, institutional and community services available to other cities. Slum-upgrading is considered a necessary and important component of urban development. It is beneficial to a city because it forecasting in social inclusiveness; promoting economic development; addressing overall city issues; improving quality of life; providing shelter for the poor; and also provides affordable land and urban services to the slum households. But slum-upgrading is most affective when linked with other initiatives of goals, such as :- poverty alleviation, health and education, preservation of historic city centers, environmental and sanitation improvement, city-wide infrastructure and transport expansion (UN-HABITAT, 2010). However, primary challenges of slum upgrading are that slums are not homogeneous and there many diverse vested interests in slums, there can be criminal elements who take advantage of the informal space.

The Kenya Slum Upgrading Programme (KENSUP), has been set up as a collaborative initiative that draws on the expertise of a wide variety of partners in order to address this issue. UN-Habitat's approach to slum-upgrading is holistic and integrated, as the aims are multiple. We use the development of an integrated infrastructure system as an entry point to slum-upgrading in order to reduce the cost of housing. This is combined with the construction or upgrading of the existing housing stock, later to be linked to capacity building and income generation activities for the residents of informal settlements, aim at improving livelihoods (Tibaijuka, 2013). Thus, the task of making slums better living and working environment for the urban poor, along with the inseparable task of reducing poverty, can only be achieved through a common vision.

In EUA, this strategy is being implemented through partnership with the County Government of Uasin Gishu, the National Government of Kenya, the World Bank and other interested partners. The slum-upgrading projects aiming at enhancing socio-economic infrastructures have been going on in Huruma, Langas, and Munyaka with in EUA. Roads, water supply, sanitation facilities, street lights are all being constructed. These enhanced infrastructures enable the the urban residents in low income neighbourhoods to access urban services, employment opportunities, hence increases their disposable income, saving, consumptions and investment, thus enable them to built economic resilience.

2.13.2. Mixed Use Development.

Mixed use development is a type of urban development that blends residential, commercial, cultural, institutional, or entertainment uses, where those functions are physically or

functionally integrated, and that provide pedestrian connections. Mixed use development can take the form of a single building, a city block or entire neighbourhoods. The term may also be used more specifically to refer to mixed use real estate development project—abuilding, complex of buildings, or a district of town or city that is developed for mixed use by private developers.

Jacobs, (2010), argues that mixed use development have become popular in USA and has been adopted in many developing countries including Kenya. Developers and investors alike are increasingly seeking out opportunities to integrate product types in order to achieve the ultimate goals of creating destination that draw residents, tenants, visitors, and patrons to engage, integrate, live, shop, walk and play. Mixed use development has been cited by both investors as well as scholars as means to solve a problem of effective land use in supply constrained areas like urban areas. It also provides diversification for investor portfolios (Jacobs, 2013). Mixed use development, as pointed out by the scholar above, is one of the ten principles of smart growth, a planning strategy that seeks to foster community design and development that serves the economy, community, public health and environment. At the same time, the Urban Land Institute's handbook has characterized mixed use development as one that:- provides three or more significant revenue producing uses for instances retail, entertainment, office, residential, hotel, or civic/cultural/recreation fees; fosters integration, density and compatibility of land uses and creates a walkable community with uninterrupted pedestrian connections.

Mixed use development could be classified into two types:- vertical, horizontal and mixed use development walkable areas. The vertical mixed use development, combines different

uses within the same building, provides for more public uses on the lower floor such as retail shops, restraint or commercial businesses; provides more private uses on the upper floors, such as residential units, hotel rooms or office spaces. The horizontal mixed use development consist of single use buildings within a mixed use zoning district parcel which allows for arrange of land uses in single development project; provides for a variety of complementary and integrated uses that are walkable and within a given neighbourhood tract or land or development project; and finally, mixed use development which combined both vertical and horizontal mixed use development in an area, within an approximately 10 minutes walking distance to core activities.

Mixed use development in Kenya and particularly, in EUA, has been useful mainly in the low income settlements where affordable serviced land is rear to comeby. As sum-upgrading are being implemented in EUA, one of the element of this project has been the issue of land tenure security this meant that some of the residents in low income neighbourhoods were able to attain the land title. These allow these residents to adapt the mixed use development.

2.13.3. Development Corridors.

Development corridors are transport routes that involve facilitating an increasing range of social and economic development activities. They may evolve to an extent that enhances only the flow of goods and people (transport corridor), or to an extent that supports trade (trade corridor), or development of a particular sector of the economy (an agricultural corridor). They might involve to an extent that supports wider social development and economic growth of a sub national region or cross-border region (a fully fledged economic

corridor). Wegner, (2011), said that development corridors are complex, because there is rarely a clear demarcation to determine that a corridor. Thus, “development corridor” is used in the general sense to refer to a corridor at any stage of evolution from a basic transport route through to economic corridor. According to Srivastava, (2011). The development corridor requires the next stage of evolution improvements to the so called “soft infrastructure” of transport services and transport logistics. But evolution into fully fledged economic corridor requires broader investments in the area served by the corridor.

Anord, (2007), identified development corridor objectives, as:- reduce average times and costs of transport; reduce variability fo times and costs transport; increase trade and other aspects of national economy. Brunner, (2013), concluded that no one economic corridor matches exactly the characteristics of another. As a corridor evolves the specific objectives changes, so do the criteria for intervening in the next stage of its evolution. The scholar also pointed out that, corridors evolve through cycles of development and operational efficiency, and then a criterion for identifying whether to invest in each new cycle will be different.

Development corridor promotes urban reconstruction and enhancement of urban growth where it is strategically needed. The reconstruction of urban process tends to create job opportunities to urban residents including those from low income neighbourhoods, enhancing their economic ability to manage disaster risks in their settlements.

In Eldoret Urban Area, two development corridors are being developed, a 35 km. route from Chepleskei on Eldoret/Nairobi road to mael tisa on Eldoret/Webuye road, this route is known as Southern route and another one the Northern route. As matter of fact, we expect

industries, and business parks to develop a long these routes creating employment opportunities to urban residents in low income neighbourhoods of EUA. This would enable the urban residents enhances their income, saving, consumption and investments hence be able to manage disaster risks in their settlements.

2.13.4. Gentrification/Re-development.

Gentrification is assign of economic growth. In the words of All Homes Campaign, (2013), gentrification is not a force of nature, an evitable economic trend or a pre ordained social phenomenon. It is a result of decisions made by real people who run institutions, seek to make profits, and are motivated by greed and power. Todd, (2014), argues that as money begins to follows in the neighbourhood, many aspects of everyday life are changed for the better. Buildings and parks are renovated and beautified. Jobs arrive within increased construction activity and new retail and services businesses. Crime rates declines. As property taxes increases so does funding to local public schools formally, neighbourhoods enhances urban services.

However, Thomas, (2016), argues that, if by gentrification you mean displacement of people of lower incomes then there are no benefits. But if by gentrification you mean economic development and ignore problems caused by same economic development that does not deliberately protect workers of lower wages or people of lower incomes, then the benefits are obviously economic development. But an important question to ask by any planner, of decision maker is whether, re-development is good or bad? Should the policy makers or planners practices, encourage, or discourage non-poor households to move into lower income urban neighbourhoods? On one hand, urban redevelopment can provide

significant benefits to new and existing urban residents. On the other hand, gentrification can impose risks and costs to vulnerable communities such like those in the low income neighbourhoods.

The gentrification benefits includes:- improved accessibility and mobility among the urban residents in the low income neighbourhoods, thus reducing the distances residents travel to reach urban services and activities like- education, employment, shopping, recreation and extra; reduction of time and money urban residents must spend on travel; provision of public infrastructure and services; increased land value; and finally, can improve residents economic opportunity.

2.13.6. Industrial Parks Strategies.

The 2030 Agenda for Sustainable Development recognizes the importance of inclusive and sustainable industrialization and the infrastructure that supports in eradicating poverty. However, premature de-industrialization has also become increasingly noticeable in developing countries with manufacturing having decreasing share of the gross domestic product (GDP). Li Yong, (2018), argues that, by delivering public goals and the accompanying policy interventions in support of investment, industrial parks acted as catalyst to facilitate industrial development. He further said that, it should be noted that industrial parks also contribute to sustainable development goals through promoting socially and environmentally responsible industrialization within the parks themselves, as well as by demonstrating what is possible to the rest of the country.

According to UNIDO, (2018), the principal rationale for establishing industrial parks is to enable “industry settle and develop at specific location that is planned and improved to that effect”. Industrial parks for this reason, an important tool within a country`s broader industrial and infrastructure policy. A common definition of industrial park is “a track of land developed and sub-divided into plots according to a comprehensive plan with the provision of roads, transportation and public utilities, sometimes also with common facilities, for use by a group of manufacturers”. UNIDO, (2018), argues that the term “industrial parks” is often also used however, to cover a broad range of concepts, such as free-trade zones, export-processing zones, special economic zones, high-tech zones, free-ports, enterprise zones, etc.

In Kenya, industrial parks examples are Athi River Export Zones, Industrial/Area, in Nairobi, High Tech Zone along Nairobi-Mombasa Road at Machakos (Konza city) and in Eldoret, the Africa Economic Zone and Plateau Business Park, being developed by Chinese Government. The Industrial parks strategy tends to have influence on low income neighbourhood residents of Eldoret Town, simply by creating job opportunities, hence increases their income, saving, consumption and hence ability to built economic resilience, resisting any disaster risks in their neighbourhoods.

2.14. Evalaution of Land Use Policy Framework on Economic Vulnerability to Disasterf Management in Low Income Neighbourhoods of Eldoret Urban Area.

Land use policy considers the way land and natural resources are used and managed, placing issues of ownership/tenure security (Mwagore, 2002). By land policy, Virtanen, (1995), means primarily the intensions, programmes and operations of public authority to

control land use in desirable direction. Thus this scholar further divides land use policy into three parts:- control system; monitoring system; and administrative system, The control system consists of different plan documents, conservation decisions and other plans that concern a specific area/region/space. Whether these plans of land use are realized or not is handled within the monitoring system, in which also environmental impacts are assessed. The administrative system (either public or private) is responsible for producing and also partly for executing, land use plans (Virtanen, 1995). In the words of Mwangi (2002), land use policy is understood as the framework to manage and control land use and natural resources, excluding the detailed examination of land tenure and land laws.

Overall policy is formed by the prevailing political power structure, the political parties and the leading political persons at the highest levels of political decision-making structure in the government. Land use policy is a statement of intent that sets out long term goals on land use management. It addresses issues relating directly to the use of land, its resources and perceptions. It also incorporates all activities that are likely to have an impact on the use of land and its resources.

According to the National Land Use Policy (2016), “the policy is important in addressing issues of optimal utilization of land and land related resources by providing principles and guidelines for proper management of land resources to promote public good and general welfare; land use planning to enhance sustainable development; anchoring land development initiatives; mitigating problems associated with poor land use, promoting environmental conservation, and preparation and review of a national spatial plan and integration of various levels of land use planning; land and land related conflicts. The land

policy initiative has developed a framework and guidelines that set a agenda for land policy processes in Africa. It aims at ensure that all land users have equitable and secure access to land. According to the Global Land Tool Network (GLTN), these provide a clear overview of the historical, political and social background of the land question in Africa, and highlight the role of land as a critical for economic development and reducing poverty. UN-Habitat, 2004, argues that the land policy initiative process provides a broad framework for African governments in land policy formulation and implementation, and acts as a foundation for popular participation in improved governance.

The National Land Policy (2016), highlighted the principles of land policy. It states that land in Kenya shall be held, used and managed in manner that is equitable, efficient, productive and sustainable and in accordance with the following principles:- equitable access to land; security of land rights; sustainable and productive management of land resources; transparent and cost effective administration of land sound conservation and protection of ecologically sensitive areas, elimination of gender discrimination in law, customs and practices related to land and property in land and encouragement of communities to settle land disputes through recognized local community initiatives consistent with Kenya constitution.

Molen (2001) and Williamson (2002), states that Land Policy is concerned with definition of the rule of law and use and ownership of land, that land policy consists of socio-economic and legal prescription that dictate how the land the benefits from the land are to be allocated. It relates to economic development, equity, and social justice, environmental preservation and sustainable land use (UN-ECE, 1996). The implementation of land policy

has a lot to do with institutional arrangements such as the organizational framework of land administration, management, enforcement of land laws and the allocation and monitoring of land administration mandates to public sector.

Development policies and programmes that assist poor men, women and youth especially in low income neighbourhoods to build livelihood assets, diversify income-generating activities, improve human capacities (health, nutritional status, education, technical skills), and strengthen community-based self help organizational, can make a major contribution to reducing vulnerability and risk, and improving the coping capacity of the poorest. Improved technologies can help prevent or mitigate damage by natural hazards:- various methods of water control, for example, can reduce the damage of flood damage, or help humans, animals and plant survive drought. Improved crop varieties that are drought or flood tolerant and pest-resistant can make the difference between crop failure and an acceptable harvest. Improved or zero tillage methods and soil conservation technologies can increase production in unfavourable agro-ecological areas, halting environmental degradation and ensuring greater sustainability. Development programmes need to get those disaster risk management technologies into the hands of farmers in vulnerable communities- low income neighbourhoods.

2.14.1. Land Tenure Security.

All Kenyans have a right to access and use land either through lease or freehold title, as individuals, corporations or collective trusts. However, the availability of land, particularly arable/cultivable land, is increasingly short in supply, and consequently some prudence is required in the issuing of public land. With a growing population and a finite

land source shortage of productive public land for Kenyan farmer and other users is an unsustainable form of land distribution.

According to National Land Use Policy (2016), land in Kenya is either public, communal or privately owned. The Country has inherited highly unequal patterns of land distribution. The peculiar patterns of land tenure, ownership and property rights that currently prevail in Kenya have to a large extent determined the use and management of land. The security of tenure on urban land, especially in the slums and informal settlements and peri-urban areas is a key policy option. According to Abdulai, Ndekugri, Olomolaiye and Proverbs (2007), indicates that land tenure security is an incentive for investing in land based activities and therefore, an impetus for economic development. Land tenure security refers to the enforceability of land rights and also immunity from expropriation (Antwi, 2000). Thus it is certainty that a person's land rights will be recognized by members of their society and protected in case of challenges (Abudulai, 2007, FAO, 2005).

In Eldoret Urban Area, this policy option is implemented in urban settlements such as Langas, Kamukunji to allow the urban residents in the low income neighbourhoods avoid physical and market evictions and be able to invest in improving the quality and quantity of their houses in these neighbourhoods. However, to achieve land tenure security in Kenya this policy option should include the digitalization of land information system to improve upon the land cadastral system or land records which would assist in the land registration. This would enable the land managers and administrators to store, retrieve and manage land data, hence would enhance land registration and cadastral system of a country or urban

areas. Currently, the Land Ministry has been struggling to introduce the digitalized land information system since 2013.

2.14.2. Land Administration/Management.

The European Economic Commission (EEC, 1996), defines land administration as “the process of determining, recording and disseminating information about the ownership, value and use of land when implementing land management policies. Dale and Mc Laughlin (1999), view land administration as a combination of routine process that include regulating land and property development and the use and conservation of land, the gathering of revenues from the land through sales, leasing and taxation and the resolving of conflicts concerning the ownership and use of land. Molen (2002), argues that the main challenge of land administration system is to support the implementation of land policy. Therefore, he argues that the essence of land administration is the land information system which its completeness and accuracy of the information system would determine how well the land administration system will serve society. The two main tools used to generate and maintain land administration are cadaster system and land registration.

Land administration system all over the World are reviewing their functional structures and undergoing major legislative and administrative changes. They are doing this in response to different internal and external drivers. In developed countries, the major drivers are advance in geo-information technology and the associated demands from customers for improved service delivery. Reforms include electronic lodgment and processing of cadastral and registration documents, digital management records and electronic distribution of products and services through internet. In the developing countries, the main drivers for

Reforms are needed for regulation of non-formal land rights. Reforms here mainly include innovative legislative and administrative adjustments to accommodate and accelerate the registration of individual and group rights in customary land and informal settlements.

According to Dale and Mc Laugh (1998), land management is about decision making and the implementation of decisions about the use of land resources. It entails the process which allocates land resources over space and time according to the needs, aspirations and desires of man and with framework of his technological interventions, his political and social institutions and his legal and administrative arrangements. It includes the information in land policy, the organization of land administration arrangements, and the management of land information. In Africa and particularly, in Kenya, land management is weak and gives room to corruption and inequality.

2.14.3. Land Information system, Cadastry system and land registration.

Land information system is a geographic information system for cadastral land use mapping typically used by local governments, city authorities and other interested bodies interested in land issues in an area like urban area. It consists of accurate, reliable land records records cadaster and it is associated with spatial data that represent the legal boundaries of land tenure and provides a vital base layer capable of integration with geographic systems or as a stand alone solution that allows data stewards to retrieve, create, update, store, view and analysis and publish land information. A good land information system is essential tool for planning and also for proper land management and land administration.

The International Federation of Surveyors (1995), defines a cadaster as a parcel –based and update land information system containing a record of interests in land e.g rights, restrictions, and responsibilities. It usually includes a geometric description of land parcels linked to other records describing the nature of interests and ownership or control of these interests and often the value of the parcel and its improvements. Stendler, (2004) and Williamson (2001), said land cadaster system is a process of land administration with a complete, accurate, and reliable information about ownership, use and value of existing land and its resources. Four common cadastral procedures recognizable in many parts of the World are:- adjudication, demarcation, surveying and mapping. Adjudication is the authoritative ascertainment of the existing rights in land. It is usually, the first component of the land delivery process before land registration. Demarcation is the marking of boundary limits of each unit on the ground. Surveying is the actual ground measurement of cadastral land units. The basic requirements of cadastral mapping are to provide sufficient specification of the location of the land unit. Many of the administration system reforms around the world involve changes or improvements in cadastral processes and records. The new Kenyan constitution (2010), and Kenya Land Act (2012), have both aimed at achieving this in the country, but due to poor flow of land records and land related information system, corruption in the Ministry of Land and Courts, little has been achieved so far.

Dale and Mc Laughlin (1999), once more highlighted land registration as an element of land policy. In their words, land registration is the process of recording recognized interest in a defined land unit. In addition to documenting the nature and spatial extent of interest in land, land registration also enable the transfer of such interests; provide evidence for the

resolution of land disputes and information for a variety of other public functions. Registration of property rights describe the use to which the land may be put, the length of time during which the rights are valid and the manner in which some or all rights can be transferred to other parties. Some of basic functions of land registration include:-security, protection, and enforcement of property rights, land transfer, screening problems and dispute resolution. Land registration, therefore, is the conventional legal means of securing rights in land and titles and hence a primary driver of economic development. Land registration or titling has been popularized by De Soto (2000).

2.15. Empirical Review

The World of 21st century is experiencing a high rate of urbanization. Before 1850, the urban population of the World never exceeded 7% (Durand-Lesserve, 2010). These demographic issues together with the economic factors, environmental factors, transportation systems, social factors, consumer preferences and governance are forces which are currently shaping urban expansion, especially in Sub-Saharan Africa Cities. This urban expansion means more urban land, hence, the need of land use planning. Urban expansion takes place in different forms in different areas globally. In many cities, this could be in the form of sprawl, Greenfield or peri-urban areas, leapfrogging or re-development of built-up areas at higher densities, through infill or remaining open spaces in already built-up areas (Sholomo, A; Sheppard, & Civco, D. L. 1989). But, it is true that the urban expansion forms outline above, does not yield the desired urban forms or spatial structure. In fact, the desired urban expansion and urban land use planning today globally, is the compact urban development.

Land use planning refers to the process by which a society, through its institutions decides where, within its territory, different socio-economic activities such as agriculture, housing/shelter, industries, transport facilities, recreation, and commerce should take place (Bruckner, 2001). This includes protecting well-defined areas from development due to environmental, cultural, historical, or similar reasons, and establishing provisions that control the nature of development activities. The latest Global Report on Human Settlements prepared by UN-Habitat entitled: “Planning for Sustainable Cities, 2009” has identified five current and future global urban challenges, namely: - demographic; environmental; economic; social spatial; and institutional. Thus, many scholars or urban developers as well as relevant institutions or stakeholders have therefore, argued that the 21st century urban planning which includes land use planning must take place with full understanding of the above factors which are the emerging forces leading to new spatial configuration or structure of large, multiple nuclei or polycentric regions.

In fact, most stakeholders associated land use planning with regulatory instruments, but in reality, a set of regulatory instruments is only a small part of the land use planning toolkit, especially in developing countries (Smolka, M. O. 2012). Modern scholars argue that there are severe limitations to efficiency of these instruments, especially in developing countries cities, where the built form is largely informal and where enforcement capacity is weak (World Bank Report, 2014). Therefore, (Smolka, M. O., 2012) points that, for the regulatory instruments to be efficient and effective, especially in developing countries cities, it should be used together with other instruments such as the economic instrument, financial instrument, and investment instrument.

In the words of Smolka, 2012, conventional urban economic models make assumptions that are at odds with the reality in most third world cities. Among the clearly problematic assumptions are that all households comply with urban standards and regulations, acquire land through monetary contracts with same transaction costs, request permission when changing land uses, and pay fiscal charges and the like. In addition, the models assume all land is fully serviced, that all housing units can be rented at any location. However, reality in third world cities is that, majority of the households are faced with different challenges, chief amongst them are the informality of land market, housing informality, unaffordable and inaccessible serviced urban land, high urban land prices and large area of unplanned urban segment as well as urban poverty. All these had made the conventional economic model assumptions unrealistic especially in the third world cities. In any case the third world cities are known for their informal settlements which are defined by tenure, access to public services, and compliance with land use regulations.

The quantity demanded of any good is the amount of the good that buyers are willing and able to purchase. Many things determine the quantity demanded of any good the price, consumer preferences, income, number of buyers and substitutes (i.e. prices of related goods). The law of demand states that, other things equal, the quantity demanded of a good falls when the price of the good rises. In rural area, households demand land for agriculture to provide food, shelter/housing and also for provision of other services such as transport and extra. However, in urban areas land is demanded, not only for residential, but for other activities such as industrial developments, commerce, transport, recreation and extra. Households are consumers of land, especially in urban area like Eldoret Urban Area.

Each of the households tends to have consumption preferences of land which they want to occupy or use, but all depends on land price, hence affordability. Therefore, the vulnerable households (i.e. the poor, women and youth) end up occupying or using low value urban land which are not of their consumption preferences. This explains why the vulnerable households end up in informal settlements, slums or peri-urban areas. At the same time, some of these vulnerable households are forced to occupy or use the environmentally fragile land such as wet lands, riverbanks, land under electricity voltage, land on top of pipeline, and waste disposal land which are vulnerable to hazard risks, hence, prone to disaster.

The major factor which sets the urban land markets is that, the supply of land is fixed (i.e. inelastic) in the short-term, as it is not possible to manufacture more land to meet increasing demand. However, in the medium and long term, the supply of the urban land available for development can be increased (i.e. elastic), through urban expansion, zoning and installation of bulk infrastructure (Yuen., 2011).

The quantity supplied of any good or service is the amount that sellers are willing and able to sell. The law of supply states that, other things equal, the quantity supplied of a good or service rises when the price of the good or service rises. Many factors determine land supply; amongst them are land price, number of sellers, consumer preferences, topography as well as technology available and consumers' income. Topography of the land will determine whether the land is allocated in a disaster prone area such as wetlands, flooding areas, mud sliding area, riverbank and extra. The availability of modern technology to

some extent would determine the land use, whether it can be developed horizontally or vertically.

The vulnerable households (i.e. the poor, women and youth), like other households has a demand for land. The need for land for residential/shelter, transportation, commerce, green infrastructure and extra. However, the supply or accessibility of land to a large extent is to be determined by the vulnerable households' income and land price. However, the vulnerable households appears to be suffering from unemployment and high magnitude of poverty, hence, tends to have low income, yet land prices, especially in the urban/cities areas appears to be high. This explains why majority vulnerable households occupy the informal settlements, slums and peri-urban areas.

The rapid and unplanned expansion of urban /cities is exposing residents and economic assets to risk of disasters and the effects of climate change. Therefore, for the urban households to manage the disaster risk reduction, they need to understand the disaster risk management cycle or plan. The city/urban authority is responsible for its development, implementation and monitoring. The land use regulatory instruments discussed here, whether, public or private should be incorporated in the city/urban disaster risk management cycle or plan.

Risk Assessment is an essential component in disaster risk management and climate change adaptation. The purpose of risk assessment is to define the risk, answer questions about characteristics of potential hazards (such as frequency and severity), and identify vulnerabilities of communities and potential exposure to given hazards (World Bank, 2015). Thus, risk assessment helps the city/urban authority to prioritizing measures for risk

management, giving due consideration to the probability and impact of potential events, cost-effectiveness of preventive measures, and resources availability.

The disaster risk reduction debate from the global perspective can be analyzed by evaluating the two recent global documents to this aspect – the Hyogo framework of action report of 2005 to 2015, and the Sendai framework for disaster risk reduction of 2015 to 2030.

In the 2005 World Conference on Disaster Reduction, the Hyogo Framework for Action 2005–2015 for disaster risk management was developed with the aim of building the resilience of nations and communities to disasters. Its main components included ensuring that Household disaster risk management is a national and a local priority with a strong institutional basis for implementation; identify, assess and monitor disaster risks and early warning; use knowledge, innovation and education to build a culture of safety and resilience at all levels; reduce the underlying risk factors; and strengthen disaster preparedness for effective response at all levels (Gencer, 2013). The framework provided general understanding of the concept of disaster management emphasizing the importance of disaster risk management phase's activities of building disaster resilience (Mayunga, D. 2009).

These phases include hazard mitigation, disaster preparedness, disaster response, and disaster recovery. This indicates that nations need to develop a comprehensive approach to disaster management (Carter, 2008). To be effective, this comprehensive approach clearly needs to cover all aspects of the disaster management cycle and needs to include an

appropriate balance of prevention, mitigation, preparedness, response, recovery, and disaster-related development.

Hazard mitigation involves actions taken before a disaster to decrease vulnerability, primarily through measures that reduce casualties and exposure to damage and disruption or that provide passive protection during disaster impact (Tierney et.al, 2001). Its long-term focus and proactive nature distinguished hazard mitigation from the more immediate and reactive activities taken during disaster preparedness, response, and recovery. Disaster mitigation, thus, is concerned with sustained action to reduce or eliminate risk to people or property (Col, 2007). Technical approaches to mitigate the vulnerability of key infrastructures include transportation, information and telecommunications systems, health systems, the electric power grid, emergency response units, food and water supplies, among others (Godschalk, 2003).

Hazard mitigation is the phase of emergency management dedicated to breaking the cycle of damage, reconstruction and repeated damage from disasters (Godschalk, 2003). According to Mohit and Sellu (2013) hazard mitigation has two approaches, that is, structural approach and non-structural approach. Structural approach is concerned with the engineering measures adopted to control floods or protect human settlements. They include the building of seawalls and revetments, levees, embankments and others. On the other hand, nonstructural approach is based on the adjustments of human activities and societies to mitigate flood damages. It includes insurance, land use management, awareness, environmentally sensitive area protection and other emergency and recovery policies for managing flood damages.

Thus mitigation measures include land-use regulations that reduce hazard exposure and building codes and construction practices designed to ensure that structures resist the physical impacts created by hazards, such as wind, water, or seismic forces (Tierney et.al, 2001). The most distinguishing feature of mitigation is that it permanently alters physical conditions of risk, hazards, and vulnerability, thereby lessening the potential severity of future disaster impacts that can threaten life and property (Schwab, 2014).

Unfortunately, some communities either lack the resources to invest in hazard mitigation capabilities or simply do not see the need to do so (Carter, 2008). Prater and Lindell (2000) concurs that pre-disaster measures unquestionably are effective, but local governments often are reluctant to adopt risk reduction policies for various reasons. Thus, there may be recognition of the hazards in many communities; risk reduction and vulnerability often are not salient concerns until after the disaster occurs. Residents have other issues that assume priority, and local elected officials do not want to dwell on the hazard vulnerability of their communities as it might hurt economic investment and growth (Cutter et.al, 2010).

The low visibility of Household disaster risk management work in comparison to emergency relief has made it unattractive for governments chasing votes and international recognition and for Non-Governmental s (NGOs) dependent on disasters for funding (Schipper & Pelling, 2006). Prater and Lindell (2000) points out that the first thing a community must do is to identify the hazards to which the community is vulnerable and assess the severity of each hazard. Here, a substantial investment in hazard mapping can pay off in the long run by informing decision making with adequate facts.

Risk represents the possible occurrence of a harmful event that has some known likelihood of happening over time (Comfort, 2005). Thus risk is ever present in a complex social world, and it would be impossible for any government to eliminate risk altogether. However, the society should take steps to anticipate a damaging event and to take proactive steps to reduce that risk, knowing that there would still be some likelihood that the event could occur (Cutter, Burton, & Emrich, 2010). Further, Schipper and Pelling (2006) argues that from a developing country perspective, Poverty Reduction Strategy Papers (PRSPs) provide a vehicle for integrating risk reduction into poverty alleviation programs but so far, emphasis has been on early warning and relief, not on prevention.

Therefore mitigation measures including appropriate land-use, mandatory and voluntary building codes, and other long-term loss reduction efforts are very important. In some cases, mitigation can also include moving neighborhoods and communities to other locations in order to avoid future losses. Mitigation activities can take the form of specific projects, such as elevating homes for flood protection, as well as process-related activities, such as hazard and vulnerability analyses, that are designed to lead to future mitigate actions (Sutton & Tierney, 2006).

According to Tierney et. al. (2001), disaster preparedness encompasses actions undertaken before disaster impact that enable social units to respond actively when disaster strikes. It is the readiness to respond to any emergency based on planning, training and exercises. According to Col (2007), although emergency managers agree that implementing emergency plans in real time involves flexible improvisation, planning and exercises but it is supposed to take into account most surprises. For instance, whereas 260,000 died as a

result of Tangshan earthquake of magnitude 7.8 in China, lives were saved largely due to effective preparedness involving continuous monitoring, mitigation and exercises.

Yet, according to Schwab (2014) preparedness typically signify preparations related to what to do during a disaster, what food and supplies to have on hand, how to evacuate, where to go, who to contact, and where to seek emergency shelter. Kapuc (2008) also asserts the need in creating a culture of preparedness that emphasizes the shared responsibilities and disaster preparedness at all levels of government and communities. For instance, there is the need for increased training in disaster preparedness areas such as fire services, blood donation, first aid and Cardiopulmonary Resuscitation (CPR). Other needed disaster preparedness provisions include a disaster supplies kit that contains enough food, water, medication, emergency shelter, smoke detectors, fire extinguishers, storm shutters, a fire sprinkler system, and carbon monoxide detector.

United Nations (2008) noted that disasters undermine development achievements, thereby impoverishing people and nations. In the absence of concerted efforts to address root causes, disasters represent an increasingly serious obstacle to the achievement of the Millennium Development Goals (MDGs). Further, Comfort (2005) argues that inability to imagine attacks on the security of U.S. cities on the scale of the 9/11/2001 events limited government capacity to plan defensively for such threats. Preparedness, thus, is more temporary and provisional, focused on short-term measures to minimize the effects of existing risk, hazard, or vulnerability in the absence of mitigation actions (Schwab, 2014).

Preparedness is commonly viewed as consisting of activities aimed at improving response activities and coping capabilities (Sutton & Tierney, 2006). 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. According to Sutton and Tierney (2006), emergency preparedness practices involve the development of plans and procedures, the recruitment and training of staff, and the acquisition of facilities, equipment, and materials needed to provide active protection during emergency response. Economic Vulnerability to disaster management (EVDM) has long been recognized in the literature for its role in mitigating the positive environmental, social and economic impacts of natural hazards (Shreve & Kelman, 2014).

After a disaster occurs, demand for aid supplies will likely change over time; some items are needed immediately at the earliest stages of relief operations, while other items can be safely supplied during later stages. Types of pre-positioned stocks vary, and are chosen to meet the immediate needs of those affected: food items, for example, high-energy biscuits, and ready-to-eat meals, non-food items such as jerry cans, taps, tents, blankets, hygiene kits, and kitchen sets, medical supplies and equipment for example telecommunication equipment, and metal detectors. Some relief stores a variety of items, while some specialize in a particular sector, such as food (Balcik & Beamon, 2008).

Additional preparedness measures may include the government use of hazard awareness campaigns to make households and businesses aware of the risks they face and of suitable hazard adjustments for reducing their vulnerability (Prater & Lindell, 2000). Disaster Recovery Planning (DRP) are also necessary, involving decisions and actions taken after a disaster to restoring or improving the pre-disaster living conditions while encouraging and

facilitating to obtain necessary adjustments to reduce disaster risk (Kaushalya, Karunasena, & Amarathunga, 2014). Further, planning for insurance protection is inextricably linked because the obvious solution for financial needs during an interruption of business is to transfer the risk of loss through the insurance (Nquot & Kulatunga, 2014).

People, economic activity, and environmental amenities are unevenly distributed across space. This also holds for the majority of environmental externalities. Spatial planning, the public policy toolbox used to alter their distribution, is one of the domains where the tensions between economic and environmental objectives are particularly acute. These tensions are, furthermore, expected to escalate as demand for housing, energy, food, fibre, but also ecosystem services, are growing.

To achieve these objectives, SPINE relies on analytical, modelling and empirical work, investigating the relationships between land use patterns, socioeconomic outcomes, environmental pressures, and the use of specific policy instruments. SPINE mainly focuses on cities, as they are not only major drivers of economic growth and employment, but also the places where many environmental, economic and social challenges have to be tackled.

The response component includes actions taken to respond to the actual disaster once it has occurred, such as rescuing survivors, conducting mass evacuations, feeding and sheltering victims, providing emergency medical care, and restoring communications (Schwab, 2014). Emergency response consists of actions taken a short period prior to, during, and after disaster impact to reduce casualties, damage, and disruption and to respond to the immediate needs of disaster victims (Tierney et.al, 2001).

Urban planning is a process of determining how cities or urban centers shall be developing and expanding. It is a process of allocating urban land to the various socio-economic activities. Land is a resource that greatly will determine cities or urban centers` economic production, hence, people`s livelihood sustainability. It is a strategy for improving their productivity, equality, and sustainability. Rapid urbanization or urban growth is being experienced in the world. UN-Habitat (2010) has indicated that in the next 20 years, half of the developing world`s population will be living in cities. For instance, in 1970, 63% of developing world`s population was living in rural areas as opposed to 37% in urban areas, in 2000, 53% lived in rural areas against 47% in urban areas, while in 2030, this would change to 40% in rural areas and 60% in urban areas (Acioly, 2012). Urban growth in many cities has been in the increase, due to natural population growth, together with rural-urban migration and has resulted in increased demand of urban serviced land, urban infrastructures and services, and therefore, calls for urban planning.

Disaster impacts tend to be large, intractable problems that test the ability of communities, nations, and regions to offer responses that effectively protect their populations and infrastructure, to reduce both human and property loss, and to rapidly recover (Altay & Green, 2006). Accordingly Col (2007) surmise that disaster response comprises immediate actions to save lives, protect property and meet basic human needs. Hurricane Katrina revealed weaknesses that may prevent effect response where the national emergency management system is in disarray, incapable of responding effectively to the immediate needs of communities along the risk areas and unprepared to coordinate the massive relief effort required to support recovery (Waugh & Streib, 2006).

According to Schwab (2014), a DRP for multi-hazard events is more effective than concentrating on a single hazard event. Consequently, a multi-hazard approach involves translating and linking knowledge of a full-range of hazards into disaster and risk management. It will look not only at natural hazards, but also factors including political strategies, technical analysis, and operational capabilities and public understanding. This approach will ultimately lead to greater effectiveness and cost-efficiency (United Nations, 2008). Emergency response activities are conducted routinely by county governments on a daily basis for emergencies that draw only upon locally available resources. A substantial share of county government budgets are dedicated to supporting day-to-day emergency response activities, such as fire suppression and ambulance calls. These emergency response needs are amplified in a disaster and will prompt local governments to call upon other entities for assistance, support, and resources (Schwab, 2014).

EVDM also needs to take into consideration the vulnerable populations such as those with poor health, disabilities, and chronic diseases which are at an increased risk of adverse health outcomes resulting from disasters (Bethel et.al, 2011). They are more likely to have a slower response time to disasters or be unable to take appropriate response steps. Similarly, people with at least one chronic disease may have their illnesses aggravated by conditions left by the disaster such as extreme heat or cold, lack of potable water, and lack of food.

