FACTORS INFLUENCING URBAN AGRICULTURE PERFORMANCE IN
MATHARE SUB-COUNTY, NAIROBI CITY COUNTY, KENYA

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A Research Project Report Submitted in Partial Fulfillment of the Requirement for
the Award of Degree in Master of Arts in Project Planning and Management of the
University of Nairobi

2018
DECLARATION

I hereby declare that this project is my original work and has not been presented for a degree at any other university.

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L50/63652/2010

This research project has been submitted for examination with my approval as the candidate’s University Supervisor.

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DEDICATION

I dedicate this research project to my family especially my parents and wife for their support and encouragement.
ACKNOWLEDGEMENT

First and foremost, I thank the Almighty God for His love and kindness that have seen me through to this level of education against many odds. I also thank the University of Nairobi for providing an enabling environment for me to gain more academic skills and knowledge and expand my professional expertise and networks.

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I thank the various student colleagues whom we have interacted and supported each other over my extended period of study. My family members, close friends and work colleagues through whose support and encouragement I have made it this far I truly appreciate and remain indebted to.

May the Almighty God bless you all.
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## ABBREVIATIONS AND ACRONYMS

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<tr>
<td>ASDS</td>
<td>Agricultural Sector Development Strategy</td>
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<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agriculture Research</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>KARI</td>
<td>Kenya Agricultural Research Institute</td>
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<td>UA</td>
<td>Urban Agriculture.</td>
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<td>KNBS</td>
<td>Kenya National Bureau of Statistics</td>
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<td>SL</td>
<td>Sustainable Livelihoods</td>
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ABSTRACT

The main aim of the research study was to investigate the factors affecting urban agriculture performance in county of Nairobi. The objectives include: To establish the impact of urban planning on urban agriculture performance; to determine the role gender plays in urban agriculture performance; to explore the link between food security and urban agriculture performance and to determine the influence of income on urban agriculture. The study draws upon the Innovation-Diffusion and Sustainable Livelihood Theories and will employ a descriptive survey research design. It will utilize the simple random sampling method and use a household survey, semi-structured interviews, and key informants to collect data. The target population was 5000 farmers who head their respective family units; hence by utilization of Krejcie and Morgan's technique the sample size was derived to be 357 respondents. Essential information was gathered by methods of semi-structured questionnaires. A pilot test was directed with the end goal to test the legitimacy of the questionnaires and Expert conclusions help to set up content legitimacy. The examination yielded both quantitative and qualitative information. The qualitative information gathered was assessed through content analysis. Quantitative information was assessed through descriptive statistics with the assistance of SPSS. The results were exhibited utilizing tables, frequencies and rates. The study established that no land use regulations in Mathare Sub-County are in place, and there are no legislations and policies encouraging or inhibiting urban agriculture. It was also found that Mathare Sub-County households have no access to sufficient and nutritious foods supply and households have unreliable food supply. In addition, women have equal access rights to urban farm space as men and more women practice urban agriculture to produce food for the family than for sale as compared to men. The study concludes that the rising food insecurity has had an increase in urban agricultural practices in Mathare Sub-County. Also, it was inferred that urban farming can profit on the off chance that it is joined in the urban organic waste management, and available salary openings and an unsatisfied interest for farm items in both amount and quality bring out a major challenge to urban agriculture. The investigation suggests that the legislature ought to be at the forefront in enabling urban inhabitants appreciate the advantages of an urban green space, making social systems to plan, execute and keep up the urban green space and make a procedure of strategy to adjust the requirements of those living in urban zones with the necessities of the bigger ecological concerns.
CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The practice of urban agribusiness can be characterized as the art of producing food crops and non-food items, for example, flowers, and raising domesticated animals inside and around urban settings. Agriculture in urban areas is a sector situated inside or at the border of a city that produces and distributes an assorted variety of non-food and food items, re-utilizing to a great extent human capital and materials, services and products within and around the region (Smit, 2010). Smit further contends that the most unique component of urban agriculture, that distinguishes it from agricultural practices in rural areas, is its incorporation to the environmental and financial urban systems.

Urban agriculture is critical around the world. In the UK, for example, individual urban home gardens represent a significant portion of the aggregate surface of a city, involving in excess of multiple times the region of protected reserves that are natural (Lwenya, 2012). The UK is the nation with the most noteworthy number of private gardens per capita of any country in Europe (Machinga, 2000) however just 20% of garden proprietors produced crops in 1996 contrasted with 35% ten years sooner, with grass and flowers being the dominant (IFPRI, 2000). In this way, it very well may be contended that a much potential of production of food items lies in family unit gardens.

In contrast to the UK, Cuba and Brazil have additionally grasped urban agriculture. Cuba has demonstrated that urban farming can possibly battle real sustenance security issues with minimal extra assets and fitting approach (Mlambo, 2011). In Brazil, neediness pushes individuals to search for confident alternatives and, for this situation, urban
farming turns into an imperative choice. The basic prerequisite, as indicated by Mlambo (2011), is to encourage appropriate urban improvement plan which can permit the act of agriculture in urban areas.