Col (2007) defines disaster recovery to include decisions and actions related to replacing lost residential and business properties, rebuilding the economic base, and repairing and rebuilding the infrastructure. This component includes restoring housing, transportation,

and public services; restarting economic activity; and fostering long-term community redevelopment and improvements (Schwab, 2014). The post-disaster recovery process usually consists of a series of distinct but interrelated programs; for instance, covering infrastructure, medical and health systems, education facilities, and so on. Recovery requires sustained commitment over time to rebuilding goals and objectives often formed or articulated after a disaster has happened. On the other hand, effective recovery may be enhanced by pre-event planning that identifies linkages between all four disaster management components (Schwab, 2014).

A disaster recovery project is a job which is never completed project planning must be tested and revised several times during its lifetime. Long-term disaster recovery has become a much more central concern, and pre-disaster recovery planning has become a focus in emergency planning (Prazeres & Lopes, 2013). There is more pressure to link disaster recovery to economic development and to deal with the long-term social and economic problems exacerbated by disasters. The broadened mission of emergency management requires a much different skill set than what was once expected of civil defense officials and has been expected of homeland security officials (Waugh & Streib, 2006).

According to Cutter et. al. (2010), vulnerability is the pre-event, inherent characteristics or qualities of social systems that create the potential for harm. On the other hand, resilience is the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-

organize, change, and learn in response to a threat. Vulnerability thus is a function of the exposure (who or what is at risk) and sensitivity of system that is the degree to which people and places can be harmed.

According to Schipper and Pelling (2006) disasters do turn back the development clock through loss of infrastructure, livelihoods and psychological stress (Desiere, Vellema, and D'Haese, 2015). Climate change too can pose one of the most serious environmental problems confronting human development. The impacts of climate change on development are expected to manifest primarily through impacts on natural resources, on which the poor depend heavily, and on human health. Hence climate change responses, particularly building adaptive capacity and technology transfer, will regularly be akin to development activities.

2.16. Research Knowledge Gap

From the foregoing literature, it is clear that there exists a seriously urgent and adequate knowledge gap in solving urban household disaster risks. There is inadequate research and practices that relate urban land use planning and disaster risk management among urban households. There is also lack of consensus among a few studies available as concerning the influence of land use planning on Household disaster risk management. Nonetheless, achievement of many national objectives still seems elusive. Planning of urban land use, especially in the urban spatial structure elements; that is urban forms build-up environment; informal settlements slum areas and pre-urban areas, CBD, and suburban areas and urban development corridors, urban development nodes, open space, sprawl and compactness development; population density patterns and household transit pattern during

day and extra, and how it relates to households disaster risk management appears to present challenges that must be tackled urgently and in a comprehensive way. In fact most studies and literature available in developing countries, Africa continent and even in Kenya appears to concentrates on physical, metrological, environmental and chemical disaster hazard risks but none so far are available on socio- economic hazard risks particularly among the urban households.

Demographic, institutional, economical, poor coordination mechanism, inadequate land use planning, social spatial structure and environmental challenges seems to play significant role in the uncontrolled encroachment in the urban land resulting in spread of slums, informal settlements, occupation of natural hazard prone location, degradation of environment, as well as the degradation of service provisions, low income, inadequate infrastructure provision and inadequate mechanisms for households to manage disaster hazard risks in Eldoret Urban Area. Otherwise, urban land allocation without proper urban land use planning will cause the poor households to occupy land which are hazard prone, hence may suffer from disaster risk. It is nonetheless important that efforts be made towards a paradigm shift in this valuable resource (urban land), if scarce natural resource is to be managed. Therefore, this study is set to address the gaps in knowledge and practices in Eldoret Urban Area in terms of households accessing, affordable urban land for shelter or residential and other development activities.

2.17. Theoretical Framework

This study was guided by The Economic Classical Theory on Urban Spatial Structure (Making Room Model), and Disaster Risk Reduction Theory (community-based model).

The theories guiding this study was undertaken through looking at factors contributing to hazard, risks and vulnerability due to structural and non-structural forces created by economic, social and environmental factors and their impact on urban neighbourhood. They focused on the economic and environmental dimensions, and overall vulnerability reduction and resilience building of the urban residents in slums, informal settlements and per-urban areas neighbourhoods of Eldoret Urban Area. The guiding theory in this study is the economic classic theory on urban spatial (making room model), while the disaster reduction theory (community –based model) was supplementary theory.

2.17.1 The Classical Economic Theory on Urban Spatial Structure (Making Room Model)

The theoretical foundation for the economic analysis of urban spatial structure in general and urban expansion in particular, was laid out by Alonso, (1964), Mills, (1967), Muth, (1969), refined by Wheaton, (1976), and later unified by Brueckner, (1987), and finally unified into making room model by Angel, (2011). The classical economic model was based on the Burgess, (1923), concentric zone theory, which was essentially an application to urban land use planning of Von Thunen`s earlier theory relating to rural land around the city. Von Thunen, (1826) postulated that around a central town, rural land of constant fertility assumed different forms, land use, diminishing intensively in inverse relationship to increased distance from the town center. Burgess, and Park, (1925), in their ecological theories of urban development, suggested that human beings compete for scarce resources such as land and raw materials with the aim of establishing spatially-disparate urban environments to satisfy their different economic and social needs. Burgess developed a

concentric ring approach, theorizing that a city expands from its original center in a series of concentric zones (Mc Donagh, 1997). Therefore, the concentric ring approach or model, suggested that any city extends radially from its center to form concentric zones and that as distance from the center increased there would be a reduction in accessibility, rents, and densities. Thus, land use would assume the following forms from the center outwards:- the central business district (CBD), a zone of transition, an area of factories and low income housing, an area of higher income housing and commuter zone (Angel, 2011).

The Alonso, (1964), on the other hand building on the Burgess's concentric theory, pointed out that the economic variables explain better the human competition for urban resources, especially the urban land. This theory is able to explain clearly, the various variations in urban spatial structure among the cities, stating that variation in climate, cultural tradition or policy environment in different cities may matter less than economic forces or variables in giving shape to their structure. Economic theories focus on the economic foundations of City growth. Following this paradigm, it is the market function that distinguishes the City from the Countryside. A fundamental assumption of all spatial economic theories is that locations with good accessibility are more attractive and have higher market value than peripheral locations, (Durand-Lesserve, 2009) Thus, the economic forces/variables such as employment, income generations, provision of urban services and infrastructures, as well as investment attractiveness would determine the urban spatial structure. For instance, slums and informal settlements have developed in urban areas, especially, either in the industrial areas, or areas close to any industry. In Eldoret Urban Area, Kamukunji slum has developed in an area close to light industries, while, Langas an informal settlement has developed and grew as a result of its proximity to Rivatex Industry.

The classical economic model of urban spatial structure is a circular, with a single Central Business District (CBD), surrounded by concentric rings of residences. The households have homogeneous incomes and preferences, and their breadwinners commute to the CBD, where all jobs are concentrated. The theory confirms that, in equilibrium, the price of land will increase with distance from the city Centre. Perhaps because land use planning is being practiced right in the CBD and sub-urban areas, and the exercise tend to decline as distance increases from the CBD. Thus, both land rent and population density appears to decline with distance from the CBD, (Angel, 2011). The Classical economic theory of Spatial Structure provides an endogenous solution for the extent of the area that a City occupies and its average density, given the population and the income, the cost of transport, the share of buildable land and the agricultural area. According to Brueckner (2001), the solution of the equilibrium equation in the Classical Economic Theoretical Model, could be attained only if one of the two alternative prevails :- the area of the city increase when its population increases, when household incomes increase, when transport costs decrease, when the share of buildable land increases and when agricultural rents on the urban periphery decrease or average density city's population will increase when population increases, when household incomes decrease, when transport costs increase, when the share of buildable land decreases and when agricultural rents on the urban periphery increase. In the words of Brueckner, (2001), both of the above alternatives demand that a City or Urban area is to undergo land use planning.

The Classical Urban Spatial Structure Theory, at the beginning emphasis the containment model based on compactness attribute of the model to check on the urban expansion. However, of late most scholars, (Angel, 2011), have been arguing that judging from the

current Global and even Africa regions urban population, Cities and Urban areas need to be prepared for the rapid urbanization, hence, making room model is appropriate. The making room paradigm is a more realistic strategy for cities and metropolitan regions that needs to prepare for their inevitable expansion. Angel, (2011), suggests that an urban planning challenges posed by Worldwide urban expansion cannot rely on simply transplanting containment strategy, but should focus to seek to enrich understanding of context in which preparation for urban expansion must take place in cities.

The making room model as forwarded by Angel, (2011) a scholar attached to Lincoln Institute of Land Policy, who pointed out that, Cities and Metropolitans should be prepared for rapid urbanization in the 21st Century by extending urban planning in the informal settlements, slum areas and even in the per-urban areas

2.17.2. Risk Reduction Theory (Community-Based Model)

Disasters are the greatest challenges for development. When it strikes, it claims and destroys lives, livelihood, property and infrastructures, causing disruptions on national scale, and sometimes affecting international arena (Hyee, 2011). Risks are challenges that can have negative influences on projects unless they are handled properly. Disaster Risks Reduction is a concept and practice of reducing disaster risks through systematic efforts to analyses and reduces the casual factors of disasters. It is a process of reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and the environment and improving preparedness and early warnings for adverse events are all examples of disaster risks reduction (UNISDR, 2014). Therefore, people and their communities must be at the heart of efforts to reduce the impacts of natural and human

induced hazards. In fact, the theory adapted in this study therefore, argues that, reducing the risks and losses of disasters is a collective effort, hence, requires collective action.

Subsequently, this study is grounded on the community-based disaster risk reduction theory propounded by Shaw, of Oxford University in 2009. The founder of this theory based his theory on the crunch model. The crunch model provides the framework for understanding the causes of a disaster (ADPC, 2000; Bakeoff, 2001, Heijmans, 2001; Cannon, 2004; Marus, 2005). In this model, the progression of vulnerability of a community is revealed and the underlying causes that fail to satisfy the demands of the people are identified. The community-based model of disaster risks reduction recognizes the fact that in the immediate aftermath of a disaster, the first response always comes from the community itself. It also recognizes that in many cases, top down approaches may fail to address the specific local needs of vulnerable communities, ignore the potential of local people, resources, and capacities, and may in some cases even increase people's vulnerability. The Community-based Model, also, borrowed a lot from the disaster pressure and release model, which was first published in 1994 by Blaikie and then by Wisner, 2004. The pressure and release model indicates that there are certain underlying causes, dynamic pressures and unsafe conditions which contribute to vulnerability. Linking the above to hazardous trigger events increases the risk in communities.

The basic practice for this theory is that disaster management techniques should adopt a risk management approach. That is a systematic approach to identifying, assessing and reducing risks associated with hazards and human activities. According to Béné, et. al. (2016) it means that risk management must be the integral part of the way individuals,

households do their work, not an add-on or a one-off action but a process of constant improvement.

The risk management approach recognizes that there is a wide range of geological, meteorological, environmental, technological, socio-economic and political threats to society. These threats creates hazards of which if human interacts with in a way not protected, then the resultant outcome and impacts will be devastating (Claire, et. al., 2017). Risks are located at the point where hazards, communities and environments interact, and so effective risk management must address all of these aspects. Disasters are seen not as one-off events to be responded to, but as deep-rooted and longer-term problems that must be planned for. Effective risk management generally involves a variety of different but related actions. Such integrated approaches work best when they are informed by specific local conditions and targeted towards local needs (Bahadur, et. al., 2015).

It is important to note that Household disaster risk management and other forms of risk management are not simply defensive measures, they must facilitate positive change. Improved security and safety provide vital support and opportunity to households, communities, societies and governments so that they can undertake development initiatives that improve well-being, strengthen livelihoods and contribute to sustainable development. Effective HDRM actions provide development benefits in the short term, as well as contributing to vulnerability reduction in the long term, although in practice there may be trade-offs between different goals.

For much of the world's population, hazards are part of everyday life. Each time a person lights a fire to cook, there is the risk of injury to children or of the house catching fire.

Where communities live on flood plains or volcanic slopes to benefit from fertile soils, there are risks associated with flooding or volcanic eruption. Risks become a part of life. When designing new development projects, we must take note of these risks. For example, planning an agricultural programme on a flood plain without considering the impacts of flooding invites failure. Similarly, building houses and schools in a known earthquake zone without earthquake resistance is foolish. Development has to be appropriate, taking full account of the context, including the likely hazards.

Applying the community-based model in this study meant that, when the households in urban areas or the urban authority adopt the urban land use planning practices, especially, land use planning regulatory tools, zoning and urban land use transit circulations and connectivity, urban households would be able to reduce vulnerability to the hazard events, hence, minimize or reduces the existing risks and even manage any existing risks or losses on their lives, livelihoods, property and even their environment. Thus, the community-based model of disaster risk reduction, emphasizes the need of social inclusiveness that is the involment of community in the process of households disaster risk management- the participatory approach to the household disaster risk management. It re-enforces the need of the bottom-up approach to the household disaster risk management.

2.18. Hyogo Framework for Disaster Risk Reduction (2005-2015).

Household disaster risk management needs theory in order to make sense of apparently chaotic events. In effect, theory is the road map of mitigation, response and recovery (Drabek, 1989). However, the field is exceptional in that there is an imperative need to validate theory according to its immediate utility. The urgency with which problems of

disaster and emergency response, and hazard and risk mitigation, need to be solved is such that we cannot afford the luxury of producing theory for its own sake in the hope that someday it might somehow be useful (Yin and Moore, 1985).

With the theme “Let our people teach us”, a review of the role of education in Disaster Risk Reduction covered the key activities related to Priority 3 of the Hyogo Framework for Action 2005-2015: “Building the Resilience of Nations and Communities to Disasters” which includes: knowledge, education and risk awareness (ISDR, 2006).

The Hyogo Framework for Action 2005-2015 under the theme, “Use knowledge, innovation and education to build a culture of safety and resilience at all levels”, states that disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities (ISDR, 2005).

Shaw *et al.* (2004), state that the need for teacher education and their roles as disaster managers in schools were realized after 1983 tsunami in Akita, Japan had killed 13 elementary school children. Whereas Ronan and Johnston (2001) in their findings after conducting research about hazard education for youth, suggest that hazard education programmes can help children achieve increased awareness, more realistic risk perceptions and more knowledge of risk mitigation and increased levels of home-based hazard adjustment.

This framework is the first plan to explain, describe and detail the work required from all different sectors and actors to reduce disaster losses. This is based on the understanding that disaster losses are on the rise with grave consequences for the survival, dignity and livelihood of individuals, particularly the poor, and hard-won development gains. Moreover, disaster risks are increasingly of global concern and their impacts and actions in one region can have an impact on risks in another, and vice versa (Reghezza-Zitt et al., 2012). This, compounded by increasing vulnerabilities related to changing demographic, technological and socio-economic conditions, unplanned urbanization, development within high-risk zones, under-development, environmental degradation, climate variability, climate change, geological hazards, competition for scarce resources, and the impact of epidemics such as HIV/AIDS, points to a future where disasters could increasingly threaten the world's economy, and its population and the sustainable development of developing countries. In the past two decades, on average more than 200 million people have been affected every year by disasters.

The Hyogo Framework for Action was developed and agreed on with the many partners needed to reduce disaster risk including governments, international agencies, disaster experts and many others. This has brought the stakeholders into a common system of coordination. The HFA outlines five priorities for action, and offers guiding principles and practical means for achieving disaster resilience. Its goal is to substantially reduce disaster losses by 2015 by building the resilience of nations and communities to disasters. This means reducing loss of lives and social, economic, and environmental assets when hazards strike. The pace of urbanization in the developing world is led by Asia. Urbanization is increasingly located in the developing countries: in 1970s, 50% of urban residents lived in

developing countries, whereas it is increased to 66% in 1990s, and is projected to be 80% by 2020.

A household, whether in urban or rural areas may have weaknesses, referred to as vulnerabilities, but it will also have strengths called capacities. These are found at community, family and individual level. Capacities create an ability to prepare for, respond to and recover from the impact of a hazard, reducing the damage and losses.

2.19. Sendai Framework for Disaster Risk Reduction (2015-2030)

The Sendai Framework for Disaster Risk Reduction 2015-2030 is the first major agreement of the post 2015 development agenda, with seven targets and four priorities for action. The Sendai Framework is a fifteen (15) years, voluntary , non-binding agreement which recognizes that the State has a primary role to reduce disaster risk but, that responsibility should be shared with other stakeholders including local government, private sector and other stakeholders. It aims at achieving the following outcomes:- the substantial reduction of disaster risk and losses in lives, livelihoods and health and the economic, physical, social, cultural and environmental assets of persons, businesses, communities, and countries. The Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015. Thus, the Sendai Framework has been the continuation of the Hyogo Framework for Action, whereby governments Worldwide have committed to take action to reduce disaster risk and adapt a guideline to reduce vulnerabilities to natural hazards.

The Sendai Framework for Disaster Risk Reduction 2015-2030, acknowledges that inadequate land use planning causes urban households to be vulnerable to disaster risk in urban areas. The Sendai Framework, in fact, states that inadequate planned and managed cities creates new risks which threatens to erode current development gains, (UNISDR, 2015). This Framework has also emphasized that inadequate infrastructures, inadequate urban services, unsafe housing, and poor health services can turn natural hazard into a disaster. Both Hyogo Framework and Sendai Framework acknowledge that poorly planned and managed urban development exposures individuals and households to disaster risk in urban areas. According to (UNISDR,2015), weak land use regulations, for instance, the lack of enforcement of building codes, planning permissions, regulatory investment, generally, exposures urban households to disaster risk. Therefore, appropriate urban land use planning would enable urban households to be less vulnerable to urban hazards which could cause disaster Thus, a well-designed urban land use planning would accomplish the following:- density management, site selection and development management, a good building regulations design, provides open space/greenbelt, promote integrations and enhances public participation. Eldoret Urban Area has been experiencing rapid growth ofvarious spatial structure, especially, slums, informal settlements and per-urban areas due to inadequate land use planning practices, but thiscould only be tackle if urban planning is extended into these spatial structures.

2.20. Conceptual Framework for the Study

The concept and practice of managing disaster risks in built-up areas is systematic efforts to analyze, understand and manage the causal factors of disasters, including reducing

exposure to hazards, resilience, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

This conceptual framework model presents the relationship between disaster risk management and urban land use planning in a way that is theoretically grounded and amenable to empirical testing. The framework model presents furthermore, the disaster risk management (DRM) framework explicitly focused on antecedent conditions, specifically those related to inherent resilience low vulnerability. Antecedent conditions are the product of urban land use that lead to households income, employment, investment and credit facilities, quality and quantity housing, socioeconomic services and housing mobility specific to households within and between natural systems, the built environment, and social systems (Cutter, Burton, & Emrich, 2010). DM therefore encompasses enhancing disaster-risk reduction before a disaster occurs, and also during the reconstruction process, requires enhanced knowledge regarding the most vulnerable groups, the areas at risk and the driving forces that influence and generate vulnerability and risk (Birkmann, 2007). Finally, Disaster Risk Management involves both Household disaster risk management (prevention, preparedness and mitigation) and humanitarian and development action (emergency response, relief and reconstruction) as may be contributed by urban land use planning (Schipper, & Pelling, 2006).

The current increasing cases of disasters and risks experienced in urban areas demonstrate urban areas with inadequate coping strategies. This exposes urban households to unmatched challenges they are unable to provide immediate and long term solutions for. The growing concern is the inability to prevent socioeconomic, demographics,

environmental, and transport networks risks events from happening. Most of the disasters when they occur, the households in such urban areas lack anticipation, resilience, understanding and forecasting of disaster risks. Yet enhancing communities' resilience and Household disaster risk management for sustainable socio-economic urban area productivity is prudent move many cities pursue.

According to details given above, although there are missing links, this conceptual framework provides a view that urban land use planning is a useful tool in disaster risk management. As for many low or middle-income countries suffer from scarce land resources, continuing resource degradation because of increasing urban population pressure, natural hazards due to climate change, and a lack of integrated planning and management of public, private, and ancestral lands and their uses. Although economic growth remains solid, poverty levels among the urban household population, as well as unequal income distribution, continue to rise. Very often, the poor are the ones living in hazardous environments unsuitable for habitation, which present an extreme disaster risk on lives, livelihood, and properties. Urban land use approaches that will play a crucial role for the anti-poverty strategy currently and in the future, not only as space for food production but also for urban growth, nature conservation, and industrial development are needed. This conceptual framework therefore tries to provide a missing link on the urban land use planning variables and the disaster risk management variable being explored in this study. This is presented on Figure 2.1.

Independent Variable (IV)

Dependent Variable (DV)

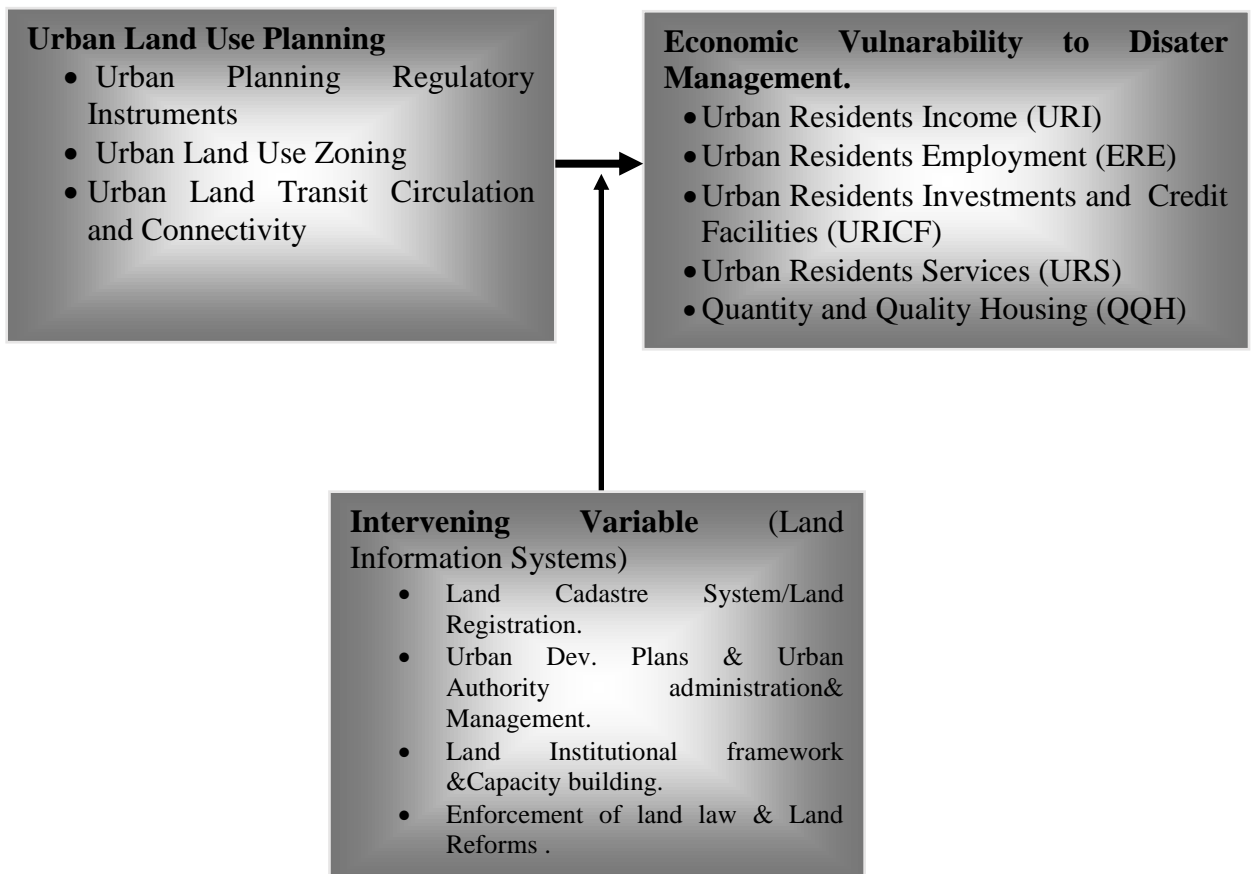


Figure 2. 1: Conceptual Framework Lining Study Variables

Source: Researcher, 2017

The land-use planning conceptualized for a specific locality may not be appropriate to another context. It is recognized that land use planning can promote effective management of natural resources for production and income diversification. It implies that proper land use planning can be a mechanism of increasing the opportunities to engage in livelihood production addressed through rehabilitation of natural springs, drilling of boreholes and introduction of energy efficient cooking stoves. The impact these initiatives can have reduced dependency on relief food of households. However, there are many cases of

drought related loss of both animals and human lives, collapsing buildings in urban areas, people being electrocuted, structures established on the riverbanks, along water lines and in swampy areas that are prone to disasters and other risks threatening lives (Santos, Toda1, Orduña1, Santos, Ferrão, Lopez, 2015). It means that desires to increase households' awareness, preparedness, and readiness and risk reduction capabilities is yet to be achieved.

The ability to reduce and manage the hazards from future disasters, less vulnerability to risks, and capacity parameters, together with the disaster management requirements, are identified, collected, and integrated with traditional land use planning information are critical. Structure and non-structure measures undertaken to limit the impact of potential disasters are not adequate for this purpose. It means that measures of mitigating disasters such as public awareness and flood forecasting, dikes and barrage construction are lacking or ineffective. This means that households and government agencies lack the ability to resist, absorb, accommodate to and recover from the effects of hazards promptly and efficiently by preserving and restoring essential basic structures.

The vulnerable low income residents, especially in cities and urban centers, include the urban poor, the urban women and the urban youth. These are considered to be more exposed to the disaster hazard risks. Poverty has been defined as the inability of an individual or household to command sufficient resources to satisfy basic needs. These basic needs include food, clothing, shelter, healthcare and other necessities of life (World Bank Report, 2030). Poverty is multidimensional, involving not only lack of income but also ill-health, illiteracy, lack of access to basic social services and little opportunity to

participate in process that influence people's lives. The concept poverty is often difficult to define, though most scholars defined it in terms of households' income. Therefore, the vulnerable low income residents in urban areas due to low or inadequate income found themselves unable to access and afford serviced urban land.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter provides an explanation of how the research was conducted. It describes the study site, research design, research methodology, target population, sampling procedures, data collection methods, research variables and indicators, validity and reliability of the research data collection methods and data analysis methods. Finally, the assumptions and limitations are also noted at the end.

3.2 The Study Site

The research study was carried out in Eldoret Urban Area, formally, Eldoret Municipality. Eldoret is located in the high agricultural potential highlands of Uasin Gishu County in Rift Valley. It lies at an average altitude of 2,085 meters above sea level. The northern part of Eldoret is marked by steep slope. Eldoret experiences an average daily means maximum temperature of 24°C. It receives a total annual average rainfall of 1,149.9mm (Uasin Gishu County Integrated Development Plan, 2008 – 2022).

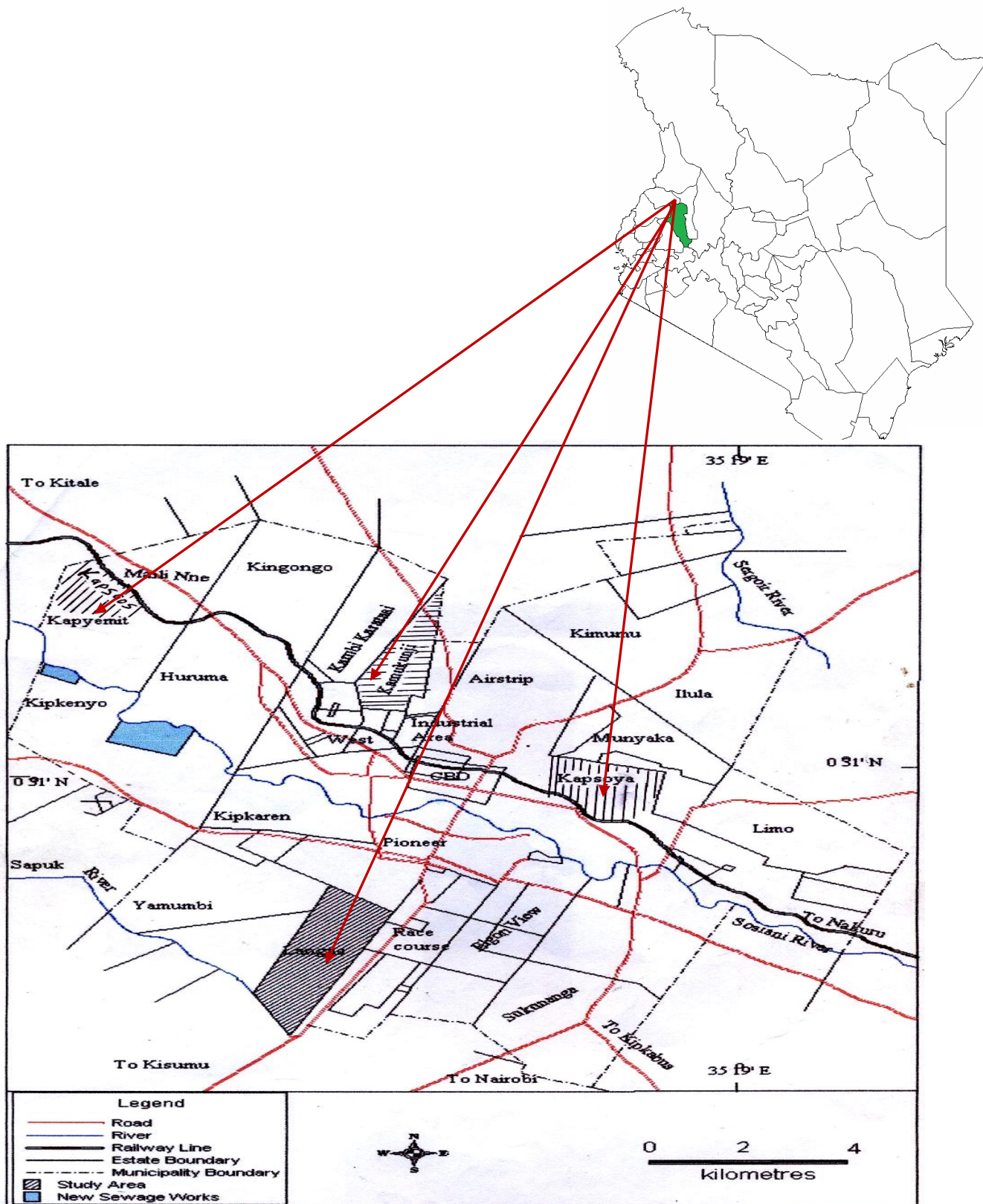


Figure 3. 1: Study Area Map.

Source: Eldoret Strategic Development Plan 2012.

3.3. Philosophical Paradigm

The term philosophical worldview means a basic set of beliefs that guide the investigation in the choices of methods (qualitative, quantitative or mixed method) in a fundamental ways (Guba, 1994). Other Scholars have called it (paradigm). However, Lincoln & Guba, (2000), refers to worldview or paradigm as epistemology and ontology (Crotty, 1998, Neuman, 2000).

The Philosophical Paradigm that was adopted by the researcher is pragmatism. Pragmatism is sustainable because as philosophical underpinning for mixed methods studies. It is not fixed to any one system since it draws freely from both qualitative and quantitative assumptions. It allowed the researcher the freedom to choose the approaches, techniques and procedures that sufficiently guided the conduct of enquiry into land use planning on economic vulnerability to disaster management in Eldoret Urban Area.

3.4. Research Study Population

Eldoret Urban Area, was first settled by the Afrikaans in 1908, and by that time the town was covering only 25 sq.km, with a population of 8,000 people in 1948, this grew to 18,000 people by 1969, and thereafter, at accelerated growth rate of 6% to 197,000 people in 1999, and to 497,446 in 2009 (Eldoret Municipal Strategic Plan, 2012). Kamukunji is located in Uasin Gishu County, Eldoret Urban Area, and Soi Constituency, Kapsuswa-Kwinet ward, Kiburgen location and Kamukunji sub-location. The settlement has an area of 237 ha and is approximately 2.5 km north of central business district. The settlement is named after a meeting place where initial residents used to converge, and is part of the

wider Kamukunji Estate. The total population is 9188 which is composed of 1,104 households (Kenya Population Census, 2009).

The settlement is flat on its southern edges and then extends up the sides of a rocky hill on its northern boundaries. The settlement becomes quite muddy during the rainy season and is surrounded by undeveloped or agricultural land as well as other less dense settlements to its northern. Kamukunji estate is also surrounded with a number of quarries, noted among them is the Kitur quarry. From the south it is surrounded with light industries.

Langas is located 5 km. south of Eldoret (CBD). It measures (425 ha.), with over 3,360 plots all of which were acquired informally. The farm was initially purchased from a white settler by a Kalenjin land buying group of 53 members. Langas settlement had a population 25021 people during 2009 population census. According to Eldoret Municipal Strategic Plan, 2012, 95% of residents in Langas, lack land ownership (land title or security). This raises the questions of land ownership in this settlement as a very critical issue; this would likely affect development in the area. Langas informal settlement is one of the largest informal settlements in the municipality. It developed as a result of development of Rivatex industry in the late 1970s to accommodate textile workers from the industry and other light industries which developed around Pioneer area. Langas estate is within Langas ward, Pioneer location, and Kapsaret constituency.

Kapsaos is pre-urban area that was sampled. Kapsaos area is located in Kapyamit location, Huruma ward, and Turbo constituency. It occupies an area of 345 ha, with a population of 7345 people (Kenya Population Census, 2009). Kapsaos is pre-urban area just adjacent to Mail Nne, which is appropriately 6.5km from the CBD. As a pre-urban area, it has been

characterized with a large agricultural land with inadequate services and infrastructure. Although land in this area has land tenure security (title deeds), but their source of water was mainly borehole, with no sewage facilities, sanitation has been mainly, pit latrines. In this area, building code/standards has not been applied as no urban planning is applied in the area.

Kapsoya estate which formal spatial area used here as control or reference point is allocated in Kapsoya location, Kapsoya sub-location, Kapsoya ward, Anaibikoi constituency. Kapsoya estate is a formal area, site and scheme project started in the 1980s. The site and scheme had been sub-divided into 1/8 ha and total there are 258 plots. The scheme had been provided with adequate urban services- piped water, sanitation sewage facilities and other infrastructure. Housing quality and quantity in the area is good and satisfactory. And because of the availability of urban services and infrastructure, residents in the estate are not exposed to disaster risk hazards. However, recently, due to reluctance of the (EUA) authorities to enforce the land use regulatory instruments, especially, the building codes, the Kapsoya population density is rapidly increasing to the cropping up total buildings and soon the area population would be above the existing or available urban services. Kapsoya estate covered an area 121.5 ha with a population of 8446 people (Kenya Population Census, 2009).

Table 3. 1: Research Study Population

Spatial Structure/Form	Area within EUA	Target	Size
Formal area	Kapsoya	8446	84
Informal Settlements	Langas	25021	253
Slum areas	Kamukunji	9188	91
Pre-urban area	Kapsaos	7345	72

Source: Eldoret Strategic Development Plan 2012

3.5. Research Design Framework

Research designs are procedures for collecting, analyzing, interpreting and reporting data in research studies. Research design are useful, because they help guide the methods, decisions that researcher must make during the study and set the logic by which he/she interpret his or her study results. According to Mark, Philip and Adrian (2009) the descriptive survey strategy is popular in social sciences and associated with deductive research approach. In this research strategy information is collected by pre-designed questionnaire, Key informants interview and document analysis.

Therefore a descriptive survey research design was applied in this study for specific objectives one, two and three. For the overall objective of the study, evaluation research design has been applied. The descriptive survey research design was useful in gathering data that describe events and then organized, tabulated, depicted (Glass & Hopkins, 1984). The design was critical in the application of visual aids such as frequency distribution tables, graphs, charts, multiple variables tests such as Pearson's Product Moment correlation, regression, or multiple regression analysis to aid the reader in

understanding the data distribution (Knupfer and Hayes, 1994; McKenna's, 1993; Orey and Nelson's, 1994 and Shapiro's, 1991).

This survey design helped in describing the current state including what is so observational on disaster management in urban areas. It was also useful in finding out if urban land use planning is introduced into the disaster management in our urban areas, then what would be the impact (Borg & Gall, 1989). This was necessary in helping in collection of quantitative data, yielding rich data that lead to important recommendations.

Table 3. 2: Research Design Framework and Study Indicators

S/N	Specific Objectives	The Independent Variable Indicators	Research Design
1.	To examine the effect of urban land use planning regulatory instruments on economic vulnerability to disaster management in EUA	-Floor Area Ratio -Height Limitations -Building & Construction permits -Building & Construction Standard -Agricultural land conservation -Open space & green space protection -Building Materials -Building Codes -Enforcement of Property Rights -Right- of- Way Protections	Descriptive Survey
2.	To determine effects of urban land use planning zoning on economic vulnerability to disaster management in EUA	-Functional zoning - Form Based - Intensity -Incentive zoning -Hazard-Based zoning	Descriptive Survey
3.	To establish the effect of urban land transit circulation & connectivity on economic vulnerability to disaster management in EUA	-Street Sections -Bicycle accommodation -Transit accommodation -Parking Standards & Design -Accessibility & Connectivity Index	Descriptive Survey

Source: Researcher, 2018

3.5 Data Collection Methods.

This focuses on types of data collected and sources of data consulted, data collection methods and instruments which included questionnaires and interviews. The section explains the rationale for selecting the research methods and sampling techniques used. Mixed methods approach was used for this study, where both qualitative and quantitative methods were combined. The mixed methods provide a procedural approach for collecting, analyzing and mixing both quantitative and qualitative data at some stage of the research process within a single study to understand a research problem more completely (Mark , Philip . and Adrian , 2009; Maree, 2010). For quantitative data, questionnaires were used to collect information from the residents of the four neighbourhoods of EUA.

For qualitative data collection, a purposive sampling method was used, and according to Leedy and Ormrod (2001) purposive sampling is applied where people are chosen for a particular purpose, for instance we might choose people who we have decided are “typical” of a group or those who represent diverse perspectives on an issue. The County Director of Lands and Planning, County Head of Physical Planning, Sub- County Administrator (County Land Surveyor), County Land Registrar, County Land cadastre/ Land Officer and Chiefs from each area of study (Langas, Kamukuji, Kapsoya and Kapsaos) were selected for completing questionnaires and face-to-face interviews because they experienced everyday life and were representing selected areas, thus relevant sources for this study t topic investigated.

The required data was gathered from primary and secondary sources. In the primary data, collection was done using questionnaires, focused group discussions and interview

process. Likewise, literature reviews of relevant sources of information about the research problem were conducted as secondary data. A chapter on literature review focused on books, articles in professional journals, research reports, policy documents such as FAO, UN/ISDR, Government Reports, and UN-Habitat Report and Acts, conference reports, internet and periodicals. Sources consulted were international, national and of local standing and focused on research that provided sound conclusions and recommendations on learner and educator preparedness.

3.6 Target Population

According to Saunders, *et al.* (2003), a target population consists of the full group of potential participants to whom the researcher wants to conduct the research for the study. It comprises of all the urban residents living within urban, sub-urban and pre-urban areas of Eldoret town. This research study covered mainly Eldoret Urban Area formally Eldoret Municipality. It covered the main four spatial structure and forms of urban areas, which included the slum areas, informal settlements areas, pre-urban areas and formal areas. Therefore, a study population comprised of the total population of Eldoret Urban Areas as per 2009 population census which was indicated to be 497,446 who were 18 years and older (Kenya population census, 2009). The Kenya population census of 2009 estimated that the above 18 years of age in EUA to be 60%, thus the target population for the study was 298,468. The study concentrated on Langas, Kamukunji and Kapsos, but uses Kapsoya, a formal area as control study area as shown in Table 3.2.

3.7 The Sample Size

This refers to the actual number of subjects involved in this study. Webster, (1985) defines a sample size as a finite part of a statistical population whose properties are studied to gain information about the whole. It can simply be defined as a set of respondents selected from a larger population for the purpose of a survey. The researcher applied proportional stratified sampling, purposive and systematic sampling techniques in this study.

The Oxford Business and Management Dictionary defines proportionate stratified sampling as a probability method in which different strata in a population are identified and in which the number of elements drawn from each stratum is proportionate to the relative number of elements in each stratum. The proportionate stratified sampling is necessary when the study population is heterogeneous, thus, the subjects are to be partitioned into multiple strata, so that each stratum consists of homogeneous subjects. For the case of this study, four spatial structures in the Eldoret Urban Area neighbourhoods, those are:- formal, informal settlements, slums and per-urban areas, with heterogeneous data were studied. For the purpose of this study, the Fishers model of (1930) and modified by Kothari, (2004) - proportionate stratified sampling has been adopted. According to Fisher's formula, Kothari's model, any study population of 1000 and above should have sample size of 10% of stratum, and therefore, a target population of 5000, should have sample size of 500. The sample size required for the study was determined by using a 95% confidence level and a sample error of 5% using the Fishers Exact formula for populations larger than or equal to 5000 as follows: The Fisher's model is stated here below:-

$$n = \frac{Z^2 Pq}{d^2}$$

Where, n is the sample size;

Z , is the z-score corresponding to 95% confidence interval = 1.96;

d , is the amount of discrepancy allowed = 0.014953;

p , is prevalence of land use planning = 0.97;

$q = 0.03$.

$[(1.96)^2(0.97)(0.03)] \div (0.014953)^2 = 499.975$ which is equivalent to 500 desired sample size. The sample was proportionately distributed using the formula below: Formal area, Informal Settlements, Slum areas and Pre-urban area population multiply by the sample size divide by the area's population.

Stratum I = Langas $n_1 = [(25,021 \div 50,000)] * (500) = 253$

Stratum II = Kapsayan $n_2 = [(8446 \div 50,000)] * (500) = 84$

Stratum III = Kamukunjin $n_3 = [(9188 \div 50,000)] * (500) = 91$

Stratum IV = Kapsaos $n_4 = [(7345 \div 50,000)] * (500) = 72$

Therefore, $n = n_1 + n_2 + n_3 = 500: 254+84+91+72=500$

Table 3. 3: Sample Size (Based on Stratified Proportional Random Sampling Technique)

Urban Spatial Structure of EUA	Study Area	Measure of Study Area	Population target of Stratum	Sample Size P=500(N/i) (Proportionate)
Formal Area	Kapsoya	12.1 Ha	8446	84
Informal Settlement Slum Area	Langas	42.5 Ha	25021	253
	Kamukunji	13.7 Ha	9188	91
Per-urban Area	Kapsaos	34.5 Ha 102.8 Ha	7345	72
	Key Informant Interview (KII)			10
	Focus Group Discussion (FGD)			40

Source: Researcher, 2018

Random samples within each stratum were selected from which structured questionnaires were distributed. A subsequent respondent was obtained by skipping every two s. The 500 resident respondents were drawn from all the four neighbourhoods within Eldoret urban area that have been there for the last five years. All the inhabitants were of Eldoret urban were selected in the study through a random sampling method from four sub-urban areas, applying a systematic sampling model in Eldoret urban Areas. The sample size for each sub-urban area was calculated to be proportional to the size of the Eldoret urban populations above 18 years.

The purposive sampling was used to select the four neighbourhood forms in EUA, after listing each spatial structural form with in EUA. Their inclusion in the study was predetermined by selection of their features that characteristically predict the economic vulnerability to disaster risks. The researcher hoped that the four settlements would

provide the desired target population from which a sample sized be drawn as true representative of the population. For the KII and FDG, both being qualitative data, purposive sampling was applied in selecting the respondents among a long list of the possible participants.

Table 3. 4: Stratified Proportional Random Sampling Technique

Stratum	Formal (Kapsoya)	Informal (Langas)	Slum (Kamkunji)	Per-Urban (Kapsaos) Sub-Total
Population Size	8446	25021	9188	7345
Sampling Fraction	0.1	0.1	0.1	0.1
Sampling Frac. Pop.	845	2582	922	734
Final Sample Size (0.1). 85		254	92	73
Total Sample Size	84	<u>253</u>	<u>91</u>	<u>72</u>
(Quantitative data)				
Total Sample size				500
(Qualitative data)-Key Informants				40
Focus Group Discussion (for each urban form)				10

Source: Researcher, 2018

3.8 Sampling Procedure

A total of 500 households from the four spatial urban structures of slum areas, informal settlements, pre-urban areas and formal area. (Kamukunji, Langas, Kapsaos and Kapsoya) were studied. Questionnaire instruments were used to collect the quantitative data necessary for the study. Stratified Proportional random sampling was used to drive at study sample size; systematic sample framework of 1 respondent out of 100 was used. However, on individual settlement area, a systematic sampling approach was used. This was done stretch from a fixed point. In Kapsoya, Limo House was the starting point counting every 99 person and identifying the 100th one for data collection, which was repeated for the 199th person counted and 200th person identified. In Langas, Corner Mbaya Stage was preferred to be the starting point. Here, 98 people were counted and the 99th person

identified to participate in data collection. In Kamukunji 99th person was counted and the 100th one was identified as a participant. Lastly, with the case of Kapsaos, every 101stth person was counted and the 102ndth was identified for data collection.

Likewise, purposive sampling technique was applied to select Key Informants and Focus Group Discussion respondents within Eldoret Urban Area. All these exercises resulted in a sample size 550 in this study.

3.9 Data Collection

In order to measure the influence of land use planning on Economic Vulnerability to Disaster Management, the study conducted a quantitative survey. In each estate, a starting point was selected. In Kapsoya, for example, Limo House was the starting point. Beginning from this point, 99 household members were counted and the 100th one was identified as a representative of participants in data collection.

In Langas, counting started at Corner Mbaya Stage was used as the starting point. In this informal area, 98 counts of individual household members were made and the 99th person identified to represent the sample size for data collection. When obtaining the representatives of Kamukunji slum area, 99 persons were counted and 100th one was identified to represent data collection participants. Lastly, in Kapsaos, 101st persons were counted and 102nd person was identified to represent participants in data collection. All these processes were repeated until every settlement area was completely covered.

The designed questionnaire forms, with the aid of research assistant, were distributed to the identified participants who were requested to respond. They were given time frame

considered enough to complete and collect back completed questionnaire. Before the administration of questionnaire, a letter requesting permission to conduct the research was requested from National Commission for Science, Technology and Innovation and the University. Thereafter, the researcher attached a covering letter to the questionnaire and requested the respondents to participate in this study. The letters for participation from respondents were required by the researcher before distribution of questionnaires.

When using the personal method, a questionnaire is handed to the respondents who completed it in his own time, but the researcher is available in case problems are experienced. The researcher also distributed the questionnaires by hand, so that respondents could complete them immediately and collect those (De-Vos, et. al. (2007). The researcher then asked all respondents to return the completed questionnaires after a week. After two weeks the researcher personally collected the questionnaires from the participants. The completed questionnaires from the target population of 200 respondents were collected using the personal method for data collection.

3.9.1 Primary Data Collection

This research study made use of questionnaires (closed /open-ended questions), structured interviews and unstructured Focus Group Discussion questions were used to collect relevant primary data from the respondents. Both open ended and closed ended questionnaires were administrated to the respondents, especially in the slums, informal settlements and pre-urban areas as well as in formal areas of Eldoret Urban Area.

3.9.2 Secondary Data Collection

Secondary data is information that has already been collected for some purpose other than the problem at hand (Mahottra *et al*, 2002). As such, while important to understand the value of secondary data, which may assist to supplement the primary data in answering the research problem. The document analysis secondary data collection method shall be used for the purpose of this study. Therefore, the secondary data, especially on land use planning, and households disaster risk management literature were gathered from the university libraries, internet sources and referred journals relevant to land issues and disaster risk management issues in relationship to socio-economic variables.

3.9.3 Triangulation

Triangulation refers to the use of different data collection techniques within one study in order to ensure that the data are telling you what you think they are telling you (Creswell, 2011). In this study, questionnaire, interviews, focus group discussion (semi-structured interview) were the main primary data collection techniques, which were combined by the secondary data collection method of document analysis as a means of qualitative data collection techniques in support of quantitative data collection techniques of questionnaires, thus triangulate the study.

3.10. Pilot Study

The pilot study or test is performed to refine the questions on the questionnaire to eliminate ambiguity or bias where necessary so that the measuring instrument is fine tuned for data collection. For the purpose of this study, 40 urban residents or respondents were sampled

for piloting and participated in this study and they were randomly selected to test the questionnaire so that the necessary revisions were made before administration of the questionnaire to the target respondents. The respondents were not included those in the target population of 50 elements.

The omission of pilot study is a big error, as researchers always rush to get into the main inquiry (Bhattacharyya (2003). The pilot study omission error must be avoided as the pilot study increases the precision of a research project (McBurney, 2001). Moreover, the researcher should be satisfied that the procedures are effective and free from errors and are reliable and valid (Sarantakos, 2000). That means, so as to successfully complete a sound research project, a pilot study is mandatory (De Vos, *et al.*, 2007).

The entire procedure and instrument must be open for criticism and comments by the random participants and the input by the respondents must be considered when amending the questionnaire for the main enquiry (Burns and Bush, 2010). Pilot studies accumulate data from the ultimate subjects of the research project to serve as a guide for the larger study (Zikmund, 2003). Once a *modus operandi* has been developed, a pilot study should be conducted to find the flaws in the procedure. The procedure of a pilot study is priceless and is an aid to careful research (Cohen and Marion, 2003). A pilot study of the questionnaire for this research was undertaken to determine if the proposed data analysis techniques can have any potential problems; to authenticate if the research procedure was realistic and workable for this study; and to determine the elimination of any ambiguities that can create statements and instructions that may be confusing in the questionnaire (Blumberg, *et. al.* (2005).

3.11. Validity of the Questionnaire

Determining validity of the instrument was one indispensable characteristics of measurement that must be considered in establishing the appropriateness and usefulness of instruments of measurements. Although this instrument was valid, face and content validity of the instruments were established again by a panel of expert. Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others (Orodho, 2008). A pilot study was carried out to determine the validity of the questionnaire; a pilot study was conducted in a similar environment prior to the actual research. The participants in the pilot study were not included in the actual research.

Table 3. 5: Pearson Correlations of all Constructs with the overall Economic Vulnerability to Disaster management (EVDM) (n=481)

Subscales	HDRM	LURI	LUZ	BCR	CC
(HDRM)	1.00				
Regulatory Instrument (LURI)	.714	1.00			
Land Use Zoning (LUZ)	.643	.736	1.00		
Building Construction Restrictions (BCR)	.678	.668	.784	1.00	
Circulation and Connectivity (CC)	.735	.689	.679	.658	1.00

All correlations are significant at the 0.01 level (2-tailed)

The validity of the instrument was thus realized after the researchers had examined the content of the instruments, through judgment of experts and the supervisors' validations, which guided the researcher. The study applied different techniques to assess the Cronbach's (1951) reliability coefficient alpha and to assess face and construct validity. In order to ascertain face validity, an initial questionnaire was passed through the routine editing after it was given to the panel of experts. They were asked to respond to the

questionnaire. Very few comments were received and some minor changes were done to enhance the clarity.

3.12. Reliability of the Questionnaire

A reliability of the measuring instrument addresses the question of whether the results of the measuring processes are consistent on occasions when they should be consistent (Trochim, 2006). It is a statistical concept that is related to consistency and dependability, that is, consistency in obtaining the same relative answer when measuring phenomena that have not changed (Burns and Bush, 2010). Questionnaires have a very limited purpose as they are often one-time data gathering methods with a very short life, administered to a limited population (Norval, 2006). The following are important parts of reliability: test-retest reliability (coefficient correlation of stability). Consistency is estimated by comparing two or more repeated questions of the measuring instruments. This gives an indication of the dependability of the result on one occasion which may then be compared with the results obtained on another occasion and internal consistency reliability. This indicates how well the test items measure the same thing (Blumberg, *et al.*, 2005). In this study reliability of the questionnaire was determined using a sample of respondents. The items were measured by a 6-point Likert-scale, which ranged from strongly disagree (1) to strongly agree (6). Reliability analysis was subsequently done using Cronbach's Alpha which measures the internal consistency to establish if certain items within a scale measure the same construct. Cronbach Alpha was established for every variable.

Table 3. 6: Reliability & Validity Analysis

Constructs			No. of Original Explained	No. of items items	Alpha value (.60 and above) retained	Variance Mean	Std Dev	<.50
Eco. Management	Vul.to	Disaster	10	8	0.7839	4.03	.480	.57
Regulatory Instrument			12	9	0.8102	3.87	.441	.52
Zoning			14	8	0.9195	3.79	.609	.63
Building Restrictions	Construction		12	5	0.8761	4.00	.452	.58
Circulation and Connectivity			10	7	0.7969	3.45	.779	.74
Total			58	39		3.96		.60

(Number of items retained that has corrected-item total >.40)

The results in Table 3.6 indicate that land use zoning had the highest reliability ($\alpha=0.9195$), followed by building construction restrictions ($\alpha=0.8761$), regulatory instruments ($\alpha=0.8102$), Circulation and Connectivity (0.7969) and Household Disaster Risk Management ($\alpha=0.7839$). This is an illustration that all the four variables were reliable as their reliability values exceeded the prescribed threshold of 0.7. This concurs with Gliem & Gliem (2003) who established the Alpha value threshold at 0.7.

3.13. Limitations of the Study

One key limitation faced in this study was the choice of research tools used relative to the questions they sought to address. In particular, the quantitative methods chosen to make significantly representative statements about the study population necessarily sacrificed a degree of contextual depth. This is because they might have also over-estimate people's knowledge gaps and under-estimate their capacities. The literature recognizes that indigenous knowledge, practices or understandings are often hard to put into words. This is because they form part of the background experience of people's everyday lives. This issue is further made complex when survey respondents are faced by questions presented in a frame of reference ("prior exposure to a disaster"; "Knowledge of Disaster Risk"; "Prior

Exposure to a Disaster”; “Duration of Disaster in Days”) that may seem unfamiliar and arbitrary. For example, an urban household’s Income and Employment, Investment and Financial Credit, Housing Quality and Quantity, Housing Mobility practices may have developed in ways that inherently reduce their vulnerability to natural hazards, but urban household members may struggle to explicitly link these steps with disaster risk management.

The study made efforts to mitigate these limitations through extensive piloting of tools and the use of FGDs and KIIs. Indeed, during FGDs the researcher noted that urban household members were much better able to elaborate their understandings and practices in relationship to disaster risk management than they were as individuals during the survey. However, the study’s findings should still be taken as a broad snapshot of the situation in Uashin Gishu County as a whole, but not as a substitute for more intensive, participatory research at the county level.

The study also faced the presence of different dialects and religions in different parts of the study area since Eldoret town is a cosmopolitan area. Translation of the research tools into local languages other than English and Swahili was not possible, meaning that research assistants had to translate questions into local dialects on the spot during interviews. This raised the risk that questions may have been asked in different ways to different respondents, leaving scope for misinterpretations and potentially affecting the validity of results in some areas. A related limitation in this respect is the fact that in most of the households in the pre-urban, informal and slum settlements, majority of the members lacked reading and writing ability; the survey had to use five separate research assistants;

one core, plus additional secondary assistants. Having higher numbers of assistants involved is again likely to increase sampling error by increasing the variation of assistants' possible interview styles and respondents' responses to them.

The research assistants attempted to mitigate these limitations by intensive review of the questionnaire and multiple rounds of interview simulation at the focused group discussion workshops, as well as repeated debriefing and close supervision while in the field.

The study was not intent to validate scientific reasons which are supposedly causing climate change and disasters. Currently, this is part of the global debate. However, the study analyses changes in resultant impacts from patterns of rainy seasons and temperatures as they affected the wider urban households.

Although various efforts were attempted but they did not make it possible to entirely exclude biases of households and other stakeholders while collecting information about disaster risk management. There is too much talk about impact of climate change that may affect people's perceived change of behaviour. Therefore, the study used several methods to triangulate the given information. Furthermore, it proved difficult to isolate the impact of climate-change-related hazards from the impact of other socioeconomic events that were pursued in this study. Therefore, the study took in consideration the interrelationship between climatic, socioeconomic and natural factors as they lead to disaster risks.

3.14. Measurement and Scaling of Data

Measurement is an underlying concept in conducting a questionnaire survey. Basically, measurement is the process of allocating numbers to a variable based on a set of rules. To

measure a concept (often referred to as an operational definition), it is necessary to have an indicator or indicators that represent the concept (Bryman, 2012). Although operationalization is very straight forward for variables such as age or level of education it is much more difficult for variables such as governance, Household Disaster Risk Management or , so where the concept is abstract, complex, and not directly observable, latent (unobservable) variables or constructs are applied (Hair et al., 2014). Latent variables are theoretical creations based on observations that cannot be observed directly or indirectly and must be inferred from measurable or observable indicators (Manifest variable), Babbie, 2013; Polites, Roberts and Thatcher, 2012) each of these indicators that serve as proxy variables would represent a single separate aspects of a larger abstract concept (Hair *et al.*, 2014).

The second issue in developing a measurement instrument is the measurement scale. A measurement scale is a tool with predetermined number of closed- ended responses that can be used to obtain an answer to a question (Hair et al., 2014). Measurement scales are categorized into four different types, including nominal, ordinal, interval and ratio. Each of the scales represents a different level of measurements (Babbie *et al.*, 2013; Hair *et al.*, 2014). Nominal scales are the lowest level of scales because they restrict the analysis options by assigning names or numbers to variables that enable us to identify or classify those variables. These scales can be composed of several categories, but they should all be mutually exclusive. The ordinal scale is the next high level of scale that arranges attributes of variables in some order; from low to high from less, and so on with result being the add quality or rank ordering to the measured variables (Babbie *et al.*, 2013).

However, these ranked values are not based on equal difference between variables so the means or variances for ordinal data cannot be calculated. The interval scale is the next measurement scale and it not only gives the same ranking capability as an ordinal scale, it also provides precise information on the distances between the attributes of variable, by capturing the differences in values (Hair *et al.*, 2014). Although interval scale enables the researcher to carry out almost any type of mathematical computations including the mean and standard deviation, it does not provide the absolute zero point, and therefore the values of zero in an interval scale does not mean there is no value (Mooi and Sarstedt, 2011). To include this information in measurement, the ratio scale should be used, that is, at the highest level of measurement (Hair *et al.*, 2014).

After choosing the scales to measure the indicators and constructs, the next thing that should become clear is the coding style. Coding is about assigning number to categories in a way that facilitates measurements are possible (Hair *et al.*, 2014). Coding is a critical issue in the application of multivariate analysis; for instances when Likert scales (which are very popular in questionnaire surveys) are used in a research, it is necessary to code the categories so they are symmetric and equidistant (Babbie *et al.*, 2013). After fulfilling this requirement, the outcome values can be treated as the results of interval scales. This means that while the Likert is ordinal, it can approximate an interval level measurement and the corresponding variables can be used in multivariate analysis ((Hair *et al.*, 2014).

The measurement scale and coding style applied in this study are summarize in all the items related to Economic Vulnerability to Disaster Management (EVDM) were defined as ordinal variables to arrange different attributes of the construct in order. These items were

rated on a- Five Point Likert Scale (1= strongly disagree, 4= strongly agree).Data was gathered from both primary and secondary sources with primary data gathered from participants through questionnaires and interview process. Literature review of relevant sources of information about the research problem and research questions were conducted as secondary data from books, articles in professional journals, research reports, policy documents, conference reports, internet and periodicals. The data collection method was carried out through questionnaires and interviews.

3.15. Materials and Methods

This section uses a probit model as a regression technique through the statistical software, Data Analysis and SPSS to investigate the link among various factors and the probability of household flood risk reduction measures being applied. A multiple linear regression model was used to predict effects using the three independent variables in the study: land use regulatory instruments, land use zoning, and transit connectivity and circulation. In addition, the β coefficients for each independent variable generated from the model was subjected to a z-test, in order to test each of the hypotheses under study. The equation used in this study is:

$$y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

The variables are:

y_i equals 1 if a household has undertaken any disaster risk management measure and 0 otherwise. That is y_i = Economic Vulnerability to Disaster Management (EVDM)

- X_1 is a vector measuring the level and intensity of the land use regulations instruments influence on household disaster risk management. X_1 = Land Use Regulatory Instruments (LURI)
- X_2 is a vector of measuring the level and intensity of land use zoning and its influence on household disaster risk management. X_2 = Land Use Zoning (LUZ)
- X_3 is a vector measuring the intensity and level of influence of circulation and connectivity variable on economic vulnerability to disaster management. X_4 = Connectivity and Circulation (CC)
- \mathcal{E}_i is a stochastic error term that is assumed to be distributed normally, $\mathcal{E}_i \sim N(0, \delta^2)$.
- α - Constant
- $\beta_1, \beta_2,$ and β_3 - Coefficient indicating rate of change of Economic Vulnerability to Disaster Management as measured by its four dimensions of land use regulatory instruments, land use zoning, Building construction restrictions and Connectivity and Circulation changes.

All the above statistical tests were analyzed using the Statistical Package for Social Sciences (SPSS), version 25. All tests were two-tailed. Significant levels were measured at 95% confidence level with significant differences recorded at $p < 0.05$.

3.16. Analysis of Data

After the fieldwork, data collected from documentary sources and the field was qualitatively analyzed. Data analysis is data that is statistically analyzed in order to determine whether the generated hypotheses have been supported (Sarantakos, 2000). The questionnaires were collected and counted to ensure that all respondents had answered and

completed the questions. The returned questionnaires were coded and captured on the computer. De Vos, *et al.* (2007) describes data analyses as the process of bringing order, structure and meaning to the mass of collected data.

Questionnaires received from respondents, content analysis and interview schedules were checked for completeness with repeat calls being made for incomplete questionnaires to maintain the number of respondents. Categorization and coding was then done and data entered into SPSS for windows version 25 for analysis. Both descriptive and inferential tests were used in the analysis. Data was described or summarized using descriptive statistics such as mean and frequencies, which helped in meaningfully describing the distribution of responses. Descriptive data and evidence relating to each research question were classified into distinctive classes based on their common qualitative characteristics. Being basically a qualitative research, the results were discussed in a narrative manner. Various inferential statistics was used to infer population characteristics from the sample. Pearson's correlation coefficient was used to establish relationships between variables.

3.17. Missing Data and Outliers

One of the most common problems in survey research is missing data. This problem occurs when a respondent either deliberately or unintentionally, does not answer one or more questions. It has been suggested that those responses where the number of missing values exceeds 15% of the total number of questions in the questionnaire (Hair *et al.*, 2014) should be eliminated, but since no such case was found in this study, all responses were kept for further analysis. A thorough check of the descriptive statistics revealed that missing data for the variables and respondents ranged between 0.1% and 4.1%, which were

less than 10% hence were ignored because it does not have a significant effect on any analyses (Hair *et. al.*, 2014).

3.18. Ethical Considerations

The study observed and complied with the ethical procedures to protect the rights of the research participants, involving the principle of voluntary participation which requires that participants do not need to be coerced into participating in this research. The following ethical measures were adhered to (Sekaran, 2003). The thesis strived to ensure that no attempt was made to harm participants deliberately and those who could experience any form of harm be it through victimization, emotional or otherwise, were informed in advance of their right to withdraw from participating in the study. Confidentiality means that information from participants was not to be divulged to the public nor made available to colleagues, subordinates or superiors. In this study, all information about participants was treated with confidentiality and the participants were anonymous (Saunders, *et al.*, 2003). A covering letter also assured respondents that all responses would be treated with confidentiality and anonymity.

These ethical issues were considered to ensure the safety of the research participants, during the process of research. According to Creswell (2003), the participants have the right to participate voluntarily and the right to withdraw at any time, so that individuals are not being coerced into participation. The participants also have the right to know the purpose of the study, so that they understand the nature of the research and its likely impact on them. These aspects were observed before data collection from both the

respondents and participants. To ensure confidentiality of responses from participants, the real names of participants were made confidential only using pseudonyms.

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND INTERPRETATION

4.1 Overview

This chapter presents an analysis and discussions of the data gathered from the respondents, in Eldoret Urban Area. It comprises the analysis, presentation and interpretation of the findings resulting from this study. The data were collected through structured questionnaire, interviews and group discussion interviews. The methodologies used provided an insight that brought to the fore key effects faced by urban resid in four spatial structuring forms in Eldoret Urban Area. The chapter discusses the general data presentation and further discusses data interpretation and analysis of specific objective one.

The analysis and interpretation of data is carried out in two phases. The first part, which is based on the results of the questionnaire, deals with a quantitative analysis of data. Since the purpose of the study was to investigate the land use planning and economic vulnerability to disaster management in Eldoret urban area, Kenya especially, in Langas, Kapsoya, Kamkunji and Kapsaos. The second part deals with qualitative data analysis, the content data analysis to analysis the (KII), and (FGD) data.

4.2 Response Rate

The response rate of the respondents is critical to this study because it reflects in-depth of the data gathered. The response is useful in determining whether to move forward with the analysis and interpretation of results and findings. Questionnaire forms, key informer

interview schedules, and focused group discussion schedules were used to collect data required for the study and a total 500 questionnaire forms, 10 key informants interview schedules and 40 focused group discussions schedules were distributed to the sampled participants.

Out of the 550 data collection instruments, 481 were appropriately filled and returned, these were marked complete. The rest 19 were either not returned or were partially filled, and were marked incomplete and so were discarded during analysis. This represented a response rate of 96.6%. This response rate was way above the minimum rate suggested by Mugenda and Mugenda (2003) who suggested that for generalization a response rate of 50% is adequate for analysis and reporting. It was considered a success and acceptable for this research for further analyses. The results are as shown in Table 4.1 and Figure 4.1.

Table 4. 1: Response Rate of Respondents

Participant Type	N	Returned	Not Returned	Sub-Total
Langas	253	247 (46.2%)	06 (01.1%)	260 (47.3%)
Kapsoya	84	80 (15.6%)	04 (00.7%)	90 (16.4%)
Kamkunji	91	85 (15.3%)	06 (01.1%)	90 (16.4%)
Kapsaos	72	69 (10.4%)	03 (00.5%)	60 (10.9%)
KII	10	10 (01.8%)	00 (00.0%)	10 (01.8%)
FGD	40	40 (07.3%)	00 (00.0%)	40 (07.3%)
Total	550	531 (96.6%)	19 (03.4%)	550 (100.0%)

Source: Researcher.

As shown in Table 4.2 and Figure 4.2, return rate from Langas was the highest as well as the non-return rate. This was followed by Kapsoya, Kamkunji and Kapsaos was the least in both return and non-return response rates. This could be an indication that the degree of preparedness to the survey differed among these urban centers. The higher response by

respondents from Langas, although it had the largest sampled population, could be attributed to the fact that they considered this survey as necessary and critical to their welfare improvement. At the same time, this could be to the fact that they were able to create some time off their schedules to participate in this study. This is an indication of their involvement of matters relating to their urban planning, livelihoods, wellbeing and settlement.

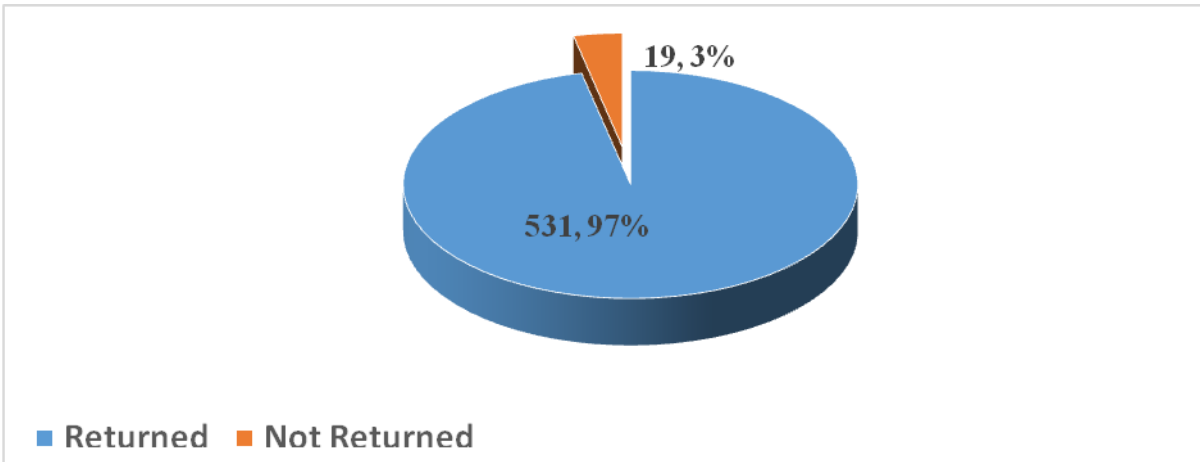


Figure 4. 1: Response Rate of Respondents

4.3 Neighbourhoods Demographic Information

In this study, background information included gender, marital status, and age bracket, highest level of education, urban residents family size, and urban residents family head. These were covered by part A with six statements. The demographic information is important to conceptualize the general picture of any influence on land use planning and economic vulnerability to disaster management being investigated. The background information of the urban residents enabled the researcher to further make inferences and references to specific features actually collected. According to Urban Land Institute Report (2017) examining demographic, economic and environmental factors that are changing are

useful in determining what will be built, where it will be built, and how it will be financed leaving room for other critical social amenities. The results of demographic profile are as shown in Table 4.2 and Figure 4.2.