The African mainland has progressively grasped urban agriculture regularly joining it to security of food and greening urban areas. South Africa offers a decent case. Here, there is an expansion in the quantity of the poor in urban territories practicing urban agriculture with the objective of expanding food security (Dornbusch and Samuelson, 2010). The expansion has not been without difficulties. For instance, formal employment opportunities frequently fail to keep pace with increase in urban population and this result in people turning to urban agriculture to meet their food requirements (Dornbusch and Samuelson, 2010). Formal service provision from urban planning has not facilitated the practice of urban agriculture. Urban farming is seen as one such an opportunity not adequately actuated in strategies of developing the urban areas.

In East Africa, Lee-Smith (2013), demonstrates that Dar-es-Salam (Tanzania) creates 90% of the city's green vegetables and somewhere around 60% of its milk by means of urban agriculture. Additionally, research directed inside East and Central Africa demonstrated that among the families included, all consumed a larger number of foodstuffs than they sold, which proposes urban farming gives food security as well as limits expenditure related to food.

Agriculture is important for Kenya's general monetary and social improvement. Agriculture straightforwardly amounts to 24% to Kenya's GDP and 60% of the export earnings. The agricultural sector has encountered development from 2002 onwards following 10 years drop. The Kenyan government has sketched out, in its Vision 2030 the
key job the Agriculture sector will undertake under the economic pillar and the ASDS 2009-2020, both of which aim to improve the standards of life of Kenyans by reducing the numbers of those living below poverty line.

As of not long ago, agriculture was viewed as an activity exclusive to rural areas. However, this has changed because of the fast increment in urban populations particularly in the developing nations basically because of rural-urban migration. Urban farming is on the rise on the grounds that as the vast majority relocate from the rural zones they carry with them indigenous learning on domesticated animals keeping and production of crops to the urban territories. East Africa has the one of the most astounding rate of urbanization in Africa at 4.5% annually (UNEP, 2002). Nairobi possesses an urbanization rate of 3.8% with an urban population of 3.1m individuals (KNBS, 2010). This has caused a fast increase in urban poverty and uncertainty in production of food in urban areas (Mougeot, 2005).

Production of food in the city is for the most part a reaction of the urban poor to deficient, undependable and unpredictable food access, and the absence of power in purchasing (Foeken and Mwangi, 2009). Urban farming likewise adds to advancement of local economies, and alleviation of poverty. Urban agriculturists originate from all groups of income, yet dominated by the poor. For the urban poor, urban farming is a survival procedure. Urban agriculture contributes to food security and healthy nutrition, helps in managing the urban systems and in micro-climate improvement, allows savings in transportation costs, storage, and in production losses. It additionally enables mushrooming of related small scale enterprises.
With the assistance of adaptable, versatile approaches, urban agriculture can be an impetus for societies by giving access to quality food, changing deserted lands into flourishing society spaces, sharing social customs crosswise over generations, and advancing truly necessary income opportunities (Foeken and Mwangi, 2009). The seeds of progress are flourishing, and with policymakers, advocates, and different partners working together, urban cultivating can spread and prosper in much more societies in Kenya.

1.1.1 Urban Agriculture

Urban agriculture has environmental and economic benefits to an urban setting. It can transform urban wastes into a profitable asset through fertilizer creation, vermiculture, and irrigation with wastewater (Veeinhuizen, 2011). It decreases environmental change by counteracting overheating of urban conditions because of the making of urban warmth island. Urban farming allows stability and diversity in economy, and limits expenses of disposal of waste. Proof has demonstrated that with appropriate management and planning, urban agriculture can really be an extremely successful and safe method for food production (Lock and Veenhuizen, 2011).

Urban agriculture is connected to nature at a few dimensions. It requests assets, which might be rare, for example, treated local water supply. This may prompt serious water resources clashes in the urban zones and/or the utilization of risky water for irrigation. Because not all urban farmers have access to suitable land for cultivation, some may resort to farming on unsafe lands with serious implications to health necessitating need to protect public health from such practices (Lock and Veenhuizen, 2011). Growing crops
near to their market of consumption can result in huge savings, by lessening expenses on use of refrigeration, transport and storage.

In Kenya, urban agriculture goes back to 1899 when the railroad laborers drawn from India began the practice in the territory towns (Mireri et al., 2007). At this time, urban agriculture was confined and restricted since the colonial government enforced strong urban planning regulations, but after independence urban agriculture expanded quickly with increasing urban population in spite of the prohibitive controls. Urban farmers originate from all social classes; however the poor seem to dominate. Most of the poor urban households switch to urban agriculture as a source of livelihood and to enhance their diet (Mbiba, 2010). While urban planners and administrators leave open spaces assigned for future improvement, the urban poor view such land as idle land, an underutilized rare asset, which could be put into prompt use through such exercises as farming (Mbiba, 2010). Almost 13.9% of Nairobi land is under agricultural practices. By the late 1990’s almost 30% of the households in Nairobi were engaged with urban farming (Foeken and Mwangi, 2009). As per Urban Harvest (2004) 33% of urban inhabitants in Kenya grow their own food crops and raise domesticated animals. More than 80-85% of the urban farmers are ladies. Urban agriculture is relentlessly turning into an optional fulltime engagement in the city (Foeken and Mwangi, 2009). It happens in terraces, along roadsides, waterways and railroads, in parks and land reserves