Table 4. 2: Distribution of Respondents Demographic Characteristics in Study Area

Sub-Urban Areas Langas		Kapsoya		Kamkunji		Kapsaos		Sub-Total (n=253)	
(n=84)		(n=91)		(n=72)		(n=481)			
Gender	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Male	118 (24.5%)	40 (8.3%)	39 (8.1%)	27 (5.7%)	224 (46.4%)				
Female	136 (28.3%)	46 (9.6%)	45 (9.4%)	30 (6.2%)	257 (53.6%)				
Marital Status	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Single	30 (6.2%)	11 (2.3%)	10 (2.1%)	7 (1.5%)	58 (12.1%)				
Married	208 (43.3%)	70 (14.6%)	69 (14.4%)	46 (9.6%)	393 (81.7%)				
Widow	8 (1.7%)	3 (0.6%)	3 (0.6%)	2 (0.4%)	16 (3.3%)				
Divorced	4 (0.8%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	7 (1.5%)				
Separated	4 (0.8%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	7 (1.5%)				
Age Bracket	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Below 30 yrs.	51 (10.6%)	17 (3.5%)	17 (3.5%)	12 (2.5%)	97 (20.2%)				
31-40 yrs.	122 (25.4%)	41 (8.5%)	40 (8.3%)	27 (5.6%)	230 (47.8%)				
41-50 yrs.	67 (13.9%)	23 (4.8%)	22 (4.6%)	15 (3.1%)	127 (26.4%)				
51-60 yrs.	10 (2.1%)	3 (0.6%)	3 (0.6%)	2 (0.4%)	18 (3.7%)				
61-Above yrs.	4 (0.8%)	2 (0.4%)	2 (0.4%)	1 (0.2%)	9 (1.9%)				
Education Level	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Primary	49 (10.2%)	16 (3.3%)	16 (3.3%)	11 (2.3%)	92 (19.1%)				
Secondary	102 (21.2%)	35 (7.3%)	34 (7.1%)	23 (4.8%)	194 (40.3%)				
Diploma	49 (10.2%)	16 (3.3%)	16 (3.3%)	11 (2.3%)	92 (19.1%)				
Univ. Degree	35 (7.3%)	12 (2.5%)	12 (2.5%)	8 (1.7%)	67 (13.9%)				
None	19 (4.0%)	7 (1.5%)	6 (1.3%)	4 (0.8%)	36 (7.5%)				
No of Children	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
1-4	116 (24.1%)	39 (8.1%)	38 (7.9%)	26 (5.4%)	219 (45.5%)				
5-7	106 (22.0%)	36 (7.3%)	35 (7.3%)	24 (5.0%)	201 (41.8%)				
8-10	16 (3.3%)	6 (1.2%)	5 (1.0%)	3 (0.6%)	30 (6.2%)				
11-14	7 (1.5%)	2 (0.4%)	2 (0.4%)	2 (0.4%)	13 (2.7%)				
15-Above	4 (0.8%)	1 (0.2%)	2 (0.4%)	1 (0.2%)	8 (1.7%)				
None	5 (1.0%)	2 (0.4%)	2 (0.4%)	1 (0.2%)	10 (2.1%)				
Household head	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Father	216 (44.9%)	73 (15.2%)	71 (14.8%)	49 (10.2%)	409 (85.0%)				
Mother	37 (7.7%)	12 (2.5%)	12 (2.5%)	8 (1.7%)	69 (14.3%)				
Child	1 (0.2%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	3 (0.6%)				
Alternative Sources of Livelihood									
Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Yes	84(33.0%)	16(19.0%)	13(16.0%)	10(18.0%)	123(26.0%)				
No	170(67.0%)	70(81.0%)	71(84.0%)	47(82.0%)	358(74.0%)				
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481 (100%)				

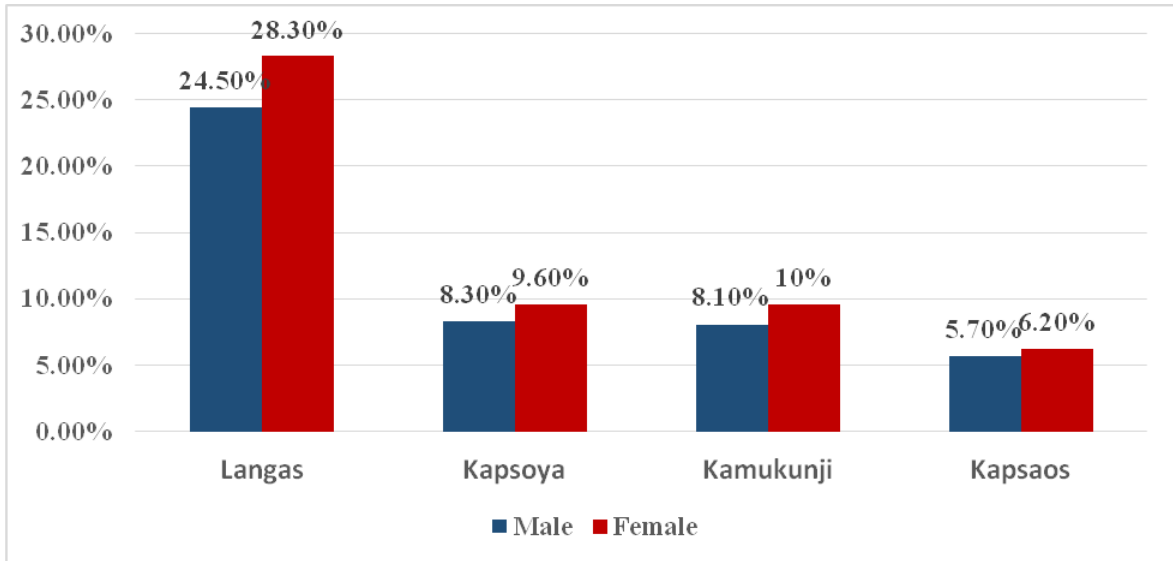


Figure 4. 2: Gender of Respondents

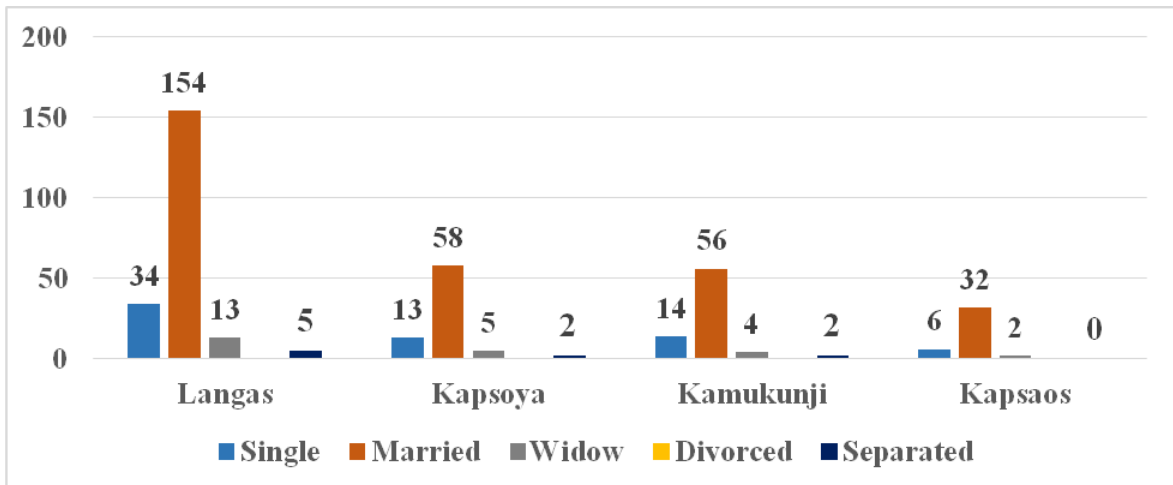


Figure 4. 3: Marital Status

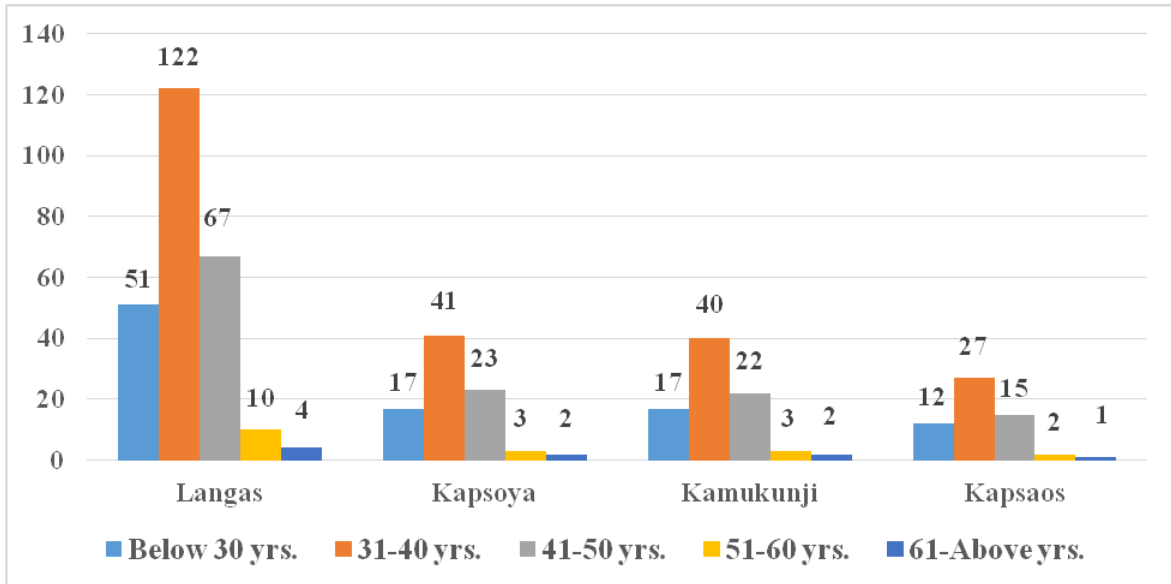


Figure 4. 4: Age Brackets of Respondents.

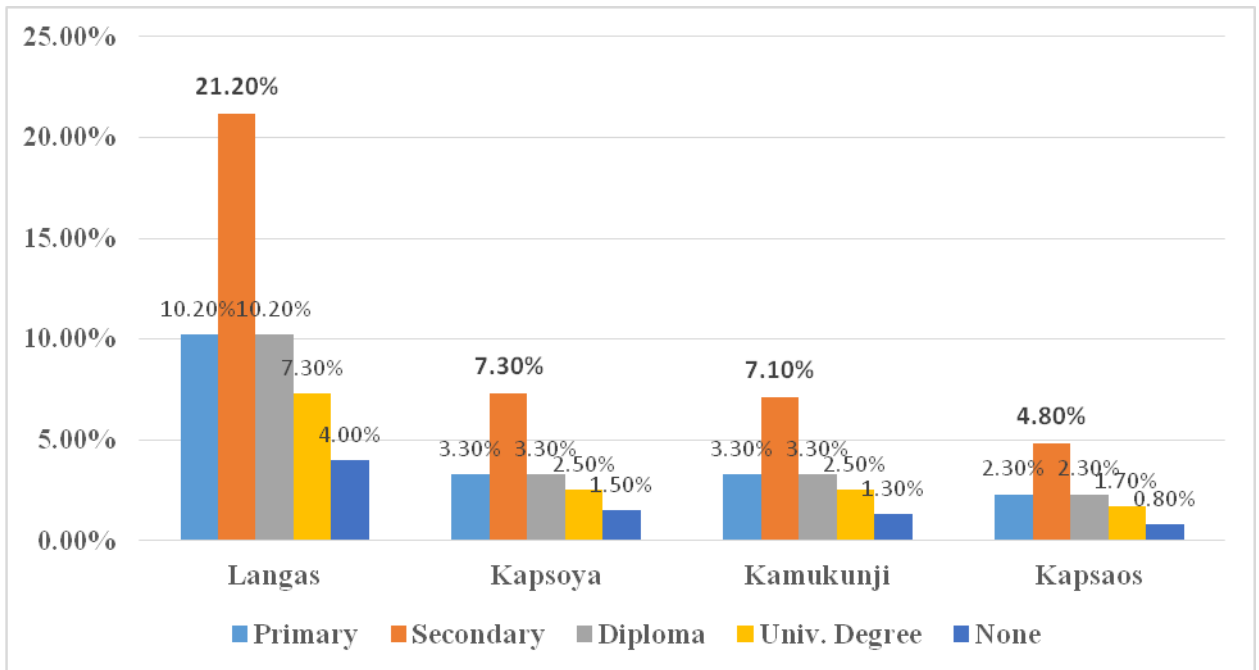


Figure 4. 5: Highest Level of Education of Respondents.

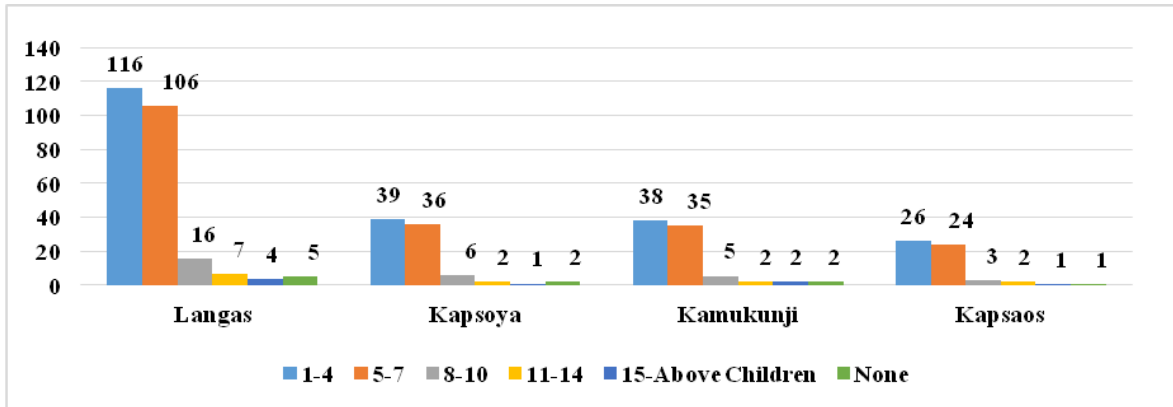


Figure 4. 6: Household Family Size (No. of Children).

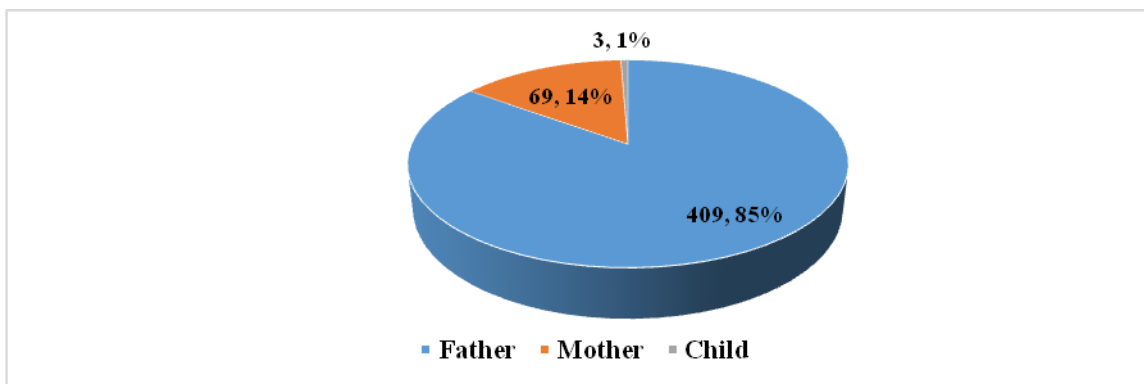


Figure 4. 7: Head of the Household.

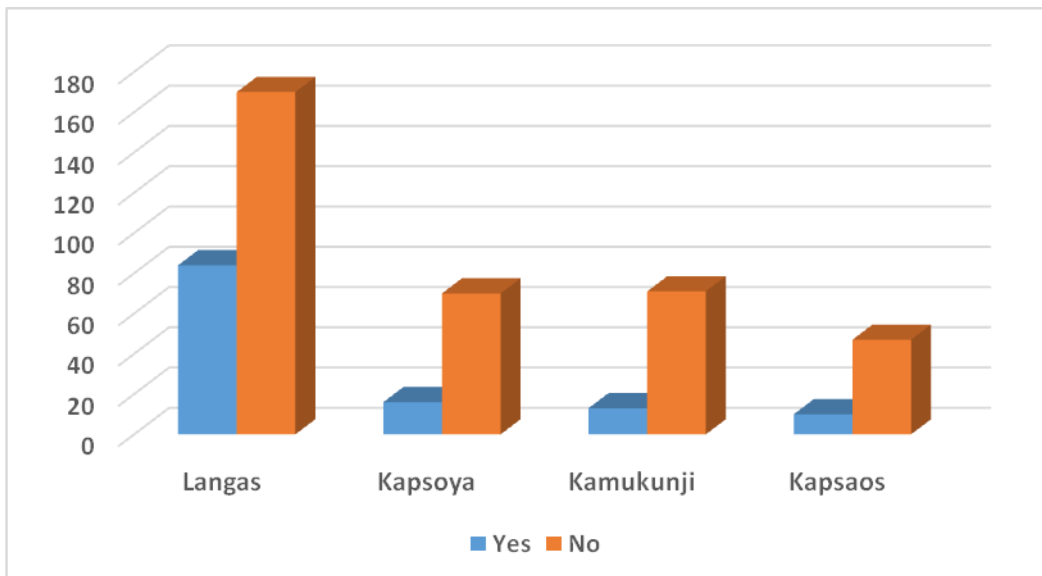


Figure 4. 8: Alternative Sources of Livelihood of Respondents.

4.4. Distribution of Respondents Demographic Characteristics in Study Area

The gender ratio was included in order to gain a perspective on disaster management of urban resident members from males and females who participated in the study. The results of gender profile of the sampled urban residents from the four study of-urban areas show in Table 4.3 and Figures 4.3 indicate that males constitute 224 (46.4%) while females accounted for 257 (53.6%). This is an indication that majority of respondents were females. The results are an indication that female were the majority participants in this study (*See Appendix V*). The dominance of female respondents is not typical of the socio-cultural norms and practices in most Kenyan societies that have high male headed households. These findings do not agree with the findings of Antwi, Boakye-Danquah, Owusu, Loh, Mensah, Boafo, and Apronti, (2015) who found out that male dominance was the majority in their study.

The results from the sampled urban residents showed a varied marital status. In all the sub-urban sampled, urban resident respondents with married status were the highest. In Kapsaos females accounted for 30 (6.2%) and males 27 (5.7%) indicating that majority were females. In Langas females were 136 (28.3%) and males 118 (24.5%) implying that majority of respondents were females, moreover, in Kamukunji, females who responded accounted for 45 (10.0%) and males 39 (8.1%) while in Kapsoya, females were 46 (9.6%) and males represented 40 (8.3%). In general, males accounted for 224 (46.4%) while females were represented by 257 (53.6%)

Marriage status in Kenya is considered a social norm and most societies consider married urban residents as safe and secure from socio-cultural hazards, although marriage also has

its own challenges. However, it is considered that female-headed urban residents, widows, aged group and children were generally perceived to be more vulnerable to socioeconomic hazards and highly exposed to socioeconomic disasters such as fire, poverty, food insecurity, drought, flood, landslide, lack of stable income, housing damage, injury or death and disrupted services as compared with their counterpart households with both spouses and father as the head of the household.

This could be explained by the fact that urban residents with both spouses are better placed financially and psychologically. It infers that those who are married could significantly perceive higher levels of threat on loss of lives of wife, husband, and children than the other disaster categories. They are therefore able to respond to any disaster risks in a better mental and emotional state than their single counterparts (Yamano & Jayne, 2002). However, this is not necessarily same as the results of this study, as shown by the losses experienced by the majority of the urban residents although most of them had both spouses available at the time of this study.

The results shown in Table 4.2 and Figure 4.2 indicate that, In Langas majority 122 (25.4%) indicated that they were in the age group 31-40 years. In Kapsoya majority 41 (8.5%) indicated that they were in the age group 31-40 years. 40 (8.3%) indicated that they were in the age group 31-40 years in Kamukunji while 27 (5.6%) shows that they were in their 31-40 years from Kapsaos. In General, 230 (47.8%) indicated that they were in the age group 31-40 years. The results show that everyone was given a chance to participate in the study and had the opportunity to voice their views.

This infers that the sampled urban resident respondents were in their prime middle age or youthful age, between 31 -50 years. This is the trend in most Kenyan urban societies where the population is fairly young as majority of respondents were between 31-50 years accounting for 357 (74.2%). These demographic trends are largely a reflection of trends in the study areas as reported during the National Population Census 2009.

Such a middle prime age has so much socioeconomic needs require proper planning for disaster risk management targeting the youth. This age group is prone to hazards such as drug abuse, crime, especially slum related, unemployment, school drop outs, unplanned early marriages and sexually transmitted infections. If not checked, these hazards can lead to disasters that may have impact on households.

In most urban residents, especially those who live in sprawling informal settlements, are often the victims of drugs and alcohol abuse, criminal gang' recruitment, high level of poverty and living below poverty line, financial credits inaccessibility, HIV/AIDS, early pregnancies, school dropouts, and poor transition rate from primary to secondary schools and to University among other challenges. So they would prefer slums where infrastructure is poorly planned and developed for hiding purposes. These findings concur with the findings of Opiyo, Wasonga, and Nyangito, (2014) who found out that age bracket is a critical issue when it comes to disaster risk management. Age bracket was also found to influence urban residents' decision making and problem solving. While long term and sustainable sources of employment and income would be pursued by the older generation, the younger generation would prefer short term and short cuts as means of income

generation, hence their concentration to slum areas where there is low level of industrial sectors that can provide employment.

This result concurs with the findings of Philips (2011) who indicated that proper land use planning provides connectivity, creativity, innovation, and as service hubs for the surrounding areas since the youthful urban residents require long term and sustainable. In another study with similar findings, Beringer (2000), found out that older people may consider themselves less vulnerable due to their increased experience. Thus the older generation would pursue decisions that would not expose them to hazard prone zones, yet for the younger group, this is not an issue.

All the sampled urban resident respondents also had low level of formal education. In Langas majority 102 (21.2%) who participated in the study are currently graduates with secondary education consisting of form four or o-level certificate. In Kapsoya majority 35 (7.3%) indicated that their highest level of education by the time of survey was secondary education. In Kamukunji while 34 (7.1%) shows that they had secondary level of education certificate while 23 (4.8%) respondents from Kapsaos too indicted that their highest level of education is secondary. In General, 194 (40.3%) indicated that they attained the secondary level of education leaving the rest to be distributed among Primary, Diploma and university degree levels. The results shown in Table 4.2 and Figure 4.2 are the evidence of the number of urban resident participants in the study constituting secondary level of education.

Education is said to equip people with knowledge and skills that are useful in understanding the importance of disaster management. However, with only secondary

education, the urban residents who participated in this study may not own adequate knowledge and skills to enable them take precautionary measures on disaster risk management. Having low level of education leaves the urban residents with inability to make well informed decision on disaster risk management, leaving the urban residents with less strategic options to deal with disasters. This would expose them to hazards common in unplanned areas, hence increasing chance of disaster risks levels. These results are in agreement to the results by Saunders and Beban, (2012; 2015 and 2016). The results of these studies indicated that education is useful for natural hazard risk reduction.

Likewise Ludwig et. al. (2011) and Stobbe (2011), in their study, found out that better educated people normally live in wealthier neighborhoods since they are generally more conscious of taking care of their health and general welfare including living standards compared to households with low level of education. Thus sustainable household disaster risk management, better education is essential.

The average urban residents size of the sampled urban resident respondents communities fall between 1-4 children was the majority accounting for 219 (45.5%). This was followed closely by 5-7 family size brackets that accounted for 201 (41.8%). This reflects the socio cultural practice where large household size among the sampled households in Eldoret sub-urban areas, and in Traditional Kenya is seen as a source of pride as well as an economic asset. It infers that sampled urban resident respondents stable income, employment, investments and financial credits to enhance sustainability of such family sizes.

It also required the ability to access and acquires quality and quantity housing and housing mobility. Varieties and diversified sources of income, employment, and low cost financial

credit are critical in sustaining such household sizes. Such households also suffer from inability to access, and acquire quality socioeconomic services. That could help control of hazards such as school dropout, declining school transitioning rate, school fee payment, illegal gang's recruit, drug peddling affecting youth, youth unemployment and gambling among others.

These findings concur with the findings of Kalaycıoğlu, Rittersberger-Tılıç, Çelik, and Güneş, (2006) that age, gender, marital status, migration, household size, number of dependent persons are some of the socio-demographic risks facing urban residents; level of education and skills, employment status as self-employed or wage or salaried work, seniority in work, size of workplace and investment if self-employed, degree and nature of unemployment, levels of income, access to welfare benefits, social networks social solidarity and reciprocal ties, family pools are some of socioeconomic risks faced; and the Social security and Insurance and perceptions of risks, attitudes towards disasters representing behavioral dimensions of risks.

The majority 409 (85.0%) average urban residents' heads were fathers. This also conforms to the socio-cultural trend of practice where most households are headed by fathers among Kenyan societies. Yet the results from gender indicted that most respondents were females, this could be true when the sampled respondents acted on behalf of the fathers whom results showed were the minority respondents. Since women have extensive knowledge of family, social roles of managing natural environmental resources and caring responsibilities can increasingly play a critical role in disaster risk management. This implies that households with women as the head would be the key to strengthening disaster

resilience, preparedness, protection and recovery of urban residents in low income neighbourhoods. Moreover, in societies where the socioeconomic status of women is low, disasters kill more women than men both directly and indirectly through related post-disaster events.

Likewise, disasters kill women at a younger age than men, and that the impacts of disasters are never merely determined by nature on its own. The reason for the difference in mortality lies in the fact that women in general have lower socioeconomic status which, in turn, leads to unequal access to opportunities and unequal exposure to risks, making them more vulnerable to disasters. Further on, women's reproductive roles can limit their chances of survival those in their final stages of pregnancy and women with young kids are less mobile. If basic health care infrastructure is severely damaged and access to obstetrical care is limited, chances of miscarriage as well as maternal and infant mortality increase.

Women also have limited access to economic resources as well as information and technology, increasing their vulnerability and adaptive capacity to disaster. Traditional expectations and home-based responsibilities limit women's mobility and opportunities for political involvement, education, access to markets, and a myriad of other resources the lack of which reinforces the cycle of vulnerability. These findings are in disagree with the findings of Coulombel, (2010) and UNISDR, 2013 a, b and c) who found out that in many regions, disaster risk is continuing to increase, mostly because greater numbers of vulnerable people and assets are located in exposed areas, but lacking is the disaster risk management gender mainstreaming. This has left women, children and the elderly to continue being vulnerable and victims of disaster risk events.

An analysis of the alternative source of sampled urban resident respondents' livelihood reveals a marked difference between Langas and the other three urban residents sub-urban areas. Whilst majority of respondents in the other three sampled urban residents did not have any other source of livelihood aside casual labor and continuous tarmac king, 33% of urban residents in Langas indicated that they have other sources of livelihood beyond casual labor and continued tarmac king. Some of the livelihood options mentioned in Langas includes small scale Trading, farming, fishing and engagement in construction works.

4.5. Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area.

This study pursued the three main dimensions of disaster risk management that are mortality, socioeconomic losses and livelihood losses, assessed as disaster-induced impoverishment. This study was designed and developed on the understanding that hazards and disaster risks are not the same and that if a urban resident or mankind does not trigger hazards to its eventual occurrence, then disaster risks and actual disaster would be eliminated. Therefore, this study notes that there are no natural disasters but there are natural hazards that if properly managed, would not lead to disasters. Apart from that socioeconomic aspect of disasters management were found to have been ignored in literature hence lacking solutions. Finally, it is high time countries need to move from being dependent on foreign aid, relief supply, and emergencies. Therefore this study is built on the framework that risk and disasters occurs as a result of interaction between man and nature, hence are preventable.

The disaster management variable was a dependent variable that consisted of urban resident income, urban resident employment opportunities, urban residents' investment and financial credits, quality and quantity housing, and housing mobility. These were some critical areas of concern for socioeconomic disaster risk management.

4.5.1 Dimensions of Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area.

It was important to identify the components of Disaster Management and their presence in the studied locations. There were five economic vulnerability to Disaster Management dimensions, which are urban residents' income, urban residents' employment, urban residents' investment and financial credits, quality and quantity housing, and housing mobility. The urban resident participants were asked to state their level of agreement or disagreement with the statement that the urban land use planning has influenced each dimension in their respective locations. The results are as shown in Table 4.3.

Table 4.3: Responses Dimensions of Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret urban Area.

Item	Disagree Strongly	Disagree moderately	Disagree slightly	Agree slightly	Agree moderately	Agree Strongly
Eco. Vul. To Management(EVDM)						
UrbanRes. Income (URI)	0%(0)	0%(0)	1%(5)	55%(264)	34%(163)	7%(34)
Urban Res. Employment (URE)	5%(24)	0%(0)	10%(48)	35%(168)	25%(120)	25%(120)
Urban Res. Investment and Financial Credit (URIFC)	0%(0)	4%(19)	3%(14)	19%(91)	34%(163)	40%(192)
Housing Quality and Quantity (HQQ)	0%(0)	0%(0)	0%(0)	10%(48)	47%(256)	40%(192)
Household Mobility (HM)	0%(0)	4%(19)	3%(14)	19%(91)	34%(163)	40%(192)
Overall EVDM	3%(14)	2%(10)	14%(28)	28%(56)	40%(192)	13%(62)

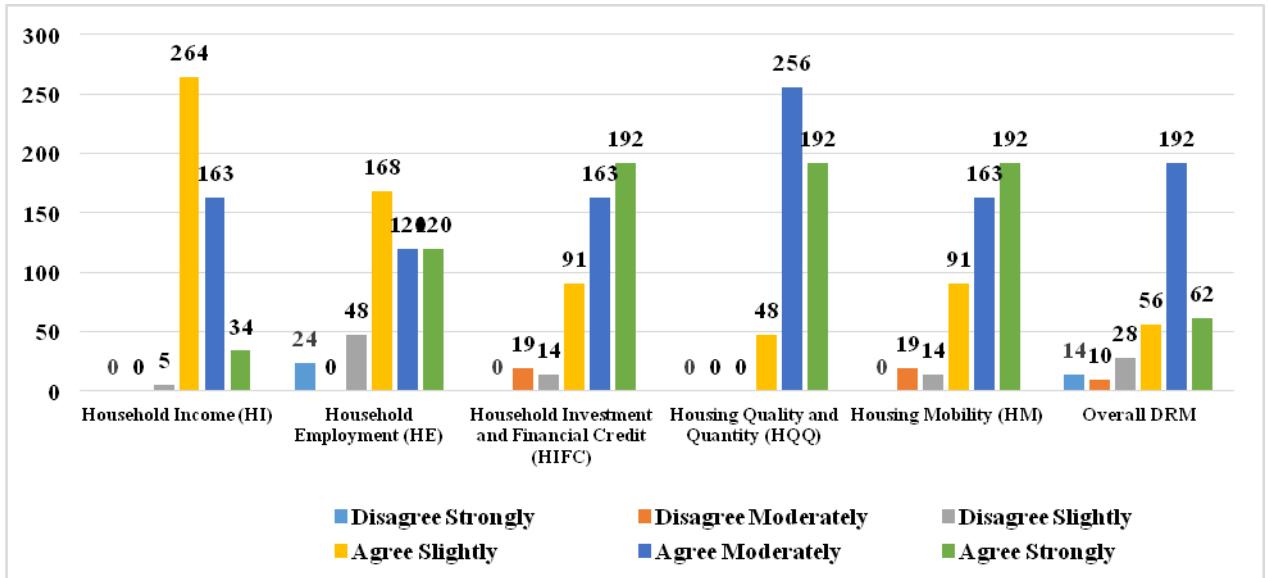


Figure 4.9: Responses Dimensions of Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of EUA.

The results in Table 4.5.1 and Figure 4.5.1 show that Household Income (HI) scored 55% on agree slightly, agree moderately accounted for 34% while agree strongly scored only 7%. This was an indication that majority of the sampled participants were of the opinion that there is slight presence of Urban Residents Income (URI) activities in the sampled urban residents sampled of Eldoret urban areas. The results for Urban Residents Employment (URE) show that slightly agree accounted for 35%, agree moderately accounted for 25% while agree strongly scored only 25%. This was an indication that majority of the sampled participants were of the opinion that there is slight prevalence of Urban Residents Employment (URE) of Disaster Management activities in the urban areas. This implies that there are some low levels of employment and income generating activities from among the urban residents sampled. However, some level here implies that majority of respondents were of the opinion that this level is not significantly convincing, it may be unstable if not unsustainable. These findings concur with the findings of Hailu, (2013).

The results for Urban Residents Investment and Financial Credit (URIFC) indicate that that slightly agree accounted for 19%, agree moderately accounted for 34% while agree strongly scored only 40%. This was an indication that majority of the sampled participants were of the opinion that they agree very much that Disaster Management activities of Urban Residents Investment and Financial Credit (URIFC) is highly prevalent in this. Finally the results also indicate that Housing Quality and Quantity (HQQ) accounted for 10% on slightly agree, 47% on moderately agree and 40% on very much agree that there is prevalence of Housing Quality and Quantity (HQQ) activities among the sampled urban residents.

This implies that the majority of the sampled participants were of the opinion that Housing Quality and Quantity (HQQ) activities are moderately low and poorly practiced from among the urban area urban residents sampled. This may be influenced by the desire to have all better living standard and well-being as the alternatively pursued by urban migrants globally. This infers that many of the urban residents from different study locations have strong concern to their Housing Quality and Quantity (HQQ); these findings are in agreement with the findings of Putman, S.H., 2010) who also found out that Housing Quality and Quantity (HQQ) is an important element of Disaster Management and therefore county governments with their disaster risk management tools should ensure that urban areas are safe and secure for all inhabitants and disasters risk prevalence is minimized or totally eliminated.

To further analyze the results in Table 4.5.1 and Figure 4.5.1 show that Urban Residents Income (URI) is the strongest dimension of disaster management, it scored 45% (216), it

was followed by Housing Quality and Quantity (HQQ) that scored 44% (211), Urban Residents Investment and Financial Credit (URIFC) scored 37% (178) while Urban residents Employment (URE) scored 30% (144), when all the highest frequencies are added together and divided by two, multifactor analysis of Likert scale scores. This infers that sampled participants agreed that Urban Residents Income (URI) and Housing Quality and Quantity (HQQ) are critical to their urban areas under study disaster risk management intensities. These findings agrees with the results of Coulombel, (2010) who also found out that Urban Residents Income (URI) is needed for households to steer socioeconomic development activities and be active in environmental management and regenerate new opportunities for Urban Residents Income (UEI) and employment activities leading to sustainability.

4.5.2 The Mean Scores on Dimensions of Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area.

There are three indicators used to measure Disaster Management in terms of Urban Residents Income and Employment (URIE), Urban Residents Investment and Financial Credit (URIFC) and Housing Quality and Quantity (HQQ) that determines the sampled urban residents strong desire to minimize their disaster risk vulnerability to improve on disaster risk management. The higher the mean and low standard deviation indicates a moderately high and stable disaster management level in the sampled urban residents respondents while the small mean and large standard deviation implies low level of disaster management activities in the sampled listed Eldoret urban areas. The results are as shown in Table 4.5.

Table 4.4: Overall Mean Scores on Indicators of Economic Vulnerability to Disaster Management in Low Income Neighbourhoods.

EVDM Dimensions	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Urban Residen Income (URI)	481	3.9696	.23201
Urban Res Employment (UE)	481	3.6123	.32159
Urban Re Investment and Financial Credit (URIFC)	481	3.8976	.25482
Housing Quality and Quantity (HQQ)	481	3.5678	.25154
Housing Mobility (HM)	481	3.6996	.62182

Results in Table 4.5.2 show the descriptive statistics of the indicators of economic vulnerability to disaster management level as determined by the five components of dependent variable. The mean scores for each indicator ranged from 2.0123 (SD = .23201) to 5.3946 (SD = .70385). Urban Residents Income (URI) of the urban areas had the highest mean and least deviation, followed by Housing Quality and Quantity (HQQ) of the urban residents, next was urban residents Investment and Financial Credit (URIFC) activities of the urban residents with a mean of 3.8976 and standard deviation of .25482, likewise Urban Residents Employment (URE) of the urban residents had a mean of 3.6123 and a standard deviation of .32159 and lastly was Housing Mobility with a mean of 3.6996 and standard deviation of .62182. Overall, the item mean for disaster management was 5.3946 (SD = .70385), which was slightly above average. This implies that there is high low level of concentration on Urban Residents Income (URI) and Housing Quality and Quantity (HQQ) activities in the sampled urban residents' respondents as reported by the participants. Moreover, this is an indication that urban residents are highly vulnerable as they are exposed to high risks since all the dimensions of dependent variables point at unstable level of each dimension. These results disagree with the findings of a study that concur with that of Twigg, (2015) who found out that the overall mean (2.461) of all items

indicate low level of competence by the two groups of respondents indicating that urban residents participation in disaster management is significantly high.

4.6. Income and Employment (IE) in Low Income Neighbourhoods of EUA.

The following section presents the results and analysis of the socio-economic characteristics of the agricultural practices in the location. It presents information on farming activities that would determine the degree of the community's socio-economic wellbeing.

Table 4. 5: Distribution of Sources of Income and Employment among Sampled Urban Residents in Low Income Neighbourhoods of Eldoret Urban Area

Socio-economic Activity		Langas	Kapsoya	Kamkunji	Kapsaos	Total
		Responses				
Casual Worker	Freq	19	24	10	19	39
	%	04	20	08	04	32
Day labor	Freq	25	00	00	25	25
	%	21	00	00	21	21
Small Business	Freq	19	02	19	19	12
	%	04	01	04	04	09
Hawkers	Freq	19	09	15	19	29
	%	04	08	13	04	25
House-help	Freq	25	00	00	25	25
	%	21	00	00	21	21
Begging	Freq	00	02	19	19	12
	%	04	01	04	04	09
Public Sector Employee	Freq	00	10	19	00	15
	%	00	08	04	00	13
Private Sector Employee	Freq	00	00	00	00	00
	%	00	00	00	00	00

The results in Table 4.5 show that casual workers accounted for 154(32%), hawkers 29(25%), house-help 25(21%), pastoralists 12(09%), public sector employee 15(13%) and private sector employee 00(00%). In Langas sub-location, majority of respondents indicated that the urban residents were house-help 101(21%), against Kapsoya and

Kamkunji sub-locations where it was each 00(00%). This is an indication that majority of participants represented urban residents with cash crop farming as activity. This was so since what was observed on the ground is that in Langas, there were many squatters who lived in slums or mud houses while in the other two sub-locations, there were teachers employed by the government teaching in primary and secondary schools.

The results in Table 4.5 further show that in the other two sub-locations, the trend indicated that lack of assets, physical amenities and necessities, inadequate market, poor socioeconomic service delivery, lack of grassroots-based institutions and credit facilities and input the most common challenges faced. These items scored more than frequencies of 30 as reported. The income generating sources and employment opportunity scenario in Eldoret urban areas is quite different and complex. Most of the households in urban areas, especially in Eldoret, are engaged in low-income generating activities, most of which are short term and those employed are engaged with low grade jobs in informal sectors due to the dearth of employment opportunities.

Table 4. 6: Distribution of Respondents on Monthly Rent Payable

Sub-Location	Langas Monthly Rent Freq (%)	Kapsoya Freq (%)	Kamkunji Freq (%)	Kapsaos Freq (%)	Sub-Total Freq (%)
Valid					
<Kshs.5000	118 (24.5%)	40 (8.3%)	39 (2.3%)	27(5.6%)	224 (46.6%)
6000-10000	28 (5.8%)	10 (2.1%)	9 (1.9%)	6 (1.3%)	54 (11.2%)
11000-15,000	32 (6.7%)	11 (2.3%)	11 (2.3%)	7 (1.5%)	60 (12.5%)
16,000-20,000	18 (3.8%)	6 (1.3%)	6 (1.3%)	4 (0.8%)	33 (6.9%)
21000-Above	21 (4.4%)	7 (1.5%)	8 (1.7%)	5 (1.0%)	40 (8.3%)
None above	37 (7.7%)	12 (3.1%)	11 (2.3%)	8 (1.7%)	70 (14.6%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481 (100%)

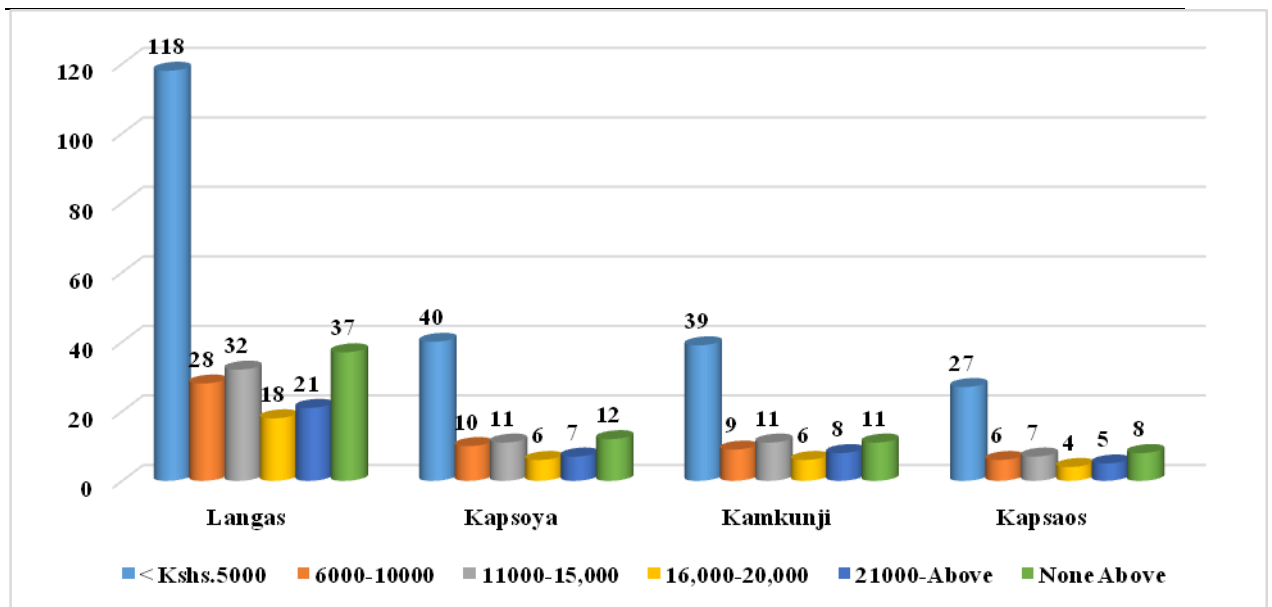


Figure 4. 10: Distribution of Respondents on Monthly Rent Payable

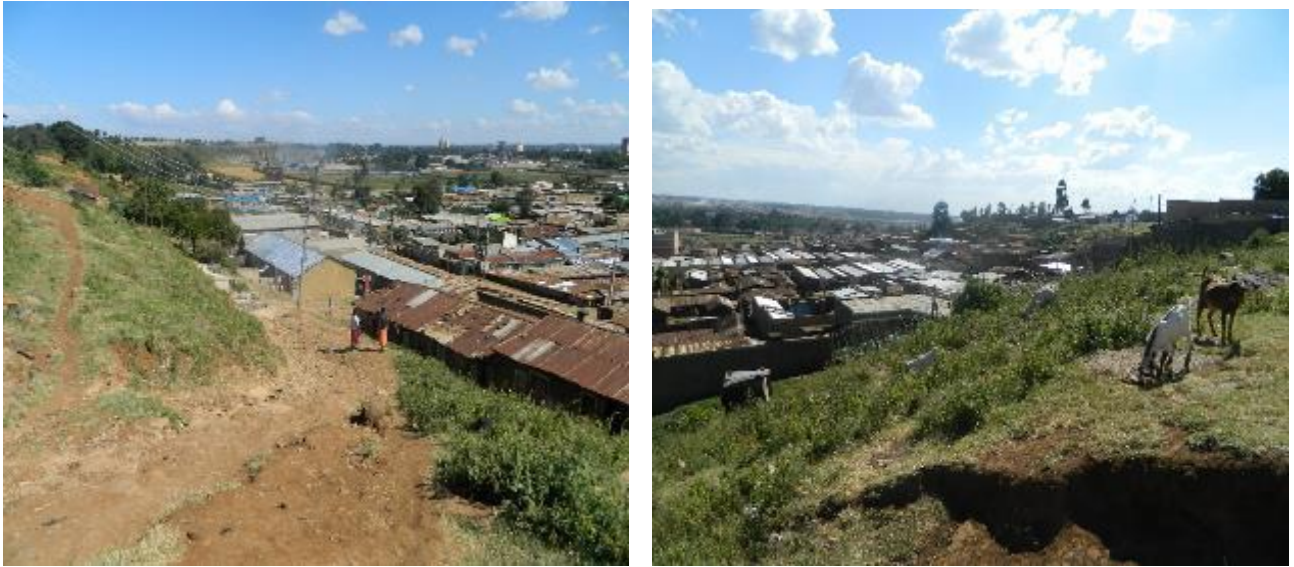


Plate 4.1: Housing Structures of Kamukunji Slum Dwelling

The results in Table 4.6 and Figure 4.10 indicate that the urban resident respondents who pay less than 5000 monthly rent accounted for 224 (46.6%); those paying monthly rent between 6000-10000 were 54 (11.2%); those paying 11000-15,000 accounted for 60 (12.5%); the urban resident respondents paying monthly rent 16,000-20,000 were 33 (6.9%); 21000-Above monthly rent payable accounted for 40 (8.3%) while those paying no rent accounted for 70 (14.6%). This infers that the majority of the urban residents respondents were of the opinion that they pay less than Kshs. 5000 for monthly rent, an indication that majority of urban residents are not capable of paying rents that is higher than this (*See also Plate4.6*). The photo indicates that those who dwell in slums have the kind of housing structures that hardly attracts monthly rent of Kshs.5,000/- as shown in Photo 4.1 most of the buildings observable confirms that the rents payable could even be less than Kshs. 1,000/-. In fact the interview with the locals, one interviewee stated:

Due to lack of stable income and employment here in Kamukunji we live from hand to mouth. My family lives in a mud walled and floor house and

I pay monthly rent of Kshs. 800, which is always difficult to pay, like right now I owe the owner rent for three months. Life in town is hard but in village it is even harder, at least here one can get kibarua (casual work) to get an income. *Hapa watoto wetu wanauia, wanakutana na wakora na kujifunza ukora mapema, mambo ya usherati kati ya watoto wa shule za msingi, upili na kondakta wa matatu, madawa za kulevia, kuwacha shule kabla kumaliza, yani sisi tunaishi tu kwa Imani ya Mungu.*

This is an indication of how the slum dwellers in kamukunji are facing difficult socioeconomic challenges. It also infers that the slum dwellers have no option but to risk living in houses not recommended for occupation. At the same time, they are also faced with slum related disasters risks such as rampant HIV/AIDS, drug addiction, malnutrition, poor and less ventilation and no space, the green space are lacking, poor sanitation and waste disposal including raw sewer and school drop outs and other poverty related problems. The Plate depicts an overcrowding feature indicating that those living in Kamukunji slums are in an overcrowded area. This infers that their population density is higher than in areas that are less crowded. This overcrowding effect has an implication on management of disaster risks such as floods, collapsing building, fire outbreaks, communicable diseases, and other socioeconomic related disaster risks. Furthermore, most of these slums and informal settlement and slum areas are considered highly volatile to violence with many hotspots for violent activities. The disparities in socioeconomic status are visible in disaster management process. There is no indication of planning implemented in the development of Kamukunji area.

Paying of monthly rent of less than Kshs. 800/- is an indicator of the poor quality and quantity of housing accessible to the urban residents in EUA. Since they cannot afford better standard of a basic need such as shelter, it means that chances of not affording other basic needs such as food, education, and clothing, would also not be automatic.

In urban areas such as Eldoret urban area, rent of quality and quantity housing would amount to minimum Kshs. 12,000/- and above, that level can offer some degree of quality and quantity, especially in Kapsoya, a formal settlement. Those urban residents with high income have low densities compared to low income households as indicated in Plate 4.6.2. The plate is a demonstration of low density population compared to the Kamukunji housing structures. The structures indicate plenty ventilation and enough space owing to the sizes of building structures shown in Picture 4.2 the Kapsoya housing also indicate level of seriousness of the housing development there.



Plate 4.2: Housing at Kapsoya Formal Settlement

These findings concur with the findings of Metternicht, (2017) who found out those households from low income countries who live in slums and informal settlements cannot afford basic needs such as food; shelter; clothing and education hence are prone to vulnerability of poverty risks. Such case would lead to hunger deaths, rampant youth gang' attacks, school dropouts and engagement in drug peddling and also drug abuse among other dangers common to urban areas. During disaster occurrences, most urban residents depend on well-wishers whenever, a disaster strikes. According to the findings of Putman,

(2010) and Coulombel, (2010) indicated that when a disaster occurs such as a building collapses, fire breaks out, floods or any other hazards is triggered causing disasters, donations of foodstuffs, beddings, temporary shelters (Tents), are common practices. This infers that most households are still not able to cope with the disaster outcomes and impacts using only their resources but rely on relief distribution instead of providing households with the capacity to develop their economic potential, and attract business and capital. But the findings of Hunte, (2010) and Khayesi, (2007) indicated that equally disturbing is that the well-wishers depended on are without well-organized patterns are the systems involved, which is a disaster of its kind.

Table 4.7: Distribution of Proportion of Sampled Urban Residents Income Spent on Food

Income Category	Frequency	Percent
Valid Less than 20%	101	21%
20-40%	116	24%
40-60%	101	21%
60-80	19	04%
Above 80%	63	13%
Total	481	100%

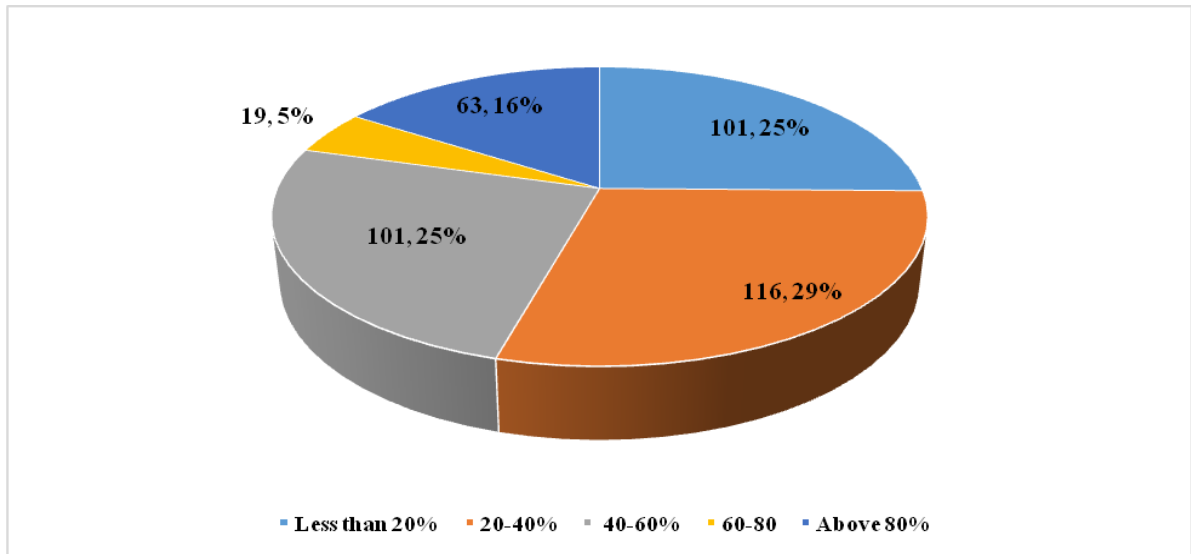


Figure 4.11: Distribution of Proportion of Sampled Urban Residents Income Spent on Food

Results in Table 4.7 and Figure 4.11 indicate that proportion of income spent on food of less than 20% accounted for 101(21%), 20-40% accounted for 116(24%), 40-60% accounted for 101(21%) and above 80% was 15(13%). This implies that majority of the sampled households spent their annual income on food at 20-40% proportion. The results imply that majority of the sampled households were found to be vulnerable since larger proportion of their total income is used for food consumption leaving less for saving, investment and other basic consumptions such as quality and quantity housing, housing mobility, healthcare, insurance, education, water. These results further suggest that majority of the sampled households are vulnerable as they spend larger proportion of their income on food consumption.

Table 4. 8: Distribution of Sub-Location Proportion of Urban Residents Income Spent on Food

Sub-Location	Langas	Kapsoya	Kamkunji	Kapsaos	Sub-Total
Income Category	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Valid					
Less than 20%	19(04%)	63(13%)	10 (04%)	10(04%)	101(21%)
20-40%	39(08%)	39(08%)	60(16%)	20(09%)	116(24%)
40-60%	12(02%)	82(17%)	14(04%)	12(02%)	101(21%)
60-80%	34(07%)	00(00%)	00(00%)	00(00%)	19(04%)
Above 80%	63(13%)	00(00%)	00(00%)	00(00%)	63(13%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481(100%)

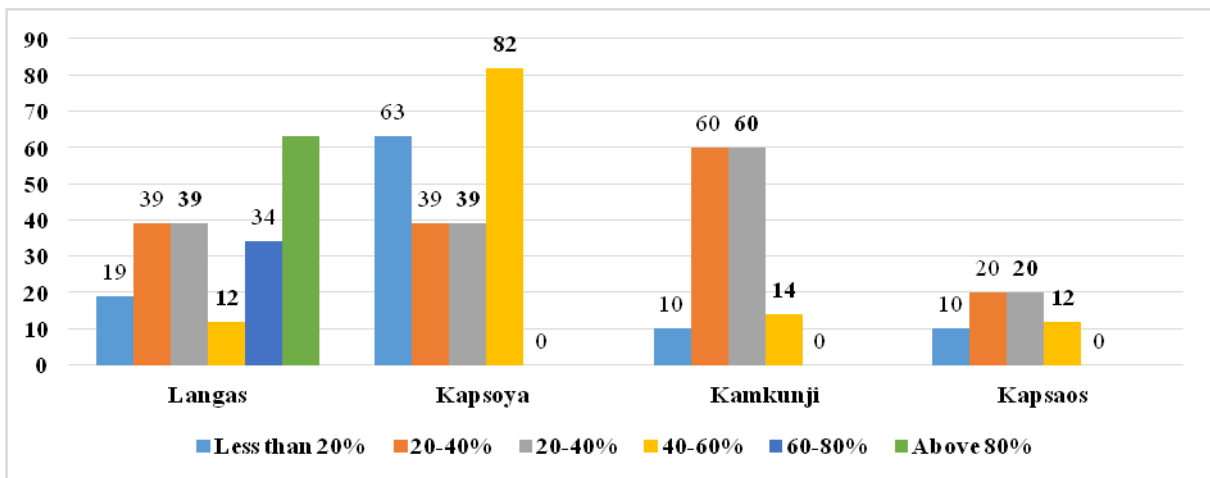


Figure 4.12: Distribution of Sub-Location Proportion of Urban Residents Income Spent on Food

The results in Table 4.8 and Figure 4.12 indicate that Langas sub-location had relatively higher proportions of urban residents who spent larger proportions of their annual income on at the proportion of above 80% compared to the other two sub-locations where the urban residents spend their annual income on food at the proportions of 40-60% in Kapsoya and 20-40% in Kamkunji.

It is an indication that the households in Langas sub-location exhaust their annual incomes on food leaving no room for savings or any other purchases or socio-economic activities unlike the other two sub-locations where there is an indication of some room to utilize the

annual income on other items as in Kapsoya, over 40% is retained, and in Kamkunji more than 30% is retained.

Table 4.9: Distribution of Respondents on Land Size Owned in Low Income Urban Residents Neighbourhoods of EUA.

Sub-Location	Langas	Kapsoya	Kamkunji	Kapsaos	Sub-Total
Land Size Owned	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Valid					
< 1/8 hec.	93 (19.3%)	32 (6.7%)	31 (6.5%)	21 (4.4%)	177 (36.8%)
1/4 hec.	21 (4.4%)	7 (1.5%)	7 (1.5%)	5 (1.0%)	39 (8.1%)
1/2 hec.	19 (4.0%)	6 (1.3%)	6 (1.3%)	4 (0.8%)	35 (7.3%)
1 hectare	47 (9.8%)	16 (3.3%)	16 (3.3%)	11 (2.3%)	90 (18.7%)
Above 1 hec.	21 (4.4%)	7 (1.5%)	8 (1.7%)	4 (0.2%)	40 (8.3%)
None Above	53 (11.0%)	18 (3.8%)	16 (3.3%)	12 (2.5%)	100 (20.8%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481 (100%)

The results in Table 4.9 and Figure 4.13 indicate that the urban residents with se with 1/8th piece of land size were 177 (36.8%); 1/4 accounted for 39 (8.1%) of urban residents respondents; 1/2 hec. were 35 (7.3%) of urban resident respondents; 1 hectare was represented by 90 (18.7%) those with more than one acre accounted for 40 (8.3%) and those without land accounted for 100 (20.8%). In terms of different locations of study, Langas had the highest number of households with 1/8th size piece of land; followed by Kapsoya; Kamkunji and lastly by Kapsaos. This was the trend in all the rest pieces of land sizes. However, as the land sizes increase in acreage sizes, the number of urban residents' ownership continue to decline. The declining land ownership compared to the increasing land sizes is an indication that majority of the urban residents are unable to acquire bigger land sizes that can enable them to participate in varieties and diversified socioeconomic activities this leaves them with small land sizes or no land that would not sustain their livelihood basic needs. This means that their living standards would be interfered with.

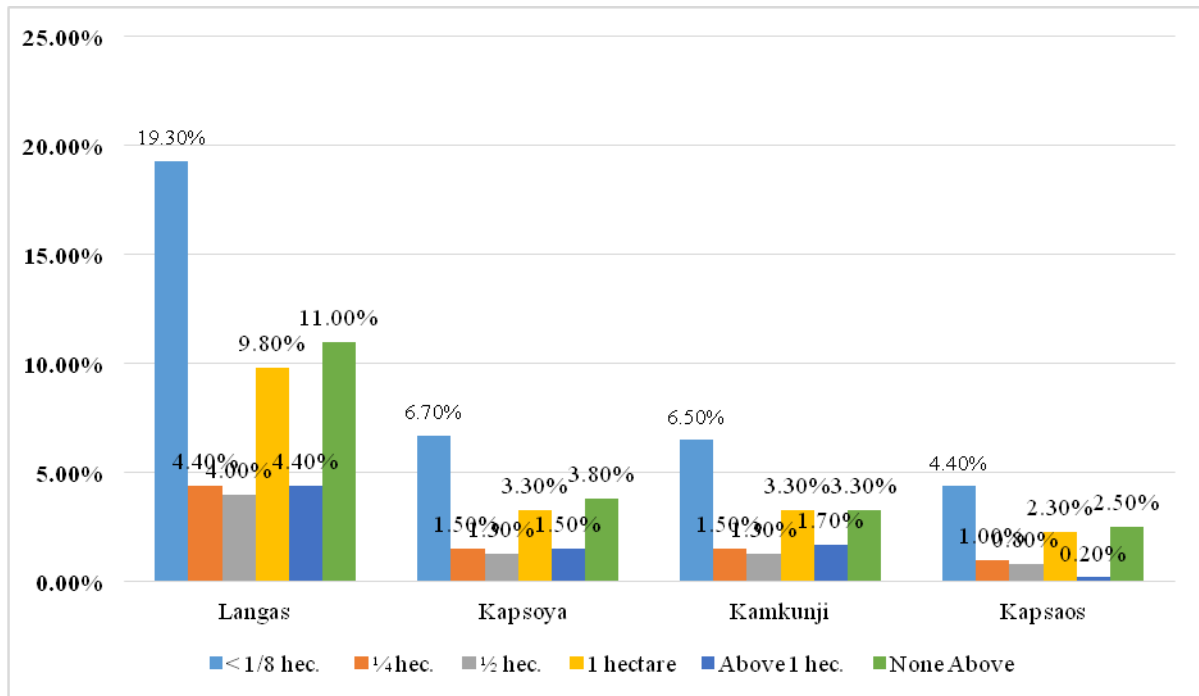


Table 4.10: Distribution of Respondents on Urban Residents Land Size Owned

But of concern is the number of those without land ownership. A total of 100 (20.8%) respondents indicated the urban residents without land ownership. Since land ownership represents an asset of wealth commutation, lacking such asset in a size big enough would help a urban residents in participating in various socioeconomic activities that would enhance disaster risk preparedness and protection. This would be useful in disaster risk management as it would stabilize the status of the household. These results concur with the findings of Saunders and Becker, (2015) who indicated that urban residents in low income countries have difficulties in acquiring assets that are used to generate more wealth hence are forced to settle in hazard prone areas exposing the households to high risks that eventually turn to devastating disasters.

When sampled urban residents were asked to indicate their sources of income, about 82% listed sale of crops as their main source of income, while 12% indicated sale of livestock

and livestock products as main source of income. Sale of fish products was mentioned by 21% and about 17% of urban residents indicated to resort to the sale of fuel wood (charcoal and fire wood) for their income. Significant proportion (31%) indicated to be providing casual labour to earn income and only 11% indicated to have permanent employment on which they derive their income. Other sources of income mentioned are handcrafting and petty trading of which 27% and 28% of sampled urban residents indicated to be their main sources of income, respectively. About 36% of urban residents indicated to depend on remittances for their income and only 2% listed bee keeping as their main source of income.

Table 4.11: Distribution of Respondents Main Sources of Income of Urban Residents.

Sub-Location	Langas	Kapsoya	Kamkunji	Kapsaos	Sub-Total
Main Sources of Income	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Valid					
Sale of Crops	30(6.2%)	15(3.1%)	30(6.2%)	20(4.2%)	95(19.8%)
Sale of livestock products	20(4.2%)	10(2.1%)	10(2.1%)	06(1.3%)	46(9.6%)
Sale of fish products	19(4.0%)	10(2.1%)	10(2.1%)	10(2.1%)	49(10.2%)
Sale of charcoal and firewood	40(8.3%)	10(2.1%)	9(1.9%)	02(0.4%)	61(12.7%)
Provide casual labour	42(8.7%)	19(4.0%)	10(2.1%)	02(0.4%)	73(15.2%)
Permanent Employment	19(4.0%)	09(1.9%)	5(1.03%)	02(0.4%)	35(7.3%)
Handcrafting	30(6.2%)	02(0.4%)	00(00%)	09(1.9%)	41(8.5%)
Petty trading	20(4.2%)	01(0.2%)	03(0.6%)	02(0.4%)	26(5.4%)
Obtain remittances	15(3.1%)	02(0.4%)	01(0.2%)	02(0.4%)	20(4.2%)
Beekeeping	19(4.0%)	08(1.7%)	06(1.3%)	02(0.4%)	35(7.3%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481(100%)

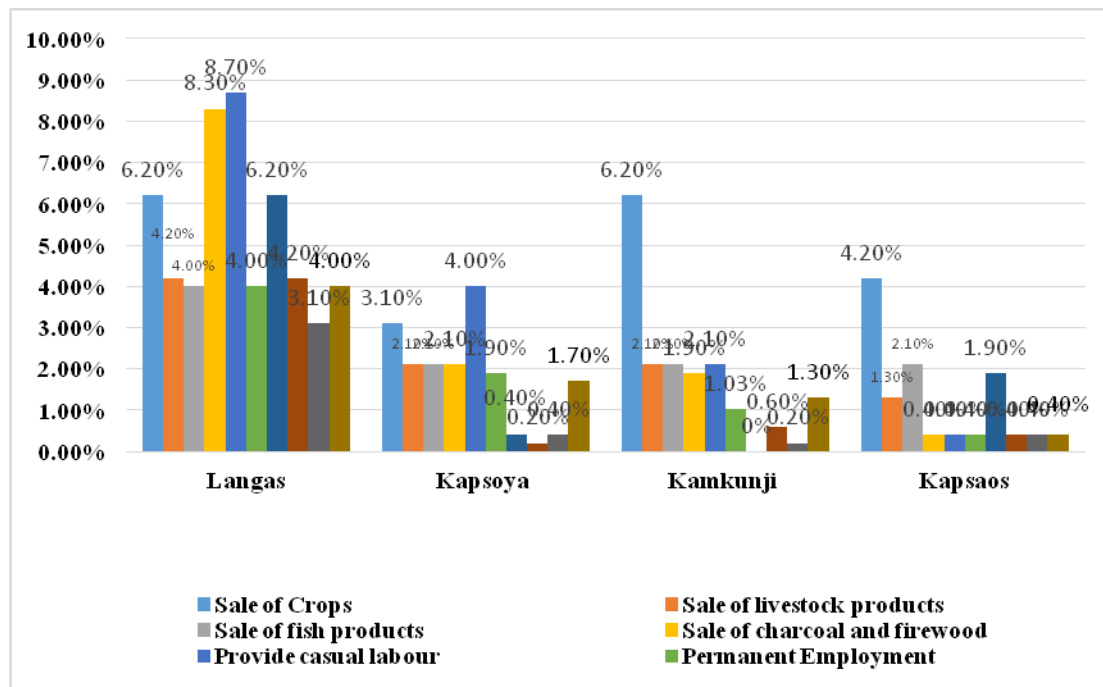


Figure 4.13: Distribution of Respondents Main Sources of Income of Urban Residents.

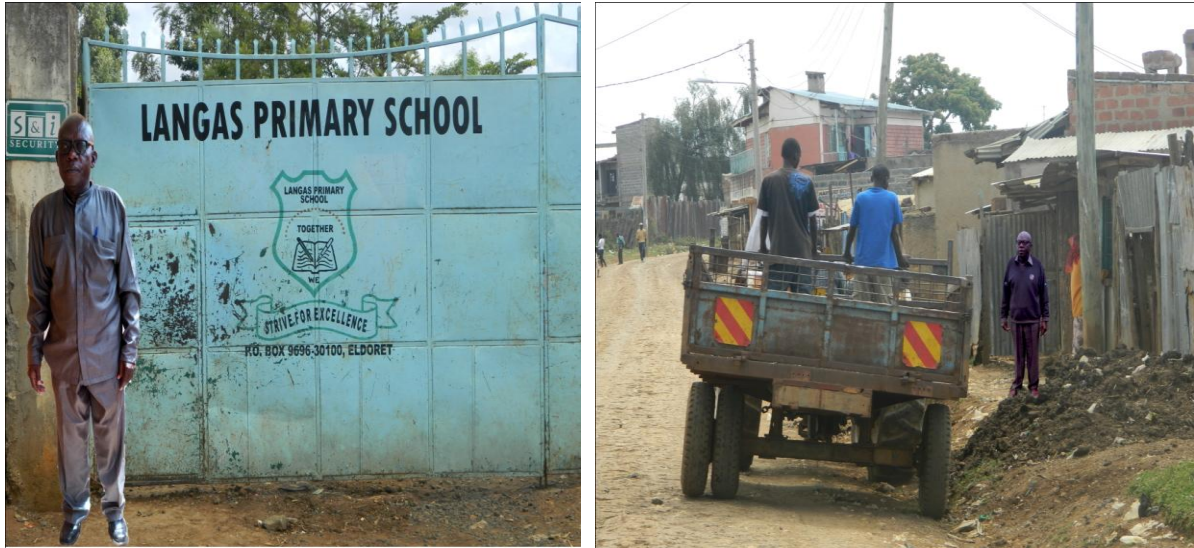


Plate 4.3: Socioeconomic Activity in Langas Informal Settlement

These results suggest existence of high incidences of vulnerability in the surveyed areas as majority of sampled urban residents depend on sale of crops (which are subject to vagaries of weather) and remittances.

Table 4.12: Distribution of Proportion of Urban Residents Engaged in Different income Generating Sources

Sub-Location	Langas	Kapsoya	Kamkunji	Kapsaos	Sub-Total
Income Source	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Trading	167(34.7%)	22(4.6%)	28(5.8%)	19(4.0%)	236(49.1%)
Employment	43(8.9%)	10(2.1%)	09(1.9%)	04(0.8%)	66(13.7%)
Hawking	22(4.6%)	09(1.9%)	11(2.3%)	15(3.1%)	57(11.9%)
Job Looking	10(2.1%)	35(7.3%)	11(2.3%)	10(2.1%)	66(13.7%)
House helpers	08(1.7%)	06(1.3%)	10(2.1%)	05(1.0%)	29(6.0%)
No Job	04(0.8%)	04(0.8%)	15(3.1%)	04(0.8%)	27(5.6%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481(100%)

As shown in Table 4.12 and Figure 4.15 in general, 49.1% of the sampled Urban Residents in the four study areas accounted for trading; 13.7% were employed as well as job seekers; 11.9% were hawkers; 6.0% represented house helpers while 5.6% accounted for those who were having nothing to do. In Langas, the proportion of those who trading were

167(34.7%), Kapsoya 22(4.6%), Kamkunji, the proportion of those who trading were 28(5.8%) while in Kapsaos those who were trading accounted for 19(4.0%). Employment appeared to be 66(13.7%), Looking for a job 57(11.9%), house-help 29(6.0%) and No Job 27(5.6%). The results further imply that the sampled households in the study area relied largely in the small scale trading and employment.

The results in Table 4.12 and Figure 4.15 indicate that 251(52.2%) of the respondents stated that their main reasons for occupation of the Eldoret Urban Area is residential, 42(8.7%) occupy the EUA for commercial reasons, 31(4.2%) occupy the EUA for industrial reasons, 70(14.6%) occupy the EUA because members of their particular community occupy the same region, 8 respondents (1.7%) occupy the region to undertake Urban agriculture. A total of 103 respondents (21.4%) gave no reasons for occupation. The results is an indication that majority 251 (52.2%) of the urban resident respondents was for residential reason. This infers that the priorities of the urban resident in Eldoret Urban Areas are residential. However, the other reasons which were given lessor priorities were fundamental in wealth generation, accumulation and sustainability thereby giving the urban residents an opportunity to even acquire bigger and more residential properties.

Table 4.13: Distribution of Respondents Reasons Behind Land Occupation

Ownership Reason	Langas Freq (%)	Langas Kapsoya Freq (%)	Kamkunji Freq (%)	Kapsaos Freq (%)	Sub-Total Freq (%)	Sub-Total Freq (%)
Valid						
Residential	133 (27.7%)	45 (9.4%)	44 (9.2%)	30 (6.2%)	251 (52.2%)	
Commercial	22 (4.6%)	7 (1.5%)	7 (1.5%)	5 (1.0%)	42 (8.7%)	
Industrial	16 (3.3%)	6 (1.3%)	5 (1.0%)	4 (0.8%)	31 (6.4%)	
Comm. Infl.	37 (7.7%)	12 (2.5%)	12 (2.5%)	8 (1.7%)	70 (14.6%)	
Urban Agri.	4 (0.8%)	1 (0.2%)	2 (0.4%)	1 (0.2%)	8 (1.7%)	
None Above	42 (8.7%)	15 (3.1%)	14 (2.9%)	9 (1.9%)	79 (16.4%)	
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481 (100%)	

It also infers that the ability to get quality and quantity housing, housing mobility would be affected since the urban residents would be lacking resourceful assets that are used to generate and regenerate more and more wealth and further investment opportunities, and also giving collaterals that would qualify one to access better financial credits. But since the urban resident respondents indicated their only reason is mainly residential, probably to build a house to stay or let out, other reasons recording lower focus, it would mean that quality and quantity housing, housing mobility, housing income, employment, investment and financial credits, would not improve and sustainability would also be affected. This leaves the households in Eldoret Urban Areas to be highly vulnerable to disaster risk eventualities.

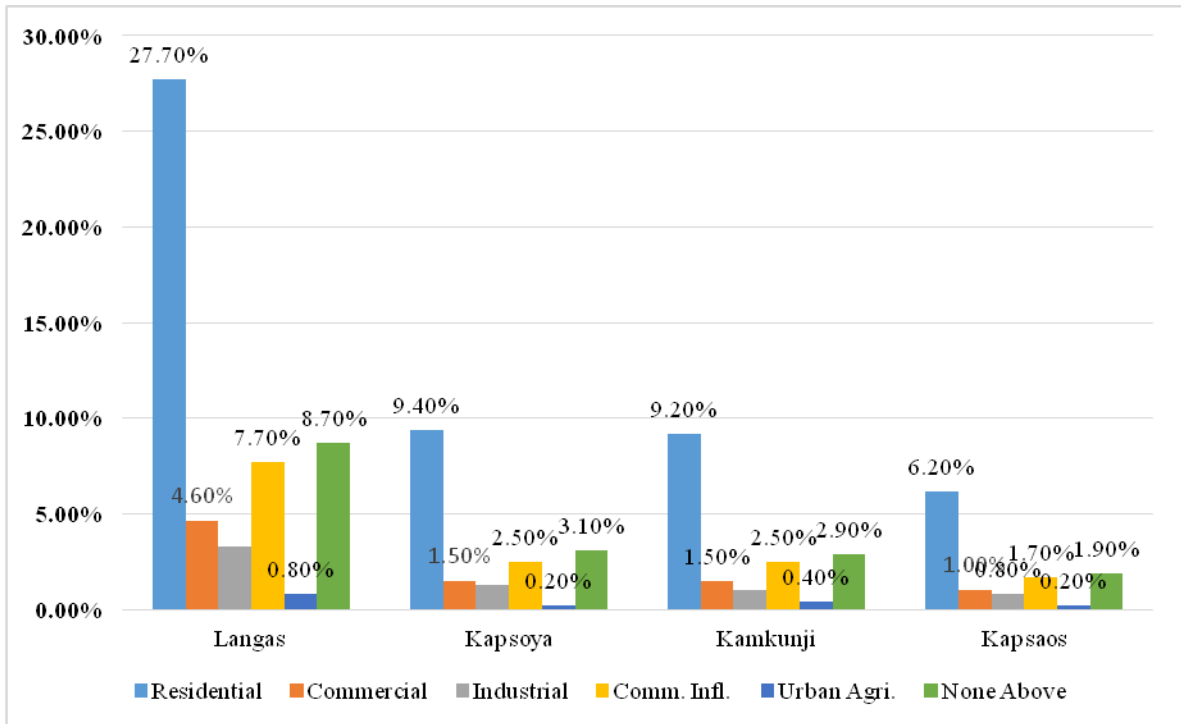


Figure 4.14: Distribution of Respondents Reasons Behind Land Occupation

These results concur with those of Jedwab, and Rémi. (2013) who found out that a population with verities of diversified income generating sources would have stable and sustainable livelihood leading to their decision making that are disaster risk minimising. However, without such incentives, then such a population is prone to exposure on hazard zones leading to high risks exposure and vulnerability to devastating outcomes and impacts of disasters that would occur. For example the tsunami that swept Indonesia in 2004 had a devastated outcome killing over 150,000 people only because the population invaded a hazard prone zone of living deep inside the ocean. Was it not that the populations had not endangered their lives by living inside the ocean; such an occurrence would not have destroyed human lives or any other property.

In summary, the average income of urban residents, specifically Eldoret suburban and peri-urban areas, is so low that is mainly used for food and not much is left for health, quality

and quantity shelter, education, clothing, healthcare, and others. The estimation shows that 57.2% of sampled households are employed mostly involved with informal and trivial works where the proposition of male and female is 57.14% and 42.86%. About 43% of population is unemployment due to having no specific job.

The occupational structure and level of income of urban residents head is different from one to another because of the variation in the employment patterns. It is estimated that nearly 20% of urban residents head among slum dwellers are rickshaw pullers and their average monthly income (8000–10,000) is also higher among other occupations. The second position in terms of the occupation of urban residents head is maid/home servants (15%) which are in essence considered a trifling and odd job and their average monthly income (less than 5000) are intensely substandard in comparison with other occupations.

After that there are substantial figures of urban residents heads who are involved with formal employment sectors like, garment's worker (12.50%) and their average income is 6000–9000; and service holder (6.25%) with income of 8000–11,000, followed by day labor and small business. It is noteworthy mentioned that most of the respondents are engaged with informal sectors and seasonal occupation who have to face obscurity to run their household.

At that time the results show that some of the respondents indicated that they had to sit inside the house without working which leads leading their family to the starvation, which is a disaster. It is obvious that urbanization creates more space of business as well as demands for urban inhabitants, which further leads to create informal jobs like street vendors, waste pickers, informal transport providers, construction works, and so on. In the

process of urbanization, the growth of the informal sector is inevitable because the informal sector is the primary job generation. There is a close link between working in the informal sector and poverty due to the fact that the urban informal sector absorbs most of the urban labour force in one hand. On the other hand, the informal economy workers earn far less than in the formal economy (Mathur, 2013). However, sampled urban residents may find themselves trapped in a low-skilled, low-income equilibrium as the continuous influx of rural migrants maintains wages at near-subsistence levels, hindering the investments in human capital that would be required to offset the adverse effects of slum living (Marx, Stoker & Suri, 2013).

4.8. Urban Residents in Low Income Urban Residents Investment and Financial Credit of EUA.

The results in Table 4.13 indicate that urban residents investment and financial credit by sampled Urban Residents of industrial property accounted for 00(00%), commercial assets was 100(25%), while residential property was 164(34%). In Langas sub-location, majority were commercial and residential investors with a 100(25%). In both Kapsoya and Kamkunji sub-locations, majority of the respondents indicated that the urban residents were both involved in commercial and residential investment but on a lower level. In general, majority of respondents indicated that the households engaged in in some level of investment and access to some financial credits.

This could infer that due to high cost of capital and cost of assessing investment properties such as land, sampled respondents do not have much of long term assets or investment properties. This is an indication that most of them depend on politicians and

well-wishers in the event disaster events occurs. Due to poor income and lack of stable employment, the sampled households indicate a picture of inability to invest on large scale and long term projects.

4.10. Housing Quality and Quantity (HQQ)

The study sought to find out the Type of Houses Owned by urban residents. The results are as shown in Table 4.13 and Figure 4.16 and Plates 4.

The results in Table 4.13 and Figure 4.16 indicate that 82(17%) of Langas sub-location urban residents own house type of very poor (thatched roof, mud walls, non-cement floor), 63(13%) and 10 for Kapsoya and Kamkunji and Kapsaos sub-locations own house types of very good (iron sheet/tile roof, concrete wall, cement floor). Those who are hazard free would have houses that are built that can withstand disasters when they occur, houses that can pass the occupancy test and clean bill of health to the occupants, houses that cannot just collapse, houses that are built with green space in between them leaving room for emergency responses. The state of the houses owned by the urban residents would indicate the socioeconomic status that would prove if they are disaster prepared or not.

Table 4.14: Distribution of Type of Houses Owned by Respondents

Sub-Location	Langas	Kapsoya	Kamkunji	Kapsaos	Sub-Total
House Type	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Valid					
Very good (iron sheet/tile roof, concrete wall, cement floor)	03(01%)	22(25%)	01(01%)	07(12%)	33(38%)
Good (iron sheet roof, mud walls, cement floor)	46(18%)	35(40%)	03(04%)	16(28%)	101(21%)
Average (iron sheet roof, mud walls, non-cement floor or thatched, brick wall)	155(61%)	22(25%)	14(16%)	12(20%)	168(35%)
Poor (tined roof, mud walls, non-cement floor)	46(18%)	08(09%)	42(50%)	22(39%)	08(07%)
Very poor (thatched roof, mud walls, non-cement floor)	05(02%)	03(01%)	24(29%)	00(01%)	01(17%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57 (11.9%)	481(100%)

This is an indication that the majority of sampled urban residents 168(35%) dwell in houses rated to be on average condition, that means urban resident houses were either iron sheet roofed, with mud walls and non-cement floor or thatched with brick wall, while 101(21%) were found dwelling in houses which were thatched roofed with mud walls and non-cement floor. Only 39(08%) of sampled urban residents were found dwelling in relatively very good houses (houses with iron sheets/tile roof, concrete wall and cement floor). These results indicate that majority of sampled urban residents live in poor housing conditions which is a reflection of high incidences of poverty.

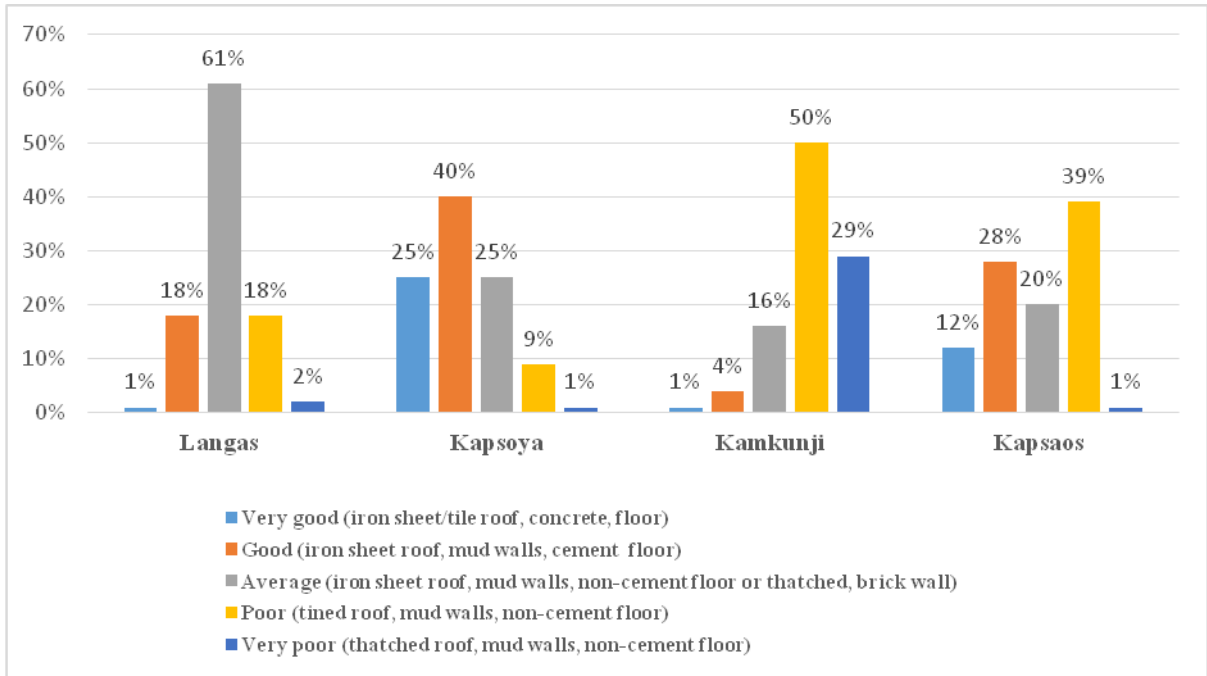


Figure 4.16: Distribution of Type of Houses Owned by Urban Residents.



Plate 4.4: Types of Housing in Kamukunji

Access to housing is an integral part in today’s society. An urban resident in a standard house, in an integrated habitat, opens the door to resources and services, while favoring coexistence and social cohesion (Carmen & Isabel, 2015). The need for quality and

quantity affordable housing for low-income and unemployed urban residents has led to the creation of slums in developing countries like Kenya and especially Eldoret urban areas. Access to housing includes both durable dwellings and sufficient living area, where there is a green space for recreation and expansion. As an example, a house is considered as durable if it is built on a non-hazardous location and has a permanent structure and adequate enough to protect its inhabitants from the extremes of hazards and vulnerabilities. On top of that, a dwelling unit is considered to provide a sufficient living area for the urban resident members if there are fewer than four people per habitable room, but the results indicate more than 5 urban resident members dwelling in single unit (UN-Habitat, 2003).

Finally, the housing structures in all the areas apart from Kapsoya areas are constructed either with tin or mud. The nature of slums is generally very tinny such as Kamkunji, Langas and Kapsaos where there are informal structures and dilapidated buildings. It is estimated that 45% of the house is found Kamkunji, most part of Langas are constructed with tin, constructed with tin shaded shanty house, mud walls. Some respondents mentioned that most of the housing structures are fabricated with cheap materials in temporary basis. It indeed mentioned that the proposition of tin structured houses has become comfortable to all and is increasing sufficiently and the number of urban residents is decreasing. It is also observed that some of the unauthorized houses are constructed on abandoned land in and government land along road reserves and within rail stations along the railway-tracks.

In terms of living area, results indicate that almost all of members in a family stay in one room with limited space. More than one room in a single house is rarely found in slum

areas. The estimation shows that just under half of respondents have one room having 5-7 family members staying together. It is also hard to note that 23.75% of house having 7–10 members have been sharing one room. In addition, 27.5% of respondents opined that they have one room allotted for their family members composed of 1–3 members. It is further noticed that most of the house in the study area slum is rented with high prices according to their poor standards. The physical looking of rented houses is not attractive without having ventilation and stay. The sampled study areas are generally grown on government land, particularly Kamkunji and Langas. On many occasions, though people have access to housing, this property does not meet the minimum conditions of habitability. Despite housing shortage, the price of land and the housing on unauthorized land is significantly increasing in Kapsuya, and Langas. Moreover, crowded and poorly-serviced low-income settlements provide a ripe breeding ground for disease transmission, and this is compounded by a but the relevant authorities portray a picture that has inadequate visible intervention in the development of housing sectors for urban poor rather largely limited to eviction threats and practice to them. Therefore, adequate urban residents housing policy performance becomes critical to achieving sustainable and socially equitable cities (Carmen & Isabel, 2015).

4.10. Housing Mobility (HM)

The results in Table 4.14 indicate that Housing mobility of Sampled Urban Residents of homeowner mobility accounted for 184(46%), Move to a New Residence was 148(37%), while Transfer of economic ownership was 64(16%). In Langas sub-location, majority were homeowner mobility with a 32(08%). In both Kapsuya and Kamkunji sub-locations, majority of the respondents indicated that the households were both involved in homeowner mobility and move to a new residence, an indication that they were yet to

pursue own homes. In general, majority of respondents indicated that the urban residents engaged in Homeowner mobility as housing mobility aimed at improving their status and wellbeing including living standards.

Table 4.15: Distribution of Respondents Housing Mobility

Sub-Location Langas	Kapsoya	Kamkunji	Kapsaos	Sub-Total	
Socio-Economic Activities Types	Freq (%)	Freq (%)	Freq (%)	Freq (%)	
Homeowner Mobility	32(08%)	84(21%)	68(17%)	25(03%)	184(46%)
Move to a New Residence	100(25%)	32(08%)	16(04%)	12(03%)	148(37%)
Transfer of economic ownership	00(00%)	32(08%)	32(08%)	10(04%)	64(16%)
None above	00(00%)	00(00%)	00(00%)	00(00%)	00(00%)
Total	254 (52.8%)	86 (17.9%)	84 (17.5%)	57(11.9%)	481(100%)

This could infer that due to high transaction costs of buying and selling a home provide an incentive for people to extend their stay in the house in order to amortize these costs over a longer holding period. Additional financial frictions can arise that exacerbate this effect. Due to poor income and lack of stable employment, the sampled urban residents indicate a picture of inability to move to better housing or their own residential areas although those who indicated that they have acquired a piece of a plot were of the opinion that it is for residential.

This study used regression analysis to find out the relationships between predictive variable and criterion variable. Regression analysis result as shown in Table 4.16 indicates that land use planning has significant connection with household disaster management success or failure.

Table 4.16: Urban Land Use Planning indicators to Disaster Management

Unstandardized Coefficients	Standardized Coefficients		Beta	t-value	Sig.	R ²
	B	Std. Error				
Model						
Constant						
Household Disaster	2.698	.320		10.261	.000	
Risk Management	-.199	.097	-.165	-2.178	.031	.027
Land use planning						
Regulatory instrument	3.227	.273		11.560	0.000	
	-.171	.068	-.198	-2.669	.008	.039
Land use zoning	2.069	.232		9.350	0.000	
	.055	.067	.062	.816	.416	.004
Building Construction	3.221	.332		10.457	.000	
Restriction	-.489	.057	-1.687	-2.987	.298	.016
Connectivity and circulation		3.311	.0728	9.344	.000	
	.659	.068	.611	.963	.028	.019

Regression of Land use planning regulatory instrument on urban residents' disaster management as shown in Table 4.16 indicates that Land use planning regulatory instrument has positive relationship with urban residents' disaster management outcomes. It implies that where there is high level of land use planning regulatory instrument involved there is high level of urban residents' disaster management and vice versa.

Regression analysis of land use zoning, Building construction restriction and connectivity and circulation influence household disaster risk management as shown in Table 4.13 indicates that land use zoning and Building construction restriction have positive relationship with household disaster risk management. It means that the high level of financial outcomes, client loyalty and market share, learning growth and process, the high level of household disaster risk management recorded.

CHAPTER FIVE

5.0 EFFECTS OF LAND USE PLANNING REGULATORY INSTRUMENTS ON ECONOMIC VULNARABILITY TO DISASTER MANAGEMENT IN LOW INCOME NEIGHBOURHOODS OF ELDORET URBAN AREA.

5.1. Introduction.

This section sought to obtain information on regulatory instruments of urban land use planning. Urban land use planning regulatory instruments can be explicit. Explicit instruments are those specifically designed to shape cities for example urban zoning mechanisms or innovative financing of urban roads in specific city. Implicit instruments are those that shape a city as an externality, for example a large scale increase in petroleum tax by a national government would result in more compact cities. Land use regulations are critical for negotiation among public sector and private stakeholders, buildings sitting and space, building codes and energy traffic calming, utilities and facilities, lot requirement and building materials. This is a control approach used to cause restriction to achieve a smooth and visual skyline and to prevent tall buildings from blocking the view of shorter buildings and the sunlight from reaching them. It aims to protect shorter buildings from being overshadowed by taller buildings. This ensures that buildings must conform to the code to obtain planning permission, usually from a county authority. It is aimed at protecting public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures. The results from sampled respondents are as shown in Table 5.1

The results from Table 5.1 show that the regulatory instruments have shown a large deviation. It shows a mean influence of 4.24%, the maximum reported influence is 69.0% and the minimum is -48.8% with deviation of 9.32 between the urban residents from sampled study areas. The mean of regulatory instruments is 4.24, with the maximum and minimum are 69 and -48.8 respectively.

These results also indicate that the building and construction permits have shown a small deviation. The mean of building and construction permits is almost 57.7%, which is 57.7% of influence on economic vulnerability to disaster management leaving the rest 42.3% be influenced by other factors.

Table 5.1: Distribution of Elements of Regulatory Instruments (LUPRI)

Variable	N	Range	Min	Max	Mean	S.D.	Var	
	Stat	Stat	Stat	Stat	Stat	Std. Error	Stat	Stat
LUP-RI	481	79.20	-48.8	69.00	4.238	1.03	9.32	95.10
Floor Area Ratio and Height Limitations	481	5.48	3.11	4.15	3.231	0.732	0.677	0.419
Building and Construction Permits	481	4.61	1.88	2.87	4.52	0.557	1.184	2.581
Open and Green Space Protection	481	5.10	1.74	3.84	8.133	0.587	1.154	2.363
Agricultural Land Conservation	481	6.14	1.56	2.98	8.120	0.668	1.165	2.541
Construction and Building Standards	481	6.10	1.45	2.86	8.120	0.848	1.174	2.333
Enforcement of Property Rights	481	0.70	0.90	0.25	0.567	0.421	0.186	0.456
Right-of-Way Protection	481	7.13	3.18	3.57	0.436	0.461	0.264	0.643
Buildings Sitting and Space	481	4.84	2.99	4.98	5.100	0.626	0.647	0.310
Building Codes and Energy Traffic calming	481	5.96	2.65	3.55	6.245	0.516	1.312	2.540
Utilities and Facilities	481	5.33	3.18	4.52	0.314	0.601	0.533	0.621
Lot Requirement	481	5.66	2.65	3.53	6.255	0.578	1.321	2.521
Building Materials	481	5.76	2.65	3.58	6.255	0.565	1.342	2.564
Height Restrictions	481	5.15	3.92	5.24	6.451	0.647	0.179	0.357

The floor area ratio and height limitations implies that urban land planning regulation considers the kind of building in certain area to be of specific standards of reference such as floor area and the height limitations. The mean of floor area ratio and height limitations is almost 73.2%, which is 73.2% of influence on economic vulnerability to disaster management leaving the rest 26.8% be influenced by other factors.

The open and green space protection of the regulatory instruments shows an experience of annual frequencies of a maximum of three times influence on economic vulnerability to disaster management. This implies that open and green space protection registered quite a small number of influences. The mean of agricultural land conservation on the regulatory instruments is only about 66.8%, which is 66.8% of the regulatory instruments influence on economic vulnerability to disaster management leaving 33.2% to be influenced by other factors.

The construction and building standards of the regulatory instruments indicate an experience of annual frequencies of a maximum of participation. This implies that construction and building standards registered quite a small number of influences of regulatory instruments. The mean of construction and building standards is 84.8%, which is 84.8% of the Regulatory Instruments. The enforcement of property rights of regulatory instruments shows an experience of annual frequencies of a maximum of four times influence of the Regulatory Instruments. This implies that enforcement of property rights registered quite a small number of degrees of influence of the total regulatory instruments influence on economic vulnerability to disaster management. The mean of enforcement of property rights of the regulatory instruments is only about 56.7%, which is 56.7% of the

urban residents' disaster management. Finally the results indicate that the right-of-way protection has shown a smaller deviation. The mean of right-of-way protection is almost 43.6%, which is 43.6% of influence on economic vulnerability to disaster management leaving the rest 57.4% be influenced by other factors.

Furthermore, the results from Table 5.1 show that the building construction restriction has shown a moderate deviation of 11.13% among the sampled urban residents from the study locations. It shows a mean influence of 53.82%, the maximum reported influence is around 56.0% and the minimum is -40.0% with deviation of 11.13 between sampled urban resident respondents. Building sitting and space shows an experience of annual frequencies of a maximum of five times and a minimum of three times the influence in the total degree of influence of building construction restriction.

The mean of building sitting and spaces is 62.6%, which is 62.6% of influence of the total influence of building construction restriction on economic vulnerability to disaster management leaving the rest 37.4% be influenced by other factors not covered in this study. The Building Codes and energy traffic calming of the building construction restriction shows an experience of annual frequencies of a maximum of four times influence with a minimum of three levels of experiences. This implies that building codes and energy traffic calming registered quite a moderate level of influences. The mean of building codes and energy traffic calming influence is only 51.6%, which is 51.6% of the building construction restriction influence on economic vulnerability to disaster management levels.

The utilities and facilities indicate an experience of annual frequencies of a maximum of five times and a minimum of three times the level of influence. This implies that the utilities and facilities registered quite a moderate level of influences on the board effects on urban land use planning approaches. The mean of utilities and facilities is 60.1%, which is 60.1% of the total building construction restriction influence on economic vulnerability to disaster management. The Lot requirement indicates an experience of annual frequencies of a maximum of five times and a minimum of three times level of influence. This implies that Lot requirement registered quite a large level of influence of the total building construction restriction influence on household disaster risk management. The mean of lot requirement of the board is only about 57.8%, which is 57.8% of the urban residents' disaster management.

The building materials indicate an experience of annual frequencies of a maximum of six times and a minimum of four times level of influence. This implies that building materials registered a high level of influence of the total building construction restriction influence on household disaster risk management. The mean of building materials of the building construction restriction is only about 56.5%, which is 56.5% of the disaster management.

The height restrictions indicate an experience of annual frequencies of a maximum of six times and a minimum of four times level of influence. This implies that height restrictions registered a high level of influence of the total building construction restriction influence on household disaster risk management. The mean of height restrictions of the building construction restriction is only about 64.7%, which is 64.7% of the urban residents' disaster management.

5.2. Regulatory Instruments Influence

This study sought to obtain information relating to urban land use planning regulatory instruments. This was considered critical in understanding further its function in altering land use to determine the urban form and land utilized by the public sector, private sector and urban household actors. The results are as shown in Table 5.2.

The results in Table 5.2 show that that strongly agree accounted for 188 (39.0%), agree 178 (37.0), disagree 72 (15.0%) and strongly disagree 43 (09.0%) with the statement that establishing an invaluable floor area ratio and height limitations that ensure buildings are constructed in a standard form and format in specific areas. This implies that majority, strongly agree 188 (39.0%) and agree 178 (37.0%) that establishing an invaluable floor area ratio and height limitations that ensure buildings are constructed in a standard form and format in specific areas.

Table 5.2: Distribution of Regulatory Instruments Influence

Statement	SD	D	A	SA	Total	
1. Establishes an invaluable floor area ratio and height limitations that ensure buildings are constructed in a standard form and format in specific areas	f	43	72	178	188	481
	%	09.0	15.0	37.0	39.0	100
2. Provides building and construction permits on approval for conformity and compliance control to the rules and laws	f	111	14	154	202	481
	%	23.0	03.0	32.0	42.0	100
3. Ensure that open and green space protection is achieved and maintained	f	82	111	101	188	481
	%	17.0	23.0	21.0	39.0	100
4. It ensures that agricultural land conservation is equitable and adequately provided	f	63	91	91	236	481
	%	13.0	19.0	19.0	49.0	100
5. Have invaluable skills to maintain construction and building standards so that quality and quantity is maintained for particular zones	f	91	72	149	168	481
	%	19.0	15.0	31.0	35.0	100
6. Represents enforcement of property rights	f	72	82	149	178	481
	%	15.0	17.0	31.0	37.0	100
7. High level of right-of-way protection is maintained	f	96	72	135	178	481
	%	20.0	15.0	28.0	37.0	100

The next item of regulatory instruments was that providing building and construction permits for approval for conformity and compliance control to the rules and laws. The results show that strongly agree accounted for 202 (42.0%), agree 154 (32.0%), disagree 14 (03.0%) and strongly disagree 111 (23.0%) that providing building and construction permits for approval for conformity and compliance control to the rules and laws. This implies that majority, strongly agree 202 (42.0%) and agree 154 (32.0%) that providing building and construction permits for approval for conformity and compliance control to the rules and laws. Moreover, it was shown that strongly agree accounted for 188 (39.0%), agree 101 (21.0%), disagree 111 (23.0%) and strongly disagree 82 (17.0%) that they ensure that open and green space protection is achieved and maintained. This implies that majority, strongly agree 188 (39.0%) and agree 101 (21.0%) that ensure that open and green space protection is achieved and maintained.

Apart from that, the study also asked to find out if they ensure that agricultural land conservation is equitable and adequately provided. In Table 5.2, the results show that strongly agree accounted for 236 (49.0%), agree 91 (19.0%), disagree 91 (19.0%) and strongly disagree 63 (13.0%). This implies that majority, strongly agree 236 (49.0%) that ensures that agricultural land conservation is equitable and adequately provided.

In relation to participants having invaluable skills to maintain construction and building standards so that quality and quantity is maintained for particular zones, results in Table 5.2 show that strongly agree accounted for 168 (35.0%), agree 31.0%(149), disagree 72 (15.0%) and strongly disagree 91 (19.0%). The results is an indication that majority agree at 168 (35.0%) that participants having invaluable skills to maintain construction and

building standards so that quality and quantity is maintained for particular zones, the results also show that strongly agree accounted for 178 (37.0%), agree 149 (31.0%), disagree 82 (17.0%) and strongly disagree 72 (15.0%) that regulatory instruments is useful in represents enforcement of property rights. This is an indication that majority who agree at 178 (37.0%) are of the opinion that the regulatory instruments is useful in represents enforcement of property rights. This question sought to establish if high level of right-of-way protection is maintained. The results show that strongly agree accounted for 178 (37.0%), agree 135 (28.0%), disagree 72 (15.0%) and strongly disagree 96 (20.0%). This implies that majority, strongly agree 178 (37.0%) and agree 135 (28.0%) that high level of right-of-way protection is maintained.

These results concur with the findings of Moreles,(2013) who found out that regulatory instruments help in creating and managing land use practices and their choices among specific growth management policy instruments determining how land use policy choices are shaped by institutional features of national and county governments and the household demands. That these regulatory instrument decisions reflect a balance of the conflicting interests and responses to socioeconomic and environmental pressures.

The results indicate that land use regulatory instrument of land use planning component has an influence on disaster risk management. Thus county governments could make use of land use planning regulatory instrument to provide quality standard housing units suitable for occupation. This means that hazards and vulnerability to collapsing buildings, sinking buildings, houses constructed under high voltage power lines, are not going to be experienced. Moreover, problems related to housing crowding leading to high density

populations in a small area will be eliminated. Once such order has been maintained, then space for expansion and recreation will be restored and access roads will be working hence in event of any emergencies, accessibility to rescue will be possible. Such an environment will attract investment of high standards quality such as an academy, for example, in Elgon View estate, there are various good schools such as Testimony, high class guest houses, Boma Inn and health facilities and others. But in places like Kamkunji, Langas, there are only public schools that are overcrowded, lack adequate and well stocked health facilities, low quality and quantity housing.

5.3. Correlation Analysis

The correlations of the independent variables of Land use planning regulatory instrument (LUPRI), Land use zoning (LUZ), and Connectivity and circulation (CC) and the dependent variables household disaster risk management were tested and their significant relationship recorded. This was important to help understand the relationships that exist between the independent and dependent variables. The results are as shown in Table 5.3.

The results in Table 5.3 summarize the correlation between the independent variables and dependent variable. It shows that land use planning regulatory instrument, land use zoning; building construction restriction and connectivity and circulation are all significantly related to Economic Vulnerability to disaster management (EVDM). This relationship is either positive or positive. The components of Urban Land Use Planning of connectivity and circulation have significantly positive relationship. The results shows that land use planning regulatory instrument is positively associated with household disaster management with summary of Pearson Correlations show that land use planning regulatory

instrument was positively and significantly correlated to influence on economic vulnerability to disaster management ($r=0.719$, $p<0.05$).

Table 5.3: Correlations of Overall Variables

		HDRM	LURI	LUZ	BCR	CC
HDRM	Pearson	1	0.72**	0.762**	0.77**	0.74**
	Correlation					
	Sig. (2 tailed)		0.007	0.000	0.002	0.005
	N	481	481	481	481	481
LURI	Pearson	0.72**	1	0.74*	0.78**	0.689**
	Correlation					
	Sig. (2 tailed)	0.007	0.016		0.006	0.000
	N	481	481	481	481	481
LUZ	Pearson	0.762**	0.74**	1	0.567	0.517
	Correlation					
	Sig. (2 tailed)	0.000	0.016		0.66	0.78
	N	481	481	481	481	481
BCR	Pearson	0.77**	0.78**	0.567	1	0.69*
	Correlation					
	Sig. (2 tailed)	0.002	0.006	0.66	0.018	
	N	481	481	481	481	481
CC	Pearson	0.74**	0.689**	0.456**	0.445**	1
	Correlation					
	Sig. (2 tailed)	0.005	0.000	0.66	0.018	
	N	481	481	481	481	481

**Test is significant at the 0.01 level (2 tailed)

*Test is significant at the 0.05 level (2 tailed)

Thus land use planning regulatory instrument had 71.9% positive relationship with economic vulnerability to disaster management. Land use zoning was also positively related with its effects on economic vulnerability to disaster management ($r = 0.762$, $p<0.05$) an indication that land use zoning had 76.2% significant positive relationship with economic vulnerability to disaster management. Building construction restriction was significantly associated with economic vulnerability to disaster management as shown by ($r = 0.77$, $p<0.05$) implying that Building construction restriction had a 77.0% positive relationship with economic vulnerability to disaster management. Connectivity and

circulation was significantly positively correlated to household disaster risk management ($r=0.74$, $\rho<0.05$). Therefore, Connectivity and circulation had 74.0% positive relationship with household disaster risk management.

5.4. Multiple Linear Regression Analysis

The result of regression analysis for both linear and multiple regression analysis provides the functions of the equation that represents the best prediction of a dependent variable from several independent variables. This method is used when the independent variables are correlated with one another and with the dependent variable. The following regression equation is estimated as follow:

$$HDRM = \alpha^0 + \beta_1 LURI + \beta_2 LUZ + \beta_3 BCR + \beta_4 CC + \varepsilon \dots \dots \dots 2$$

Where: HDRM: Household Disaster Risk Management

α^0 : Constant LUPRI: Land use planning regulatory instrument

LUZ: Land Use Zoning

BCR: Building Construction Restriction

CC: Connectivity and Circulation

ε : Error term.

Table 5.3 shows multiple regressions which is related to EVDM as dependent variable. The Table shows the influence of independent variable LUPRI, LUZ, BCR, and CC on

dependent variable EVDM. The Table indicates that the independent variables determine 75.0% of the EVDM variance. This means that the other factors influence EVDM by 25.0%.

Table 5.4: Summery of the Regression Model

Model	R	R ²	Adjusted R ² of the Estimate	Std. Error R ²	F	Change statistics df1	df2	sig. of Change	
1	0.866 ^a	0.75	0.045	13.3200457	0.769	2.393	4	95	0.078

^a. *Predictors: (Constant), LUPRI, LUZ, BCR, CC*

5.5. Multiple Regression Analysis

A Multifactor linear regression model was used to predict economic vulnerability to disaster management in the study. The prediction was carried out basing on the effect of the three independent factors: Land use planning regulatory instrument, Land use zoning, and Connectivity and circulation. In addition, the b coefficients for each independent variable generated from the model was subjected to a t-test.

The multiple regression analysis was evaluated to determine any effects of the independent variables on the dependent variable. This was important since it was necessitating the test of hypotheses on individual Urban Land Use Planning dimensions that included Land use planning regulatory instrument (LUPRI), Land use zoning (LUZ), and Connectivity and circulation (CC). The results are as shown in Table 5.5.

Table 5.5: The Coefficients of Multiple Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
(Constant)	11.113	8.907		1.359	0.177
LUPRI	1.363	2.056	0.074	0.726	0.469
LUZ	1.194	4.501	0.026	0.265	0.791
BCR	0.678	0.758	0.093	0.894	0.374
CC	10.468	5.7950	0.249	2.482	0.015

^a. *Dependent Variable OP*

$$EVDM = \alpha_0 + \beta_1 LUPRI + \beta_2 LUZ + \beta_3 BCR + \beta_4 CC + \varepsilon$$

$$11.113 + 1.363LUPRI + 1.194LUZ + 0.678BCR - 14.768CC + \varepsilon$$

Table 5.5 shows the relationship between independent variables namely LUPRI, LUZ, BCR, CC on dependent variable EVDM. Statically, there is significant relationship between four dimensions of the ULUP mechanisms used in this study; LUPRI, LUZ, BCR, and CC, on the Economic vulnerability to disaster management (EVDM). It is clear that the increasing in the percentage of Urban Land Use Planning dimensions, EVDM will increase leading to reduced vulnerability of urban residents. If the Land use zoning increases by 1, the EVDM will increase by about 14.8. If Urban Land Use Planning components LUPRI, LUZ, BCR, and CC are equal to zero, EVDM will be 11.113 units of level of economic vulnerability to disaster management.

5.7 Hypotheses Testing

The effects of ULUP on EVDM were evaluated based on dimensions of Land use planning regulatory instrument, Land use zoning, and Connectivity and circulation. These were evaluated against the indicators of economic vulnerability to disaster management in order to test the influence on dimensions, various regressions were done to find out if the combined effects were sufficient or not to support the hypothesis. Thus, *the first hypothesis*

(H0₁) stated in the null form is as follows: There is no relationship between Land use planning regulatory instrument on economic vulnerability to disaster management.

Hypothesis one sought to establish the effects of Land use planning regulatory instrument on economic vulnerability to disaster management. This hypothesis was tested by regressing LUPRI on economic vulnerability to disaster management guided by the equation: $\gamma = \beta_0 + \beta_1 LUPRI$: Where LUPRI represented Land use planning regulatory instrument and γ denotes EVDM. The results of the regression are presented in Table 5.6

The results presented in Table 5.6 show that the effect of Land use planning regulatory instrument on EVDM was significant positive (R= 0.784). This was an indication that Land use planning regulatory instrument explained 78.4% (R² =.615) of EVDM. The other variables in the urban areas explained the remaining 21.6%.

Table 5.6: Effect of Land Use Planning Regulatory Instrument of Urban Land Use Planning on Economic Vulnerability to disaster management

Model Summary					
Model	R	R ²	Adjusted	Std. Error of the	Durbin-Watson
R ²	Estimate				
1	0.784 ^a	.615	.445	.1032843	1.6418

^a. Predictors: (Constant), Floor Area Ratio and Height Limitations, Building and Construction Permits, etc.

^b. Dependent Variable: HDRM

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized	t	Sig.
	β	Std. Error	Beta		
1 (Constant)	.687	.044		-16.015	.000
KC	1.482	.060	.878	20.901	.000

^a. Dependent Variable: HDRM

$$\gamma = \beta_0 + \beta_1 LUPRI = .687 + 1.482 LUPRI$$

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	4.494	1	4.494	436.858	.000 ^b
Residual	3.052	481	.013		
Total	7.849	125			

^a. Dependent Variable: HDRM

^b. Predictors: (Constant), LUPRI

Residuals Statistics					
Minimum	Maximum	Mean	Std. Dev	N	
Predicted Value	.028314	.421485	.205132	.1451186	481
Residual	.4120858	.2454981	0E-7	.1001964	481
Std. Predicted Value	1.780	1.650	.000	1.000	481
Std. Residual	3.933	2.343	.000	.967	481

^a. Dependent Variable: EVDM

The analysis from the model had the F value of 426.8. At p-value less than 0.05, the findings thus were sufficient to support effects of Land use planning regulatory instrument and building construction restriction on economic vulnerability to disaster management, implying that Land use planning regulatory instrument and building construction restriction had statistically significant positive effects on economic vulnerability to disaster management. The results indicate that there is a significant positive relationship between LUPRI and economic vulnerability to disaster management activity level. The urban areas

under study with longevity of tenure creating Land use planning regulatory instrument and building construction restriction score tended to have higher level of economic vulnerability to disaster management. $\gamma = \beta_0 + \beta_1 LUPRI = .687 + 1.249 LUPRI$; if LUPRI is zero γ will be 1.936 units level of economic vulnerability to disaster management while if LUPRI is 10; γ will be $0.878 + (1.482 * 10)$ which is equal to 13.238 showing an increasing effect of LUPRI on EVDM. The hypothesis that there is no relationship between Land use planning regulatory instrument on economic vulnerability to disaster management was therefore rejected. The results were not consistent with the study conducted by Coulombel, (2010) who reported that there is a positive relation between ownership concentration and urban areas residents' disaster management.

These findings are not in agreement with the findings of Shreve & Kelman, (2014) who found out that there is a significantly positive relationship between urban land planning component of regulatory instrument and building construction restrictions on Economic Vulnerability to Disaster Management activity level as measured by EVDM. The results were consistent with the study conducted by Shreve & Kelman, (2014), they argued that specific components of urban planning management can be used by increasing buildings sitting and space, building codes and energy, traffic calming, utilities and facilities, lot requirement, building materials and height restrictions to ensure strict policy and procedure observation for any structures being constructed in urban areas. This would create sanity and minimize triggering hazard into becoming disaster risks as currently the practice.

CHAPTER SIX

6.0. EFFECTS OF URBAN LAND ZONING ON ECONOMIC VULNARABILITY TO DISASTER MANAGEMENT IN LOW INCOME NEIGHBOURHOODS OF ELDORET URBAN AREA

6.1 Introduction

The main aim of this study was to investigate the influence of urban land use planning (land zoning) on economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area. This chapter presents the results of the objective two that was to determine the effect of urban land use zoning on economic vulnerability to disaster management in Eldoret urban area. This component was explored by measuring its functional, form based, intensity, incentives and hazard zoning elements. These elements determine the productivity of land in a balanced and multiple purposes. Since land does not increase on its size, it implies that its productivity is the factor that can be interfered with to boost the output. Hence zoning can be useful in determining the kind of usage such as industrial, commercial, residential zones and urban land not useful for occupying.

As indicated in Chapter three, data were collected through questionnaires and interviews. The data collected were analyzed in Chapter four using triangulated analysis techniques. For quantitative data, frequency distribution tables, charts were used to display and the qualitative data, descriptive analysis method was employed. Triangulation method was used through questionnaires, interviews and literature review to determine the similarities, differences or corroboration in the findings.

6.2 Types of Land Use Zoning in Eldoret Urban Area

The process of urban land use zoning emerges as a critical factor of providing order and sustainability in land use. Since land use is the object of zonal characterization, each land use zone is subject to a series of regulations depicting what can be built in terms of nature, function and density, giving tools to county governments to influence urban development.

There are four major types of land use zoning. These are presented in Table 6.1.

Table 6.1: Descriptive Statistics for Types of Urban Land Use Zoning (ULUZ)

Variable	N	Range	Min	Max	Mean	S.D.	Var	
	Stat	Stat	Stat	Stat	Stat	Std. Error	Stat	
LUZ	481	80.45	-38.0	73.00	4.46	1.17	10.13	0.240
Functional	481	4.77	4.01	5.26	4.100	0.630	0.624	0.400
Form Based	481	5.96	1.94	2.74	7.965	0.667	1.177	2.330
Intensity	481	6.35	1.83	3.41	4.213	0.624	1.687	0.230
Incentives	481	7.33	3.18	3.57	0.314	0.576	0.264	0.615

The results from Table 6.1 show that the Urban Land use Zoning has shown a moderate deviation among the sampled urban areas in Eldoret. It shows a mean ability to put town to order of almost 4.46%, the maximum reported influence is around 73% and the minimum is -38.0% with deviation of 10.17 between sampled regions of Eldoret urban Areas. It implies that the need for Urban Land Use Zoning adoption as an approach in helping in disaster management to urban residents living in Eldoret Urban Areas. Therefore the county governments need to understand the need for building a proper and sustainable zoning as a critical tool in urban sanity design and development. The authority needs to adopt various techniques and tools including urban land use zoning as integral part of land use planning.

The mean of the functional zoning of the Urban Land Use Zoning is 4.100, with the maximum and minimum are 5 and 4 respectively. The functional zoning is capable in organizing the urban land use as commercial, administrative, residential, and industrial and green space. The functional zoning shows an experience of annual frequencies of a maximum of five times the influence in the total degree of influence of Urban Land Use Zoning. The mean of the functional zoning is 63.0%, which is 63.0% of influence of the total influence of Urban Land Use Zoning on economic vulnerability to disaster management leaving the rest 37.0% be influenced by other factors. It implies that county governments such as Uasin Gishu in which Eldoret Urban Authority is housed need to utilize functional zoning to facilitate the application of urban land use zoning to effective disaster management to urban residents.

The form based zoning of the Urban Land Use Zoning shows an experience of annual frequencies of a maximum of three times influence with a minimum of two levels of experiences. This implies that form based zoning registered quite a small level of influences. The mean of form based zoning influence is only 66.7%, which is 66.7% of the orderly function in urban planning influence on economic vulnerability to disaster management. The form based zoning classifies the land use in terms of downtown, uptown, east side, historical zones, and manufacturing areas.

The Intensity zoning indicates an experience of annual frequencies of a maximum of four times and a minimum of three times the level of influence. This implies that the Intensity zoning registered quite a moderate level of influences on economic vulnerability to disaster management. The mean of Intensity zoning is 58.1%, which implies that 58.1% of the total

Urban Land Use Zoning influence on economic vulnerability to disaster management. This infers that urban land planning departments, urban land use zoning influences the designing of high density, average density, low density and no density areas for building infrastructure that are not disaster risk themselves. This may be the reason why most urban areas strategically indicate the kind of housing property to be built in a certain areas. In Kenya for example, various residential areas require specific housing in terms of height, space, and type. Although in places like Nakuru commercial or residential properties were not to go beyond certain height, due to the region being near the seismic core prone to volcanicity, yet today there are many skyrocketing in the presence of this regulation.

The Incentives zoning indicates an experience of annual frequencies of a maximum of four times and a minimum of three times the level of influence. This implies that the incentive zoning registered quite a moderate level of influences on economic vulnerability to disaster management process. The mean of Incentive zoning is 57.6%, which implies that 57.6% of the total Urban Land Use Zoning influence on economic vulnerability to disaster management. This infers that urban land planning departments, urban land use zoning influences the designing of incentives such as Export processing Zones, Konza City, and Africa Economic Zone in Uasin Gishu, Plateau Business Parks in Uasin Gishu, and Commercial Parks and extra. These results concur with the finding of Gosnell, et al., (2011) and Enermark, (2012) whose studies identified the same factors to have contributed to challenging strategy implementation in urban planning departments in different countries globally.

6.3 Urban Land Use Zoning Influence

The study also sought to find out the level of urban land use zoning influence from the urban resident respondents. There are several types of zoning codes in use today and combinations thereof. It is sometimes difficult to distinguish between the types of codes and their respective formats or techniques. However, this study made use of functional zoning, form based zoning, intensity zoning and incentive zoning under which there are other sub elements. Urban land use zoning is considered to be useful in the following areas: stabilizing and increasing property values, particularly residential properties; relieving and checking congestion in the streets and neighborhoods; increasing safety and enhancing security and administration of security services in buildings and residential neighborhoods; making business more efficient by ensuring there is order, and making life healthier by increasing the quality and aesthetic values of a locality, neighborhoods, city or town. Ten items were identified and measured on a 4-Likert scale of agree and disagree. The results are as shown in Table 6.2.

Table 6.2: Distribution of the Measure of Land Use Zoning Influence

Statement		SD	D	A	SA	Total	
1.	Functional zoning is important in dividing land into commercial areas useful in concentrating commercial activities in specific zones giving various support to the operators	f	14	43	168	255	481
		%	03.3	09.0	35.0	53.0	100
2.	Zoning of urban land use can influence creation of administrative areas useful in providing basic administrative services stabilizing security and safety of towns	f	14	34	168	265	481
		%	03.0	07.0	35.0	55.0	100
3.	Establishing specific residential zones is important to urban households in accessing residential services	f	24	43	164	250	481
		%	05.0	09.0	34.0	52.0	100
4.	This is able to create industrial zones that is critical in locating industries in specific areas for purposes of concentrating basic industrial services in one location	f	24	43	154	260	481
		%	05.0	09.0	32.0	54.0	100
5.	Creating a zone for green space is critical for future expansion, recreation	f	29	48	154	250	481
		%	06.0	10.0	32.0	52.0	100
6.	Establishing the downtown considered the CBD for commercial, and administrative functions of the inter and intra-governmental activities	f	19	39	154	269	481
		%	04.0	08.0	32.0	56.0	100
7.	Establishing zones for mixed use development popular with pedestrian friendly, most dense and is home to a diverse set of establishments including office buildings, residential towers, apartment complexes, retail centers, nightlife strips, and hotels	f	14	58	144	265	481
		%	03.0	12.0	30.0	55.0	100
8.	Creation of Estate Zones is useful for urban households to inhabit areas officially marked for human occupation	f	29	34	164	255	481
		%	06.0	07.0	34.0	53.0	100
9.	Establishing Intensity zones is important in determining the high, average, low, or no densities housing development	f	24	19	144	294	481
		%	05.0	04.0	30.0	61.0	100
10.	Setting aside zones for incentives or no incentives attract certain socioeconomic activities and enhanced control of environmental management	f	14	19	144	303	481
		%	03.0	04.0	30.0	63.0	100

The results in Table 6.2 show that strongly agree accounted for 255 (53.0%), agree 168 (35.0%) disagree accounted for 43 (09.0%), and strongly disagree 14 (03.0%). This is an indication that majority of the participants approved the statement that functional zoning is important in dividing land into commercial areas useful in concentrating commercial activities in specific zones giving various support to the operators.

In relations to zoning of urban land use can influence creation of administrative areas useful in providing basic administrative services stabilizing security and safety of towns, the results show that strongly agree accounted for 265 (55.0%), agree 168 (35.0%), disagree accounted for 34 (07.0%), and strongly disagree 14 (03.0%). This is an indication that majority of the respondents strongly agreed that zoning of urban land use can influence creation of administrative areas useful in providing basic administrative services stabilizing security and safety of towns.

At the same time, these results show that strongly agree accounted for 250 (52.0%), agree 164 (34.0%), disagree accounted for (09.0%), and strongly disagree 24 (05.0%). This is an indication that majority of the participants also agreed that establishing specific residential zones is important to urban residents in accessing residential services.

Moreover, from the results in Table 6.3, one realizes that strongly agree accounted for 260 (54.0%), agree 154 (32.0%),), disagree accounted for 43 (09.0%), and strongly disagree 24 (05.0%) with the statement that zoning able to create industrial zones that is critical in locating industries in specific areas for purposes of concentrating basic industrial services in one location. This implies that majority of participants approved the statement that

zoning are able to create industrial zones that is critical in locating industries in specific areas for purposes of concentrating basic industrial services in one location.

Also participants with opinion of strongly agree accounted for 250 (52.7%), agree 154 (32.0%), disagree accounted for 48 (10.0%), and strongly disagree 29 (06.0%) with the statement that zoning enhance creation of zones for green space is critical for future expansion, recreation. This implies that majority of participants agreed with the statement that zoning enhance creation of zones for green space is critical for future expansion, recreation.

Again these results reveal that strongly agree accounted for 269 (56.0%), agree 154 (32.0%), disagree 39 (08.0%), and strongly disagree 19 (04.0%) on the statement that establishing the downtown considered the CBD for commercial, and administrative functions of inter and intra-governmental activities. This implies that majority of participants agreed with the statement that establishing the downtown considered the CBD for commercial, and administrative functions of inter and intra-governmental activities.

In relation to establishing zones for (uptowns) mixed use development popular with pedestrian friendly, most dense and is home to a diverse set of establishments including office buildings, residential towers, apartment complexes, retail centers, nightlife strips, and hotels, the results in Table 6.2 show that strongly agree accounted for 265 (55.7%), agree 144 (30.0%), disagree 58 (12.0%), and strongly disagree 14 (03.0%). This implies that majority of participants were strongly of the opinion that establishing zones for mixed use development popular with pedestrian friendly, most dense and is home to a diverse set

of establishments including office buildings, residential towers, apartment complexes, retail centers, nightlife strips, and hotels.

Furthermore, the results in Table 6.3 indicate that strongly agree accounted for 255 (53.0%), agree 164 (34.0%), disagree 34 (07.0%), and strongly disagree 29 (06.0%) on the opinion that creation of estate zones is useful for urban residents to inhabit areas officially marked for human occupation. This implies that majority of participants agreed with the statement that creation of estate zones is useful for urban residents to inhabit areas officially marked for human occupation.

In addition to that, the results in Table 6.2 indicate that strongly agree accounted for 294 (61.0%), agree 144 (30.0%), disagree 19 (04.0%), and strongly disagree 24 (05.0%) on the opinion that establishing Intensity zones is important in determining the high, average, low, or no densities housing development. This infers that majority of participants agreed with the statement that establishing Intensity zones is important in determining the high, average, low, or no densities housing development.

Finally the results in Table 6.3 indicate that strongly agree accounted for 303 (63.0%), agree 144 (30.0%), disagree 19 (04.0%), and strongly disagree 14 (03.0%) on the opinion that indicate that setting aside zones for incentives or no incentives attract certain socioeconomic activities and enhanced control of environmental management. This infers that majority of participants agreed with the statement that indicates that setting aside zones for incentives or no incentives attract certain socioeconomic activities and enhanced control of environmental management.

This would enhance the urban residents determining their multiple uses and diversified socioeconomic activities. This would enhance livelihood stability and sustainability hence making the urban residents able to minimize their vulnerability to socioeconomic and environmental disaster risks. Zoning would result in restoring residential density associated affecting downtown zones, address a zoning and land use inconsistency that would allow the urban residents plan land use density match the higher density allowed in the former zoning since Kenya is modernizing, the pervious colonial planned urban system would not work today, establish an urban household plan implementation overlay zone for the largely residential areas within suburban areas and its neighborhoods that and its neighborhoods' that would trigger discretionary review for development exceeding 30 feet in height.

Thus urban land use zoning would enhance planning where different users are able to access particular zone for specific activities. These results are in agreement with the findings of Twigg, (2015); Gunjal, (2016); Freire, Maria, Lall, and Leipziger, (2014) and Gaube, and Remesch, (2013) that zoning is important in organizing urban land space in multipurpose uses such as sub division and specific area plans, neighborhoods design, heritage preservation, growth and service boundaries and natural hazards zoning enhancing equitable and adequate distributions.

Land use zoning will thus ensure that density bonuses allow developers to build more densely than normally permitted in exchange for providing a public good, such as affordable housing. This zoning tool achieves two things: developers can build additional units, increasing potential profit, and loosely populated areas become denser. For example, instead of building a single-family home on a large plot, a developer would be incentivized

to build multiple affordable condominiums a project that would not otherwise be legal. Density zoning is similar to incentive zoning because it makes exceptions to density regulations in exchange for some public benefit.

6.4. Results of Correlation Analysis

To test the effect of LUZ on Economic Vulnerability to Disaster Management components, various regressions were done to find out if the combined effects were significant or not to support the hypotheses. This resulted in the second *hypothesis (H0₂) stated that there is no relationship: The Effect of Land Use Zoning on Economic Vulnerability to Disaster Management*. Hypothesis two sought to establish the relationship between Urban Land Zoning dimensions of Urban Land Use Planning on Economic Vulnerability to Disaster Management. This hypothesis was tested by regressing Land Use Zoning on Economic Vulnerability to Disaster Risk Management guided by the equation $\gamma = \beta_0 + \beta_1 \text{LUZ}$ Where LUZ represented Land Use Zoning and γ denoted Economic Vulnerability to Disaster Management measures. The results of the regression are presented in Table 6.3.

The results from Table 6.3 are observation that there is a significant positive relationship between Land Use Zoning and Economic Vulnerability to Disaster Management Activity level ($R=.842$). This was an indication that Land Use Zoning explained 70.9% ($R^2 = .709$) of Economic Vulnerability to Disaster Management. The other variables affecting Economic Vulnerability to Disaster Management explained by the remaining 29.1%. The analysis from the model had the F value of 5.4873 at p-value <0.05 , the findings were sufficient to support the relationship between Land Use Zoning and Economic Vulnerability

to Disaster Management, inferring that Land Use Zoning had statistically significant positive effects on Economic Vulnerability to Disaster Management activity level.

Table 6.3: Relationship between Land Use Zoning and Economic Vulnerability to Disaster Management

Model Summary				
Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.842 ^a	.709	.677	.53441

Predictors: (Constant), Functional, Form Based, Intensity, Incentives

ANOVA ^a						
Model	Sig.	Sum of Squares	df	Mean Square	F	
1 Regression		9.123	1	1.384	5.4873	.000 ^b
Residual		16.641	481	.287		
Total		26.513	125			

^a. *Dependent Variable: Economic Vulnerability to Disaster Management*

^b. *Predictors: (Constant), Functional, Form Based, Intensity, Incentives*

Coefficients ^a					
Model	Un-standardized Coefficients		Standardized Coefficients	t-value	Significance p-value
	β	Std Error	Beta		
(Constant)	.3856	.115		4.030	.051
Land Use Zoning	.664	.121	.654	4.564	.000

^a. *Dependent Variable: Economic Vulnerability to Disaster Management activity level*

^b. *Predictors: (Constant), Functional, Form Based, Intensity, Incentives*

$$\gamma = \beta_0 + \beta_1 LUZ = .3856 + .664LUZ$$

The results indicate that there is a positive significant relationship between LUZ and Economic Vulnerability to Disaster Management activity level. The functional, form based, intensity, and incentives increases as LUZ increases. Therefore given the equation $\gamma = \beta_0 + \beta_1 LUZ = .3856 + .664LUZ$ when LUZ is zero γ will be equal to .3856 and when LUZ is increased to 10 units then γ will be $.3856 + .664(10)$, which will be 7.0256 units of EVDM showing an increasing effects of LUZ on EVDM. Therefore the null hypothesis that there is no relationship between Land Use Zoning and Economic Vulnerability to

Disaster Management is rejected. Although in the literature there are varied results but this finding concurs with the finding of Smolka, (2014) who found that urban areas with larger boards that are weak, LUZ tend to have higher desire for improved Economic Vulnerability to Disaster Management, which could be to help deal with vulnerability and resilience problem of urban households. They found out that Land Use Zoning as a dimension of Land Use Planning which is more entrenched due to socioeconomic values that can be realized from applying land use planning to bring stability and sustainability in urban areas in Eldoret and any other city in the world.

In summary, it infers that household's lives, livelihoods, and wellbeing are at risk either directly or indirectly from the destructive effects of a hazard. Their incomes and livelihoods are at risk because movement, access and utilization of their productive assets are restricted where there is no land use zoning. Each type of hazard puts somehow a different set of elements at risk due to their vulnerability. Therefore, land use zoning could be a useful tool used to reducing such vulnerability. To this end, development planners need to identify elements that are most at risk from the principal hazards, which have been identified (UNDP, 1991). In the Eldoret Town case, elements at risk comprise people's life and wellbeing, employment, housing mobility, environmental concerns, local systems and social structures, coping strategies.

CHAPTER SEVEN

7.0 EFFECTS OF LAND USE TRANSIT CIRCULATION AND CONNECTIVITY ON ECONOMIC VULNARABILITY TO DISASTER MANAGEMENT IN LOW INCOME NEIGHBOURHOODS OF ELDORET URBAN AREA

7.1 Introduction

This chapter presents the final objective of the study. This objective intended to establish the effects of Land Use Transit Circulation and Connectivity on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area. The circulation system is the backbone of the urban areas, supporting the economy and serving and influencing land use patterns in a positive way. Eldoret town is growing and automobile is the primary mode of transportation. The automobile will continue as the primary mode of transportation, but there is an increasing emphasis on alternatives to the personal automobile for transportation, such as public transit, bicycling, motorcycle and walking.

This element is a guide for planning and implementing alternative modes of travel to afford greater accessibility for residents and visitors, mitigate congestions and pollution, and support a more efficient and sustainable land use pattern in Eldoret Urban Area. Transition to a more complete multi-modal transportation system requires an integrated land use and transportation planning approach that support land use pattern with concentrated mixed-use linkages to neighborhoods'. Transportation access is the heart of a

successful mixed-use development pattern, where more intense growth occurs around major roadways and transit facilities.

7.2 Circulation and Connectivity

This focuses in ensuring that regional connections and roadways, pedestrians & bicycle circulation, transit and circulation plan are well calculated designed and developed. This makes it possible for movement in and outside cities. Lack of circulation and connectivity can be cited as critical to access to and outside disaster scenes.

7.3 Elements of Circulation and Connectivity

The results in descriptive statistics are displayed in Table 7.1 with variables reflecting influence of elements of Circulation and Connectivity.

Table 6.4: Descriptive Statistics for Elements of Circulation and Connectivity

Variable	N	Range		Min	Max	Mean	S.D.	Var	
	Stat	Stat	Stat	Stat	Stat	Stat	Std. Error	Stat	Stat
CC	481	96.11	-56.0	73.00	4.983	1.121		14.44	0.121
Street Sections	481	4.84	3.00	5.00	4.510	0.533		0.541	0.580
Bicycle Accommodation	481	6.11	4.16	6.40	6.025	0.576		1.451	2.740
Transit Accommodation	481	6.01	4.54	6.60	6.015	0.536		1.451	2.578
Accessibility	481	6.12	4.16	6.54	6.045	0.587		1.451	2.760
Connectivity Index	481	6.32	4.57	6.55	6.505	0.616		1.451	2.960
Traffic Calming	481	6.41	4.58	6.53	6.325	0.567		1.451	2.780
Parking Standards and Design	481	5.13	2.18	6.77	0.450	0.534		0.531	0.642

The results from Table 7.1 show that the circulation and connectivity has shown a large deviation of 14.44% among the sampled household. It shows a mean influence of almost 4.983%, the maximum reported influence is 73.0% and the minimum is -56.0% with

deviation of 12.1. Street sections show an experience of annual frequencies of a maximum of five times and a minimum of three times the influence in the total degree of influence of street sections of circulation and connectivity. The mean of street sections is 53.3%, which is 53.3% of influence of the total influence of circulation and connectivity on household disaster risk management leaving the rest 46.7% be influenced by other factors.



Plate 7. 1: Urban Land Use Transit Circulation and Connectivity

Source: Standard Newspapers, May (2017) – Outtering Road, Nairobi.

The traffic calming of the circulation and connectivity shows an experience of annual frequencies of a maximum of seven times influence with a minimum of five levels of influences. This implies that Traffic calming registered quite a moderate level of influences. The mean of traffic calming influence is only 47.6%, which is 47.6% of the influence on household disaster risk management. The parking standards and design indicates an experience of annual frequencies of a maximum of seven times and a minimum of two times the level of influence. This implies that the parking standards and design registered a high level of influences. The mean of connectivity and circulation is 53.2%, which is 53.2% of the total Circulation and Connectivity influence on economic

vulnerability to disaster management. These results concur with the findings of Saunders, and Becker, (2015) that Lack of circulation and connectivity can be cited as critical to access to and outside disaster scenes. This can lead to more property destructions and more lives lost. It also helps in access to market and business centers as well as industrial areas for job-related activities. In some places, difficulties of circulation and connectivity cause households to move to and from work places on foot slowing down economic activities movement.

7.3. Results of Regression Analysis

The effects of Connectivity and Circulation were evaluated based on key dimensions that included: street sections, bicycle accommodation, transit accommodation, accessibility, connectivity index, traffic calming, and parking standards and design. These were evaluated against the indicators of Economic Vulnerability to Disaster Management. To test the effect of ULUP on EVDM components, various regressions were done to find out if the combined effects were significant or not to support the hypothesis. This resulted in the *third hypothesis (H0₃) stated that there is no relationship between Connectivity and Circulation (CC) and Economic Vulnerability to Disaster Management (EVDM)*. Third hypothesis sought to establish the relationship between Connectivity and Circulation and Economic Vulnerability to Disaster Management. This hypothesis was tested by regressing Connectivity and Circulation (CC) and Economic Vulnerability to Disaster Management guided by the equation $\gamma = \beta_0 + \beta_1 CC$ where CC represented Connectivity and Circulation (CC) and γ denoted Household Disaster Risk Management. The results of the regression are presented in Table 7.2.

The results from Tablee 7.2 are observation that there is a significant positive relationship between Connectivity and Circulation and Economic Vulnarability to Disaster Management Activity level ($R = .883$). This was an indication that Connectivity and Circulation explained 78.0% ($R^2 = .780$) of Economic Vulnarability to Disaster Management. The other variables affecting Economic Vulnarability to Disaster Management explained the remaining 22.0%. The analysis from the model had the F value of 5.4665 at p-value < 0.05 , the findings were sufficient to support the relationship between Connectivity and Circulation and Economic Vulnarability to Disaster Management, inferring that Connectivity and Circulation had statistically significant positive effects on Economic Vulnarability to Disaster Management. Therefore the null hypothesis that there is no relationship between Connectivity and Circulation and Economic Vulnarability to Disaster Management was rejected.

The results indicate that there is a positive significant relationship between CC and Economic Vulnarability to Disaster Management. The urban resident income, urban residents employment, urban residents investment/financial credit, urban residents quality and quantity housing, and urban residents housing mobility increases as well as increase in HDRM resiliency hence low vulnerability. Although in the literature there were varied results but this finding concurs with the finding of Saunders, and Becker, (2015) who found that LUP, CC tend to introduce sanity in urban development leading to more attraction of various large scale projects. Such projects would boost socioeconomic wellbeing of urban households. They found out that Connectivity and Circulation as factor for ULUP pursue higher leverage to raise urban sanity level, value and even reduce accident rates.

Table 7.1: Relationship between Connectivity and Circulation (CC) and Economic Vulnerability to Disaster Management

Model Summary				
Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.883 ^a	.780	.492	.62541

Predictors: (Constant), street sections, bicycle accommodation, transit accommodation, accessibility, connectivity index, traffic calming, and parking standards and design

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	9.123	1	1.789	5.4665	.000 ^b
Residual	16.340	481	.287		
Total	25.513	125			

^a. *Dependent Variable: Economic Vulnerability to Disaster Management*

^b. *Predictors: (Constant), street sections, bicycle accommodation, transit accommodation, accessibility, connectivity index, traffic calming, and parking standards and design*

Coefficients^a

Model	Un-standardized Coefficients		Standardized Coefficients	Significance	
	β	Std Error	Beta	t-value	p-value
(Constant)	-.703	.117		3.050	.053
Connectivity and Circulation (CE)	-.664	.111	.657	4.164	.000

^a. *Dependent Variable: Economic Vulnerability to Disaster Management*

^b. *Predictors: (Constant), street sections, bicycle accommodation, transit accommodation, accessibility, connectivity index, traffic calming, and parking standards and design*

$$y = \beta_0 + \beta_1 CE = -0.703 + .664 CC.$$

In summary, the result findings indicate that all the three components of urban land use planning pursued in this study have significant positive relationships with the household disaster risk management. Since, there are strong interdependence among the three variables on the land use planning therefore their significant positive relationships on

household disaster risk management are indicators that urban land use planning has a significant positive relationship with the household disaster risk management.

Therefore the process of creating vulnerability profile of Transit, Connectivity and Circulation factors such as road accidents due to the sharing of narrow roads and highways, can be dealt with using Transit, Connectivity and Circulation components of urban land use planning. This could be useful in areas such as social, structural, environmental and economic planning. The benefits of this could be improved accessibility to neighbourhoods, increased investments and attracting more job opportunities in one area. This could be critical to the local households who need sustainable sources of employment opportunities.

C HAPTER EIGHT

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

8.1 Introduction

This chapter presents summary of discussions, draws conclusions of key findings of this study and further gives recommendations objective by objective.

8.2 Summary of the Findings

The study found out that majority of urban resident respondents were female members accounting for 257 (53.6%); with Langas having the largest portion; those who were married were also the majority accounting for 393 (81.7%); while those aged 31-40 years old also accounted for the majority representing 230 (47.8%); secondary level of education were the majority accounting for 194 (40.3%); in terms of urban residents size, those with 1-4 children 219 (45.5%) were the majority, children accounted for 201 (41.8%); neighbourhoods with father as the urban residents head were the majority with 409 (85.0%).

It was also found out that majority of the respondents 265 (55.0%) stated that there was slight presence of urban resident Income (NRI); majority 168 (35.0%) of the sampled respondents stated that there was slight prevalence of Urban Resident Employment (URE); it was also found out that majority 192 (40.0%) of the sampled participants strongly agreed that there were slightly some level of urban resident investment and financial credit, 47% of respondents also agreed that there was some level of housing quality and quantity and

housing mobility. The findings indicated that owing to the poor degree of presence of disaster income dimensions, the sampled urban residents were highly vulnerable as they were exposed to high risks since all the dimensions of dependent variables point at unstable level of each dimension.

In terms of awareness and preparedness, 394 (82.0%) of respondents lacked awareness on disaster risk prevention and preparedness while 259 (54.0%) of respondents indicated that they had been exposed to disaster previously; 331 (69.0%) of the respondents had never taken any disaster risk management related training; 374 (78.0%) of respondents did not have warning systems in their houses, 302 (63.0%) of respondents did not have any knowledge of disaster management while those who experienced disaster for more than 7 days had high chances of being aware and prepared. 312 (65.0%) of respondents lacked the basic neighbourhood resident measures for disaster preparedness. The findings indicated that 177 (36.8%) of the respondents owned 0.125 points of an acre and this was for residential use which was also a majority 251 (52.2%) respondents. Likewise the findings indicated that 229 (47.6%) of respondents experienced inadequate socioeconomic services from their neighborhoods’.

It was also found out that respondents aged ≥ 61 years were nearly six times more likely to have protection and preparedness compared with those aged below 30 years (AOR=2.62; 95% confidence interval (CI): 1.6, 6.7). The odds of having protection and preparedness among respondents who had university level of education were found to be higher compared with household respondents with no education (AOR=28.1; 95% CI: 8.15, 59.1). Income was also found to be statistically significant with neighbourhood residents’ disaster

risk protection and preparedness. Neighbourhood residents having monthly income Kshs.>21,000/- were nearly 27.4 times prepared compared with those who had Kshs.≤5,000/- (2.27, 19.7 (AOR=6.7; 95% CI: 2.27, 19.7). The odds of being prepared for disaster risk among those having warning system in the urban residents were higher than those who did not have (AOR=5.4; 95% CI: 2.4, 12.3). Respondents having knowledge on household preparedness were more likely to be prepared compared with less knowledgeable lot requirements (AOR=8.92; 95% CI: 1.67, 47.6). The odds of being prepared among those who had prior exposure were higher compared to those with no such exposure (AOR=32.67; 95% CI: 6.2, 67.4). The odds of urban residents preparedness were two times higher among those experiencing ≥ 7 days of disaster risk compared with those experiencing ≤ 7 day's duration of disaster risk (AOR=2.5; 95% CI: 1.14, 5.6). It was also found out that 224 (46.6%) of respondents pay less than Kshs.5,000/- monthly rent, which points to the low purchasing power among these respondents.

8.3. Influence of Urban Land Use Planning Regulatory Instruments on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area

The findings indicated that land use planning regulatory instruments with all its 8 dimensional items have combined influence of 69.0% over economic vulnerability to disaster management. The findings indicated that floor area ratio and height limitations and construction and building standards accounted for higher level of influence of 73.2% and 84.8% respectively on economic vulnerability to disaster management. Other dimensions were equally influential but at a lower level.

This would be useful in disaster management that permits, compliance and conformity to the regulations, rights and laws are observed before a permit is issued hence buildings would be constructed to the required standards hence their rampant collapsing would be avoided. This would influence urban residents to pursue access to agricultural land and carry out socioeconomic activities that would enable them have some employment and sources of income, that later would enhance their wealth commutation hence improve their capability and coping ability to deal with disasters when they occur.

It was found out that majority of respondents 188 (39.0%) strongly agree that establishing an invaluable floor area ratio and height limitations ensures that buildings were constructed in a standard form and format in specific areas; the next findings was that 202 (42.0%), strongly agree that providing building and construction permits for approval for conformity and compliance control to the rules and laws. Likewise on the green space protection, it was found out that 188 (39.0%), strongly agree that ensuring that open and green space protection is achieved and maintained. At the same time, the regulatory instrument dimension of agricultural land conservation, the findings indicated that 236 (49.0%), strongly agree that agricultural land conservation is important to urban residents socioeconomic service access.

In addition to that, it was found out that majority 168 (35.0%) of respondents agree that participants having invaluable skills to maintain construction and building standards so that quality and quantity is maintained for particular zones. Likewise, study found out that majority 178 (37.0%) of respondents agree that regulatory instruments were useful in represents enforcement of property rights. Finally the findings showed that majority 178

(37.0%) of respondents strongly agree that high level of right-of-way protection is maintained.

Test results on H_0 showed that there was significantly positive relationship between urban land use planning and economic vulnerability to disaster management. The effect of Land use planning regulatory instrument on EVDM was significant positive ($R = 0.878$). This was an indication that Land use planning regulatory instrument explained 87.8% ($R^2 = .771$) of EVDM. The other variables in the urban areas explained the remaining 12.2%. The analysis from the model had the F value of 426.8. At p-value less than 0.05, the findings thus were sufficient to support effects of Land use planning regulatory instrument on economic vulnerability to disaster management, implying that Land use planning regulatory instrument had statistically significant positive effects on economic vulnerability to disaster management. The results indicate that there was a significant positive relationship between LUPRI and economic vulnerability to disaster management activity level. The urban areas under study with longevity of tenure creating Land use planning regulatory instrument score tended to have higher level of economic vulnerability to disaster management. $\gamma = \beta_0 + \beta_1 LUPRI = .687 + 1.249 LUPRI$; if LUPRI is zero γ will be 1.936 units level of economic vulnerability to disaster management while if LUPRI is 10; γ will be $0.878 + (1.482 * 10)$ which is equal to 13.238 showing an increasing effect of LUPRI on NEVDM. The hypothesis that there was no relationship between urban land use planning regulatory instruments on economic vulnerability to disaster management was therefore rejected.

8.4. Effect of Urban Land Zoning on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area

Land use zoning was considered useful in the following areas including functional zoning, form based zoning, intensity zoning and incentives zoning. In the functional zoning, this divides urban land in various uses including commercial, administrative, residential, and industrial and green pace. The findings indicated that Urban Land use Zoning and all its five dimensional items combined had an influenced of 73.0%. The findings also indicated that functional and form based land use zoning had highest level of influence on economic vulnerability to disaster management compared to the other dimensions.

Zoning provide areas specifically allocated suitable for particular activity. It means that zonal mapping will have already taken place and determination of hazard prone areas identified and included in the map when zoning and allocation of specific activities are done. For example, form based zoning is aimed at dividing land into downtown, uptown, historical zones, and manufacturing areas. While intensity zoning divides and classify urban land into high density, average density, low density and no density. Finally, incentive zoning provide for incentives or no incentives. The finding indicated that zoning would influence economic vulnerability to disaster management by providing specific zones suitable for particular socioeconomic activities that attract similar investment in such areas creating employment opportunities, and providing sustainable income to neighbourhood residents. Other business start ups would also emerge in supporting those working in these zonal areas.

The benefit of zoning is that it helps to separate different, incompatible property uses and collects together those that are similar. This ensures creation of neighborhoods' that match and useful to each other. This can help influencing neighborhoods whose residents are not hard working to adopt a culture of trying and putting more efforts hence they would become self-reliant. Zoning would also provide control mechanisms that would limit the kind of housing construction for example in high density areas, skyrocketing buildings would be allowed to be constructed, this would put a mechanism that ensures no informal structures are established in average density areas.

Test results on H_0 indicate that there was a significant positive relationship between LUZ on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of EUA in all activity level. The functional, form based, intensity, and incentives increases as LUZ increases. Therefore given the equation $\gamma = \beta_0 + \beta_1 LUZ = .3856 + .664 LUZ$ when LUZ is zero γ will be equal to .3856 and when LUZ is increased to 10 units then γ will be $.3856 + .664(10)$, which will be 7.0256 units of EVDM showing an increasing effects of LUZ on EVDM. Therefore the null hypothesis that there was no relationship between Land Use Zoning on Neighbourhood Economic Vulnerability to Disaster Management was rejected. Although in the literature there were varied results but this finding concurs with the finding of Smolka, (2014) who found that urban areas with larger boards that are weak, LUZ tend to have higher desire for improved Economic Vulnerability to Disaster Management, which could be to help deal with vulnerability and resilience problem of urban residents in the neighbourhoods. They found out that Land Use Zoning as a dimension of Land Use Planning which was more entrenched due to socioeconomic values

that could be realized from applying land use planning to bring stability and sustainability in urban areas in Eldoret and any other city in the world.

8.5. Effects of Urban Land Transit Circulation and Connectivity on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area

The findings indicated that circulation and connectivity plus all its seven dimensions had a combined influence of 73.0% on economic vulnerability to disaster management. The findings further show that the mean of street sections is 53.3%, which directly translates to the total influence of circulation and connectivity on economic vulnerability to disaster management leaving the remaining 46.7%, be influenced by other factors. The street section of the circulation and connectivity provides cross sections for typical roadways detailing lane width, parking, bicycle lanes and required right-of-way. The study also found out that the mean of traffic calming influence was only 47.6%, which directly translates to the influence on economic vulnerability to disaster management. That meant that the parking standards and design registered a high level of influences. The mean of connectivity and circulation was 53.2%, which was 53.2% of the total Circulation and Connectivity influence on economic vulnerability to disaster management.

The findings showed that circulation and connectivity presents the recommended standards for both on-street and off-street bicycle facilities; provides the standards and recommended location for paths, trails designed to accommodate pedestrians, and cyclists; presents recommended bus routes and transit shelter design; presented the percent of urban residents, employees and mixed-use centers served by pedestrian, bicycle facilities and

transit; summarizes a catalog of traffic calming techniques and discusses appropriate locations and benefits and presents a discussion of shared parking, parking ratios, and on- and off-street parking.

In the findings from the regression analysis, there was a significantly positive relationship from among the three dimensions of urban land use planning, indicating that the urban land use planning also has a significantly positive relationship to economic vulnerability to disaster management. This finding imply that where the components of land use planning increased, the wellbeing of the household dimensions also improves and subsequently develop disaster management strategies such as risk reduction, risk mitigation, and risk coping. The correlation analysis findings indicated that land use planning regulatory instrument was positively and significantly correlated to influence on household disaster risk management ($r=0.719$, $\rho<0.05$); Thus land use planning regulatory instrument had 71.9% positive relationship with economic vulnerability to disaster management. Land use zoning was also positively related with its effects on household disaster risk management ($r = 0.762$, $\rho<0.05$) an indication that land use zoning had 76.2% significant positive relationship with economic vulnerability to disaster management. Connectivity and circulation was significantly positively correlated to household disaster risk management ($r=0.74$, $\rho<0.05$). Therefore, Connectivity and circulation had 74.0% positive relationship with economic vulnerability to disaster management.

Test results for H_0_3 are depicted in table 7.6 which observes that there was a significant positive relationship between connectivity and circulation and economic vulnerability to disaster management activity level ($r= .883$). This was an indication that Connectivity and

Circulation explained 78.0% ($R^2 = .780$) of economic vulnerability to Disaster Management. The other variables affecting Economic Vulnerability to Disaster Management explained the remaining 22.0%. The analysis from the model had the F value of 5.4665 at p-value < 0.05 , the findings were sufficient to support the relationship between Connectivity and Circulation and Economic Vulnerability to Disaster Management, inferring that Connectivity and Circulation had statistically significant positive effects on Economic Vulnerability to Disaster Management. Therefore the null hypothesis that there was no relationship between Connectivity and Circulation and Economic Vulnerability to Disaster Management was rejected.

8.6. Conclusions

This study hereby draws the following conclusions based on the three specific objectives, and the fourth conclusion is based on the overall objective of the study.

8.6.1 Influence of Urban Land Use Planning Regulatory Instruments on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area

The study concludes that the institutions responsible for implementing the urban land use planning regulatory instruments meant to manage the economic vulnerability to disaster management in Low Income of Eldoret Urban Area, appears to be weak and inefficient to re enforce the implementation and application of these land instruments such that to influence the economic vulnerabilities to disaster management in low income neighbourhoods of Eldoret Urban Area. This is evidenced by the widespread of slums, and

informal settlements in the urban neighbourhoods and the encroachment of road reserves, open spaces within the urban area of EUA. The Uasin Gishu County/Urban administration appears also to be experiencing bureaucracy in issuing building permits and general implementation of land use regulatory instruments in their jurisdiction; hence, residents in the neighbourhoods tend to ignore the application of these instruments. Thus, floor area ratio, building height restriction, building standards, construction permits are all ignored by the urban residents in the neighbourhoods, exposing them to be vulnerable to disaster in their neighbourhoods. This is evidenced in Kapsoya informal area which the study has used as control or reference point. The same has been extended even in Langas, an informal settlement where tall buildings have been emerging.

8.6.2 Effect of Urban Land Zoning on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area

It was evident from the findings that land use zoning has an important role in improving neighbourhood economic vulnerability to disaster management. Urban land use zoning would enable them to identify with different zones for specific socioeconomic activities attraction to such special zones such as industrial parks, commercial zones, residential, and others, and as such economic vulnerability to disaster management in low income neighbourhoods would improve since such activities would help stabilize the residents socioeconomic and environmental management.

The land use zone as an element of land use zone planning was introduced by the colonial government and it was meant to bring law and order especially in urban area. The colonial governments were able to implement land zoning and this is evidenced by the fact that

urban areas such like Eldoret were divided into industrial areas, commercial areas. However, urban administrators in the post colonial period have been slow in applying the land use zone in our urban areas, thus, urban development has been disorderly resulting in wide spread of slums, informal settlements. The inefficient and lack of proper implementation of land zoning has exposed the urban residents to disaster risk in their settlements.

8.6.3 Effects of Urban Land Transit Circulation and Connectivity on Economic Vulnerability to Disaster Management in Low Income Neighbourhoods of Eldoret Urban Area

This study concludes that circulation and connectivity too has a significant effect on economic vulnerability to disaster management in low income neighbourhoods of EUA. This was important in enhancing neighborhoods access and connectivity to industrial areas and improving inter urban areas trade; movement of urban residents to and fro; and movement of goods and services. The study concludes that appropriate land transit circulation & connectivity should be adapted and implemented by EUA authority while designing the transits on neighbourhoods, to make the residents in the low income neighbourhoods safe and secure. For instance, most road designers, especially, in developing countries cities have ignored this aspect, such that most persons with disabilities or physical challenges in many occasions have been suffering.

The overall objective which aims at evaluating the effect of land use planning on economic vulnerability to disaster management in low income neighbourhoods of Eldoret Urban Area with a view to determine the best urban land use planning strategies and policies to

minimize vulnerability exposure and built vulnerability resilience of low income urban residents in EUA.

Finally, the general conclusion was that urban land use planning has significant effects on economic vulnerability to disaster management in low income neighbourhoods of EUA. Therefore urban land use planning is a critical tool or technique in designing and developing urban areas where hazardous zones are mapped, demarcated and kept off from urban residents socioeconomic activities. It has also concluded that the application of land use planning regulation instruments appropriately in the urban spatial structures, for instance in the slum areas, informal settlements and pre-urban areas, would brought all these land forms into urban planning jurisdiction, hence would enable the urban residents residing in them to manage the disaster risks by adopting various land use regulatory strategies such as slum-upgrading, mixed-use development, development corridors, gentrification, special zoning, industrial/business parks, green space/agricultural conservation. These strategies together with other relevant land policies such land reforms would enable urban residents in low income neighbourhoods to build capacity and resilience to reduce disaster risks in their urban areas which would enhances their economic activities, hence better income, saving, consumption, employment opportunities and credit facilities.

8.7. Recommendations

Basing on the findings of the study, the following recommendations are hereby presented:

8.7.1 Recommendation one based on the specific objective one.

That, the national and county governments who are responsible to administer land use planning regulatory instruments should improve upon the implementations of land use regulatory instruments to enhance urban residents to built resilience and capacity to cope up with economic vulrability to disaster in Eldoret Urban Area. To re enforcing land use regulatory instruments by urban residents, the physical planning Act of 1996, building codes, public health Act as well as Environmental Management Act of 1999 should be applied by the cities/ urban centers administrination authority. It has also recommended that strategies such as mixed-use development, slum upgrading, gentrification, development corridors, land reforms candstre system, land tenure security all should be implemented by land use authorities to enhance urban residents' vulnerability resilience in EUA.

8.7.2 Recommendation two based on specific objective two.

The study recommends the application of land zoning, thus the urban residents be able to manage the economic vulnerability to disaster so that the settlements become safe and secure.Land use zoning policies should be re-enforce in terms of land tenure security and land reforms to improve on candstre system in the land. Land zoning would control sprawling of slums and informal settlements in EUA.

8.7.3. Recommendation three based on specific Objective three.

National/County governments should strictly enforce transit land use circulation & connectivity to ensure proper design,, compliance practices and maintainance of urban infrastructures.

Transit land circulation & connectivity provide for parking accommodations that result in increased separation of buildings and increased distance from street or sidewalk to building to provide spaces for cars. Since urban residents with sprawl, disconnected sidewalks, streets, poor sidewalk infrastructure, and making walking less feasible, inconvenient, and/or unsafe which, in turn, lead to lower rates of active transportation walking, biking, or taking public transit and limit opportunities for leisure-time physical activity. Circulation and connectivity supporting the economy and serving and influencing land use patterns in a positive way. Increase travel planning well designed, proportionately with anticipated urban population growth including support of sustainable growth and economic development, keeping pace with circulation system. This will provide automobile as primary mode of transportation, with alternatives such as pedestrians, public transit, bicycling, and walking. Hence it is recommended to pursue the use of connectivity and circulations to improve land use value capture.

8.8. Suggestions for Further Studies

The focus of this study was on the use of urban land, (land use planning), and its effects on economic vulnerability to disaster management in low income neighbourhoods of EUA, which the findings have indicated that the urban resident respondents lack knowledge, awareness yet there are various urban planning documents and instruments available with

the institutions concerned. Therefore, it is critical to pursue and carry out a longitudinal study to establish the level of implementation these frameworks by the relevant authorities have on economic vulnerability to disaster management on urban settlements particularly by the devolved county governments.

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APPENDICES

APPENDIX 1: HOUSEHOLD QUESTIONNAIRE

Dear Respondent,

I am a student of Masinde Muliro University of Science and Technology, pursuing a Ph.D. in Disaster Management and Sustainable Development. I am currently carrying out a study entitled: “THE EFFECT OF LAND USE PLANNING ON ECONOMIC VULNERABILITY TO DISASTER MANAGEMENT IN LOW INCOME NEIGHBOURHOODS OF ELDORET URBAN AREA, KENYA”. The data gathered will be treated with high confidentiality and is intended for academic purpose only. Your cooperation will be highly appreciated.

PART ONE: URBAN RESIDENTS BACKGROUND INFORMATION IN ELDORET URBAN AREA.

(Urban Residents in Langas area, Kapsoya, Kamukunji slum and Kapsaos area).

(QA).

CODE	STATEMENT	OPTIONS
A1	What is your gender?	1. Male () 2. Female ()
A2.	What is your marital status?	Single () 2. Married () 3. Widow () 4. Divorced () 5. Separated ()
A3.	What is your age?	1. Below 30years () 2. 31-40yrs. () 3.41-50 yrs () 4.51-60 yrs () 5. Above 61 yrs ()
A4.	What is your highest level of education?	Primary () 2.Secondary () 3. Diploma () 4. University Degree () 5. None ()
A5.	What is the size of your family?	1-4 () 2. 5-7 () 3. 8-10 () 4. 11-14 () 5.Over 15 children () 6. None ()
A6.	Who is the head of your family household?	Father () 2. Mother () 3. Child ()
A7.	Alternative Sources of Livelihood	Yes () 2. No
A8.	Monthly Income in KES	If you are renter, how much do you pay on monthly? 1. Less than ksh 5000 () 2. 6000 -10000 () 3. 11000-15,000 () 4. 16,000-20,000 () 5. Above 21,000 ()
A9.	Knowledge of Disaster Risk	Yes () No ()
A10.	Prior Exposure to a Disaster	Yes () No ()
11A.	Duration of Disaster, Days	≤ 7 () ≥ 7 ()

SECTION B: ECONOMIC VULNARABILITY TO DISASTER MANAGEMENT

Please use the following Likert Scale to respond to question B1. (*Strongly Disagree SD=1; Disagree Moderately dm=2; Disagree Slightly DS=3; Agree Slightly AS=4; Agree Moderately AM=5; and Agree Strongly AS=6*)

B1: Indicate the level of your agreement and disagreement with the statement that urban land use planning can influence these disaster risk management dimensions

Disaster management dimensions	SD	DM	DS	AS	AM	AS
UR Income (URI)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UR Employment (URE)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UR Investment and Financial Credit (URIFC)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Housing Quality and Quantity (HQQ)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Housing Mobility (HM)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B2: Please tick (√) even more than one choice on your awareness and/or knowledge of

disaster Risk Preparedness	<input type="checkbox"/>
Awareness	<input type="checkbox"/>
Training on disaster preparedness	<input type="checkbox"/>
Warning system in the household	<input type="checkbox"/>
Knowledge of disaster risk events	<input type="checkbox"/>
Prior Exposure to a Disaster Risk	<input type="checkbox"/>
Length of Disaster Risk, Days ≤7	<input type="checkbox"/>

B3: The kind of items of assets (in terms of number) that the household respondents own preparing them ready to face disaster events at any time. Please tick (√) only one option.

No items owned	<input type="checkbox"/>
1-6 items	<input type="checkbox"/>
7-10item	<input type="checkbox"/>
11 items	<input type="checkbox"/>

B4: Urban Residents Disaster Risk Handling Strategies

Type of Socio-economic Activity	<input type="checkbox"/>
Casual Worker	<input type="checkbox"/>
Hawkers	<input type="checkbox"/>
House-help	<input type="checkbox"/>
Retail Shop Operator	<input type="checkbox"/>
Public Sector Employee	<input type="checkbox"/>
Private Sector Employee	<input type="checkbox"/>

B5: Key challenges household experience

A state of being income poor	<input type="checkbox"/>
Lack of assets	<input type="checkbox"/>
Physical amenities and necessities	<input type="checkbox"/>
Deprivation	<input type="checkbox"/>
Vulnerability	<input type="checkbox"/>

Powerlessness	<input type="checkbox"/>
Physical weakness	<input type="checkbox"/>
Isolation and social Inferiority	<input type="checkbox"/>
Inaccessibility to land, a major means of production	<input type="checkbox"/>
Inaccessibility to financial Credit facilities and input	<input type="checkbox"/>
Poor socioeconomic service delivery	<input type="checkbox"/>
Lack of grassroots-based Institutions	<input type="checkbox"/>
Inadequate market and lack of employment opportunities	<input type="checkbox"/>
Theft	<input type="checkbox"/>

B6: Proportion of Sampled Urban Residents Income Spent on Food

Less than 20%	<input type="checkbox"/>
20-40%	<input type="checkbox"/>
40-60%	<input type="checkbox"/>
60-80	<input type="checkbox"/>
Above 80%	<input type="checkbox"/>

B7: Urban Residents Land Size Owned

< 1/8 hec.	<input type="checkbox"/>
1/4 hec.	<input type="checkbox"/>
1/2 hec.	<input type="checkbox"/>
1 hectare	<input type="checkbox"/>
Above 1 hec.	<input type="checkbox"/>
None Above	<input type="checkbox"/>

B8: Monthly Rent Payable by Urban Residents respondents

< Kshs.5000	<input type="checkbox"/>
6000-10000	<input type="checkbox"/>
11000-15,000	<input type="checkbox"/>
16,000-20,000	<input type="checkbox"/>
21000-Above	<input type="checkbox"/>
None Above	<input type="checkbox"/>

B9: Proportion of Urban Residents Income Spent on Food

Less than 20%	<input type="checkbox"/>
20-40%	<input type="checkbox"/>
40-60%	<input type="checkbox"/>
60-80%	<input type="checkbox"/>
Above 80%	<input type="checkbox"/>

B10. Sub-Location Proportion of Urban Residents Income Spent on Food

	Langas	Kapsoya	Kamkunji	Kapsaos
Less than 20%	[]	[]	[]	[]
20-40%	[]	[]	[]	[]
40-60%	[]	[]	[]	[]
60-80%	[]	[]	[]	[]
Above 80%	[]	[]	[]	[]

B11. Reason for occupation of the piece of land size (in B10)

Residential	[]
Commercial	[]
Industrial	[]
Community Influence	[]
Urban Agriculture	[]
None Above	[]

B12. Land Use Challenges Faced in by Urban Residents in the Neighbourhood

High Urban	[]
Land Price	[]
Eviction	[]
Inadequate socio-economic services	[]
Inadequate Green infrastructure	[]
Poor transport infrastructure	[]

B13. Type of Houses Owned by Urban Residents

Very good (iron sheet/tile roof, concrete wall, cement floor)	[]
Good (iron sheet roof, mud walls, cement floor)	[]
Average (iron sheet roof, mud walls, non-cement floor or thatched, brick wall)	[]
Poor (tined roof, mud walls, non-cement floor)	[]
Very poor (thatched roof, mud walls, non-cement floor)	[]

B14. Socio-Economic Characteristics of Urban Residents

	Langas	Kapsoya	Kamkunji	Kapsaos
Trading	[]	[]	[]	[]
Casual worker	[]	[]	[]	[]
House Helper	[]	[]	[]	[]
None above	[]	[]	[]	[]

B15. Main Sources of Income of Urban Residents

	Langas	Kapsoya	Kamkunji
	Kapsaos		
1.
2.
3.
4.
5.

B16. Proportion of Urban Residents Engaged in Different income Generating Sources

	Langas	Kapsoya	Kamkunji
	Kapsaos		
1.
2.
3.
4.
5.

B17. Urban Residents Experience of number of times Disasters occur

	Langas	Kapsoya	Kamkunji	Kapsaos
Very frequent	[]	[]	[]	[]
Frequent	[]	[]	[]	[]
Not frequent	[]	[]	[]	[]
Irregular	[]	[]	[]	[]

SECTION C: URBAN LAND USE PLANNING

C1. The importance of the urban land use planning in disaster management

Yes () No () Not Sure ()

C2. Knowledge of the dimensions of urban land use planning

	Langas	Kapsoya	Kamkunji
	Kapsaos		
Urban land use regulatory instruments []	[]	[]	[]
Urban land Use Zoning []	[]	[]	[]
Building Construction Restrictions []	[]	[]	[]
Circulation and Connection []	[]	[]	[]

C3. Influence of regulatory instruments of land use planning on economic vulnerability to disaster management

Floor Area Ratio and Height Limitations

Building and Construction Permits

Open and Green Space Protection

Agricultural Land Conservation

Construction and Building Standards

Enforcement of Property Rights

Right-of-Way Protection

C4. Regulatory Instruments Influence on household disaster risk management

Statement	SD	D	A	SA
Establishes an invaluable floor area ratio and height limitations that ensure buildings are constructed in a standard form and format in specific areas	()	()	()	()
Provides building and construction permits on approval for conformity and compliance control to the rules and laws	()	()	()	()
Ensure that open and green space protection is achieved and maintained	()	()	()	()
It ensures that agricultural land conservation is equitable and adequately provided	()	()	()	()
Have invaluable skills to maintain construction and building standards so that quality and quantity is maintained for particular zones	()	()	()	()
Represents enforcement of property rights	()	()	()	()
High level of right-of-way protection is Maintained	()	()	()	()

C5. Types of Land Use planning Zoning that the sampled households are aware of

	Langas	Kapsoya	Kamkunji	Kapsaos
Functional	[]	[]	[]	[]
Form Based	[]	[]	[]	[]
Intensity	[]	[]	[]	[]
Incentives	[]	[]	[]	[]

C6. Influence of Land Zoning on Household Disaster Risk Management

Statement	SD	D	A	SA
Functional zoning is important in dividing land into commercial areas useful in concentrating commercial activities in specific zones giving various support to the operators	()	()	()	()
Zoning of urban land use can influence creation of administrative areas useful in providing basic administrative services stabilizing security and safety of towns	()	()	()	()
Establishing specific residential zones is important to urban households in accessing residential services	()	()	()	()
This is able to create industrial zones that is critical in locating industries in specific areas for purposes of concentrating basic industrial services in one location	()	()	()	()

Creating a zone for greenspace is critical for future expansion, recreation	()	()	()	()
Establishing the downtown considered the CBD for commercial, and administrative functions of the inter and intra-governmental activities	()	()	()	()
Establishing zones for mixed use development popular with pedestrian friendly, most dense and is home to a diverse set of establishments including office buildings, residential towers, apartment complexes, retail centers, nightlife strips, and hotels	()	()	()	()
Creation of Estate Zones is useful for urban households to inhabit areas officially marked for human occupation	()	()	()	()
Establishing Intensity zones is important in determining the high, average, low, or no densities housing development	()	()	()	()
Setting aside zones for incentives or no incentives attract certain socioeconomic activities and enhanced control of Environmental management	()	()	()	()

C7. Various Elements of Building Construction restrictions

	Langas	Kapsoya	Kamkunji	
Kapsaos				
Buildings Siting and Space	[]	[]	[]	[]
Building Codes and Energy				
Traffic Calming	[]	[]	[]	[]
Utilities and Facilities	[]	[]	[]	[]
Lot Requirement	[]	[]	[]	[]
Building Materials	[]	[]	[]	[]
Height Restrictions	[]	[]	[]	[]

C8. Types of Connectivity and Circulation of land use planning that the sampled urban residents are aware of

	Langas	Kapsoya	Kamkunji	
Kapsaos				
Street Sections	[]	[]	[]	[]
Bicycle Accommodation	[]	[]	[]	[]
Transit Accommodation	[]	[]	[]	[]
Accessibility	[]	[]	[]	[]
Connectivity Index	[]	[]	[]	[]
Traffic Calming	[]	[]	[]	[]
Parking Standards and Design	[]	[]	[]	[]

ELDORET URBAN AREA

These refer to specific objective three.). (E). The following statements relate to the effect of land use planning strategies on economic vulnerability to disaster management among the low income neighbourhoods of Eldoret Urban Area. Using the rating given below, provide response. Strongly Agree (5), Agree (4), Undecided (3), 2. Disagree (), 1. Strongly Disagree (). (E).

CODE	STATEGEMENT	5	4	3	2	1
C9.	Zoning can be used as a powerful tool creating value by directing the location, type and scale of development hence enable households in Eldoret Urban Area neighborhood to avoid disaster prone areas.					
C10.	Incentive zoning provides developers with rewards in exchange for including certain public amenities or meeting other public objectives, hence to prove households with disaster risk free social housing in Eldoret Urban Area.					
C11.	Inclusionary zoning policies which require housing developers to include a certain percentage of affordable units in their projects is necessary to create mixed-income communities among the households' in your neighborhood to acquire social-economic services, hence avoid disaster risk.					
C12.	Natural hazard zoning is necessary to protect households from occupying disaster risks prone areas of river riparian, cliff areas, wetlands, land on electricity voltage, and land on oil pipelines in Eldoret Urban Area.					
C13.	Urban growth boundaries or green belt movement (greenbelt zone) are growth constraint of cities which limits urban growth, hence result on compact development and high density and allows households to enjoy high standard of living in EUA.					
C14.	Other regulatory instruments (Floor Area Ratio, height limits, building standards) are all necessary to control housing quantity & quality in Eldoret Urban Area, enabling households to avoid disaster risk of houses collapsing.					
C15.	Transfer of Development Rights (sell, purchase and donated) are all necessary to make urban serviced land available to households in Eldoret Urban Area to enable them avoid disaster fragile land.					
C16.	Transfer of Development Rights (TDR), land use instruments (i.e., donated, purchase and sale) are necessary to provide households with land to use for economic/investment activities and infrastructural development, hence enhances sustainable livelihood of households in Eldoret Urban Area.					
C17.	Land Value Capture instrument application by Eldoret Urban Authority makes funds and urban land available to provide households in your neighborhood in EUA with social housing in areas free from disaster risk.					
C18.	Land Value Capture instrument application by Eldoret Urban Authority makes funds and urban land available to provide households in your neighborhood with					

	infrastructure free from disaster risk.					
C19.	Land value capture is a public financing technique that “captures” a part or all of the increases in private land values that result from a new public investment, by imposing a tax on property or in-kind contribution, hence allow households to manage disaster risk in their neighbourhood in EUA.					
C20.	Land value Capture is “value creation” therefore happens when the introduction of infrastructure in a certain place results in land close to this infrastructure increasing in value. Thus enable households in the neighbourhood to manage the disaster risk of poverty by increasing their income, hence enjoy higher standard of living.					
C21.	The benefits of public transport are concentrated at nodes/interchanges where traffic exposure, their maximum levels .Households and private investors are attracted to locate their businesses at interchanges, to attracts the customers, hence households in the neighbourhood be able to manage disaster risk of promoting sustain livelihood.					
C22.	New residential and other land development needs to be supported by adequate provision of urban transport or transit infrastructure to enable households in EUA to manage disaster risk of pollution in their neighbourhood.					
C23.	Urban sprawl or fragmentation development is the physical expansion of the city built environment, which usually uses up surrounding rural areas. It is usually characterized by low density settlements and households often lack access to public infrastructure and socio-economic services in Eldoret Urban Area.					
C24.	Land regulation instruments LVC- (fees, land tax) are generally significant to influence urban development in Eldoret Urban Area hence, result in monocentric growth and enable households to manage disaster risk.					
C26.	New residential other development should be supported with adequate provision of socio-economic services to enable households in Eldoret Urban Area to manage disaster risk in their neighborhood.					
C27.	New residential other development should be supported with adequate provision of green infrastructure to enable households in Eldoret Urban Area to manage disaster risk of waste product in their neighborhood.					
C28.	Redevelopment land use planning instrument is mainly required to develop CBD , suburban areas, slum areas and informal settlements, hence enable households in Eldoret Urban Area to manage disaster risk in their neighborhood.					
C29.	Land use planning instruments building height limits and building standard constraint are both necessary to enable households to manage risk of housing quality and standard in Eldoret Urban Area.					

SECTION D: - FOCUS GROUP DISCUSSION – UNSTRUCTURED INTERVIEW

Respondents are generally ten (10) participants selected by purpose sampling technique at Kapsoya, Kamukunji. Langas and Kapsaos, after administering the households’ questionnaires. (At least 10 respondents from the study area need to be residents of the area selected at random, but the selection must include, 1, Ward Administration, 2 business persons, 2 women leaders, 2 youth leaders , 1 opinion leader and 2 spiritual leaders.).

S/NO.	CATEGORIES OF RESPONDENTS TO BE INTERVIEWED	NO.
1.	Ward administrator	
2.	Business leaders	
3.	Women leaders	
4.	Youth leaders	
5.	Opinion leaders/spiritual leaders	
CODE	QUESTIONS	
D1.	<p>GENERAL QUESTIONS</p> <p>What is the status of your tenure security in terms of titling in your neighborhood?</p> <p>How do you comment on urban land accessibility and affordability in your neighborhood?</p> <p>In your view, do think the availability of urban land would enable urban residents in Eldoret Urban Area to manage disaster risk hazards in your neighborhoods?</p> <p>Are socio-economic services (i.e. water, electricity,) available in your neighborhood?</p> <p>Comment on the availability of green infrastructure (i.e. sanitation, sewage, drainage) development on your neighborhood?</p> <p>What types of land use planning instruments (i.e. zoning, TDRs, Re-adjustment, LVC, Inclusionary housing etc) have been applied by the Eldoret Urban Authority in your neighborhood?</p> <p>Are areas in your neighborhood commonly exposed to disaster hazard risk?</p> <p>SPECIFIC QUESTIONS</p> <p>A2. GENDER (WOMEN)</p> <p>D2 Comment on challenges women headed households’ faces in accessing an affordable serviced urban land in your neighborhood?</p> <p>Do you think by applying land use planning in your neighborhood shall sort out these challenges?</p> <p>A3. BUSINESS PERSONS</p> <p>How easy is it to acquire business premises or land in your neighborhood?</p> <p>Comment on the availability and affordability of business space or land in your neighborhood?</p> <p>D3.</p> <p>A4. YOUTH GROUP</p> <p>How is it easy for youth groups to access serviced urban land to conduct their business in your neighborhood?</p> <p>Comment on the availability and affordability of open spaces for cultural and</p>	

D4.	<p>sporting activities in your neighborhood?</p> <p>A5. RELIGIOUS GROUP</p> <p>How does the land use planning as implemented in Eldoret Urban Authority, assist religious organizations to access serviced land in your neighborhood?</p>
D5.	<p>OPINION LEADERS</p> <p>In your view do you think that land use planning is likely to enable Eldoret Urban Authority improve land tenure security in your neighborhood?</p> <p>Comment on urban land administration and management especially land cadastre system and land registration in your neighbourhood?</p>

SECTION E: KEY INFORMANTS STRUCTURED INTERVIEW

(Chiefs; Physical Planners; Sub-County administrators, Ministry of Land Officers).

Chiefs- 4, Physical Planner – 1, County land director – 1, Sub-county administrators – 4.

S/NO.	CATEGORIES OF RESPONDENTS TO BE INTERVIEWED.	NO.
1.	County Director of Lands and Planning	
2.	County Head of Physical Planning	
3.	Sub- County Administrator (
4.	County Land Surveyor	
5.	County Land Registrar	
6.	County Land cadastre/ Land Officer.	
7.	Chiefs from each area of study (Langas, Kamukuji, Kapsoya and Kapsaos).	
8.	TOTAL	
CODE	QUESTIONS	
E1.	<p>CHIEFS OF LANGAS, KAPSOYA, KAMUKUNJI, AND KAPSAOS.</p> <p>Comment on Land tenure security in your neighborhood?</p> <p>What do you attributes to the development of slums and informal settlements in your neighborhood?</p> <p>Comment on peri-urban development in your neighborhood?</p> <p>Outline how you have been dealing with land conflicts and disputes in your area?</p> <p>Are areas of your neighborhoods commonly exposed to disaster hazard risks?</p> <p>f) What type of disaster risks are faced by households in your neighborhood as a result of the development of slums, informal settlements and peri-urban development's?. (Floods, Fire, Mudslide, Building collapsing and extra).</p> <p>g) Comment on how land use planning enables Eldoret Urban Authority to reduce or overcome disaster risk among the households in your neighborhoods?</p> <p>h) As land administrator, how have you been able to deal with gender matters with regard to NEW Kenyan constitution?</p> <p>i) Outline the Land use administrative and management challenges in Eldoret Urban Area?</p> <p>i) Comment on the Eldoret Urban Area, management in terms of responding to space accessibility availability, housing issues, employment opportunities, environmental issues and household's disaster risk management?</p> <p>SUB-COUNTY ADMINISTRATOR</p> <p>What is the status of land tenure security in Eldoret Urban Area?</p> <p>How does the Eldoret Urban Area Authority deals with small scale business persons with regard to space need in Eldoret Urban Area?</p> <p>Has the EUA authority used Temporary Occupation Certificate to allocate business space to households or small scale business persons in Eldoret Urban Area?</p>	
E2.	<p>What do you contributes to the rapid expansion of Eldoret Urban Area`s growth?</p> <p>Comment on the challenges of Eldoret Urban Area Authority in implementing the</p>	

<p>E3.</p>	<p>land use planning instruments to evade disaster risks such as collapsing of buildings, (building codes/standards), floods, fire, mudslides etc.). Outline how you have been dealing with land disputes or conflicts within Eldoret Urban Area?. Comment on policies and strategies that should be adapted or formulated to guide land use planning in order to enable the Eldoret Urban Area deal with disaster risk?</p> <p>COUNTY LAND REGISTRAR/LAND OFFICER OF UASIN GISHU. Comment on land information system of Eldoret Municipality? . What are the challenges of land cadastre system within Eldoret Municipal? Comment on land tenure security in Kamukunji, Kapsoya, Kapsaos and Langas within Eldoret Municipality? Are the households in the above mentioned areas been able to register their land?. What are the challenges faced by households in these areas?. Comment on the cost of land registration within Eldoret Municipality? Comment on urban land accessibility and affordability in the above four areas? What are the challenges in terms of disaster hazard risks, gender issues, and vulnerable households? What type of urban land spatial structure elements are evidenced within Eldoret Municipality? (i.e., open space, densification, sprawl, compactness, urban development corridor, nodes, line, population density pattern, daily population transit by day, building forms extra). What do attributes to rapid growth of Eldoret Municipality? How do you classify the building forms present within Eldoret Municipality? Comment on specific urban land use instruments which has been used to manage and administrate urban land within Eldoret Municipality? . How do you relate urban land use planning and households disaster hazard risk management within Eldoret Municipality?. Comment on land policy and institutions guiding urban land management and administration within Eldoret Municipality? . Comment on the various land reforms and laws which has been enacted together with the new constitution in Kenya since 2010?</p>
<p>E4.</p>	<p>PHYSICAL PLANNER/DIRECTOR OF LANDS AND PLANNING. Comment on urban land spatial structure in Eldoret Urban Area? In terms of: - urban sprawl, compactness, population density, land use patterns, movement around the city during the day, fragmentation of open spaces and infrastructural development. Does land use planning influence the urban spatial structure of Eldoret Urban Area? Are there possibility of development activities taking place outside the Eldoret Urban Area? Is Eldoret Urban Area an inclusive city, in terms of space accessibility& availability, housing issues, employment, infrastructural development, environmental management and disaster risk management? Is it true that urban land use planning instruments- zoning, transfer of development rights (TDR), land value capture (LVC), and inclusionary housing (IH) HAVE BEEN PUT INTO USE IN Eldoret Urban Area? If yes, comment on each of them? Are areas within Eldoret Urban Area, commonly exposed to disaster hazard risks? Comment on whether the disaster risk (i.e., flooding, fire, mudslide, eviction, building collapsing etc.) are common in your neighborhood? Comment on gender mainstreaming with regard to land administration and management in Eldoret Urban Area?. -Women heading households, - urban land accessibility and affordability to women - Constitutions requirements and land reforms in Kenya with regards to women.</p>

	<p>h). Does the Eldoret Urban Authority have the following documents (master plan; spatial plan; strategic plan; and sectoral plan) to guide her urban land use management and administration?. And how frequent do they formulate them?</p> <p>i) If so how does the EUA, have been able to incorporate urban risk assessment in those documents so as to ensure disaster risk reduction?.</p> <p>g) Does Eldoret Urban Area generally, generate or develop a separate Land use Plans different from the rest (i.e., Master Plan, Strategic Plan, Spatial Plan, Integrated Plan or Sectoral Plan)?.</p> <p>h) Does the Eldoret Urban Area authority has a vision guiding the Strategic Plan which in turn shall enable them achieve the land use planning objectives of efficiency, equity and sustainability?.</p> <p>h) What kind of strategies and policies can be adapted by Eldoret Urban Area Authority to enable households to manage disaster risk in their neighborhood?</p> <ul style="list-style-type: none"> - to enhancing households income, saving, investment and employment. - improve households housing and housing environment. -providing services and infrastructure to households in EUA. -Enforcing urban land use regulations- building standard, FAR,. -improved land information system and cadastre system - improving households urban land tenure security. <p>i) Comment on slums/informal settlements upgrading as households disaster risk management strategy in Eldoret Urban Area?</p>

APPENDIX 2: INTERVIEW PROTOCOL

(Land use planning and households disaster risk management in Eldoret Urban Area, Kenya)

- 1. Date of interview-----
- 2. Time of interview-----
- 3. Place of interview-----
- 4. Interviewer-----
- 5. Interviewee-----
- 6. Position of interviewee-----
- 7. Briefly describe the project:- The project is based on the above research topic, which is a PhD study.

- 1. Questions: - Are attached.
- 2. Researcher: - Dedan Oriewo Ong`anya

Reg. No. CDS/H/10/09

Center for Disaster Management and Humanitarian Assistance

Masinde Muliro University of Science and Technology

APPENDIX 3: RESEARCH PERMITS



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

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NAIROBI-KENYA

Ref: No. **NACOSTI/P/16/17803/14519**

Date:

6th December, 2016

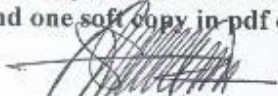
Dedan Oriewo Onganya
Masinde Muliro University of
Science and Technology
P.O. Box 190-50100
KAKAMEGA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Land use planning and household disaster risk management in Eldoret Urban Area, Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Uasin Gishu County** for the period ending **5th December, 2017.**

You are advised to report to **the County Commissioner and the County Director of Education, Uasin Gishu County,** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Uasin Gishu County.

The County Director of Education
Uasin Gishu County.

National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified

**COUNTY COMMISSIONER
UASIN GISHU COUNTY**


6/11/17

REPUBLIC OF KENYA



MINISTRY OF EDUCATION
STATE DEPARTMENT OF BASIC EDUCATION

Telegrams: "EDUCATION", Eldoret
Telephone: 053-2063342 or 2031421/2
Mobile : 0719 12 72 12/0732 260 280
Email: cdeuasingishucounty@yahoo.com
: cdeuasingishucounty@gmail.com

Office of The County Director of Education,
Uasin Gishu County,
P.O. Box 9843-30100,
ELDORET.

When replying please quote:

Ref: No. **MOEST/UGC/TRN/9/284**

6th January 2017

Dedan Oriewo Onganya
Masinde Muliro University of Science and Technology
P.O Box 190- 50100
KAKAMEGA.


RE: RESEARCH AUTHORIZATION

This office has received your request for authority to carry out research on "Land use planning and household disaster risk management in Eldoret Urban Area, Kenya", Within Uasin Gishu county.

We wish to inform you that your request has been granted for a period ending 5th December , 2017.

The authorities concerned are therefore requested to give you maximum support.

We take this opportunity to wish you well during this research.


Otieno C.O

FOR COUNTY DIRECTOR OF EDUCATION
UASIN GISHU COUNTY
P.O. Box 9843, ELDORET
Tel: 0719-127 212/ 053-2063342

For: COUNTY DIRECTOR OF EDUCATION
UASIN GISHU COUNTY





MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

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P.O Box 190
Kakamega – 50100
Kenya

Office of the Dean (School of Graduate Studies)

Ref: MMU/COR: 509079

Date: 19th October 2016

Dedan Oriewo Ong'anya
CDS/H/10/09
P.O. Box 190-50100
KAKAMEGA

Dear Mr. Oriewo

RE: APPROVAL OF PROPOSAL

Following communication from the Departmental Graduate Studies Committee and the Faculty Graduate Studies Committee, I am pleased to inform you that the Board of the School of Graduate Studies meeting held on 4th August, 2016 considered and approved your Doctor of Philosophy proposal entitled: *'Land use Planning and Household Disaster Risk Management in Eldoret Urban Area, Kenya'* and appointed the following as supervisors:

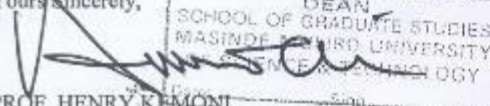
1. Prof. Samuel S. China - Department of Disaster Management and Sustainable Development
2. Prof. Jacob Wakhungu - Department of Disaster Management and Sustainable Development

You are required to submit through your supervisor(s) progress reports every three months to the Dean SGS. Such reports should be copied to the following: Chairman, Centre of Disaster Management and Humanitarian Assistance Graduate Studies Committee and Chairman, Disaster Management and Sustainable Development. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of three years from the date of registration to complete your PhD thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,


DEAN
SCHOOL OF GRADUATE STUDIES
MASINDE MULIRO UNIVERSITY
OF SCIENCE AND TECHNOLOGY
Prof. Henry Kemoni
EXECUTIVE DEAN, SCHOOL OF GRADUATE STUDIES