The growth of urban agriculture since the late 1970s is largely understood as a response to escalating poverty and rising food prices or shortages.. For instance, urban poverty in Nairobi in the mid-1970s was small: just 2.9% of the family units in Nairobi lived below poverty line (Smit, 2010). Things changed in the 1990s, because of three, interrelated,
conditions; quick population growth from both natural increase and rural-urban migration, the on-going financial recession; slow economic growth since 1980; and the impacts of structural adjustment policies put in place all happenings that made life undeniably costly for Kenyans and for the poor specifically. This led to marginalization of the vulnerable groups such as women headed households, with urban farming coming in handy to assist such cases.

Nairobi has an urban population of 3.1 million persons (KNBS, 2010) characterized by high unemployment. A good portion of the urban poor not only cannot afford shelter but also a decent meal in a day (UN-Habitat, 2004). As per urban harvest (2004), 33% of Kenyan urban occupants are engaged in urban agriculture.

Urban agriculture is a lawful practice in Kenya yet most urban inhabitants assumes it’s illegal. Kenya's Physical Planning Act approves the County government to rent, exchange or allot land for temporal use (sec 144), while sec 144c forbids farming by unapproved persons on land that is not occupied or enclosed to private persons, governments and local authorities. The Physical Planning Act (Sec 16) then again does not recognize urban farming as urban land utilization (Bryld, 2012).

In Nairobi, the populations of the poor in low income residential areas are the most actively engaged in urban farming. Susceptible groups, for example, female– headed family units, youngsters, resigned individuals, widows, and individuals with restricted formal training are especially associated with urban farming. Nairobi encountered a move from rain sustained agriculture to water fed farming from year 2000-2009, yet contemporary ecological changes keep on quickening water deficiencies (Maingi, 2010).
1.2 Statement of the Problem

Urban agriculture can possibly assume a critical role in national development by contributing towards food security, creation of jobs, and generation of income and conservation of environment. As of now the development of urban agriculture around urban communities has been connected to developing poverty, unemployment, expanding interest for food, nearness to markets, labour that is cheap, and assets, for example, urban organic wastes and wastewater (Lee-Smit, 2010). Numerous family units in Nairobi are confronting a genuine decrease in their purchasing power and poverty levels are on the ascent (Harvoka, 2009). In Nairobi City urban farming is a critical form of land utilization. The research has chosen Mathare sub-county in light of the fact that many families in the area are confronting a genuine decrease in their purchasing power and poverty levels are on the rise. The poorer the family unit the more they are likely to rely on farming to enhance their livelihood.

Hagey (2010) focused on developing urban agriculture and discovered that in some low-income societies, the main spots to purchase food are convenience and fast food stores that offer greasy, sugary, prepared food items. Nyambura (2010), researched the status of urban agriculture and its consequences on policy reforms in urban land use in Nairobi. Githungunyi (2014), completed an appraisal of the commitment of urban agriculture to family units' jobs in Roysambu Ward, Nairobi County and discovered that the pattern of UA in Nairobi County demonstrated a decrease of 28% of the area under forest and farms contrasted with an expansion of 35% of the area under developed zones in the course of the most recent 20 years. This demonstrates all farming territories in the County will before long be taken up by the developed zones.
Urban farming in Nairobi has pulled in extensive consideration over the most recent couple of decades. A few examinations, as talked about above, have focused on developing urban agribusiness by low-salary networks, others have concentrated on elements affecting food security of urban farming practitioners. Additionally, a few researchers have taken a look at urban agriculture and its input for changes in policies.

With its regularly expanding population, constrained job opportunities and high inflation, with high costs for food stuffs being one of the biggest facilitators, Nairobi County has not used the extensive potential in urban farming. Lee-Smith (2010) is of the opinion that urban farming can adequately address the daily food requirements and demands of the majority of households in the urban areas. This can assume a significant role in enhancing the dietary need of most families, cut costs on purchasing of food and guarantee individuals access to food items that are healthy. This study therefore seeks to look at the factors influencing urban agriculture performance in Nairobi County in both contexts of those that have assisted and continue to assist in its growth and adoption by the county dwellers as well as those determinants inhibiting the great potential that lies in this practice.

1.3 Purpose of the Study

The purpose of this study was to establish the factors influencing urban agriculture performance in Mathare sub-county, Nairobi County.

1.4 Research Objectives

The study was guided by the following objectives-:
i. To establish how urban planning influence urban agriculture performance in Mathare Sub County;

ii. To examine how food security influence urban agriculture performance in Mathare Sub County;

iii. To establish how income factor, influence urban agriculture performance in Mathare Sub County; and

iv. To explore how gender factor, influence urban agriculture performance in Mathare Sub County;

1.5 Research Questions

The study sought to answer the following research questions: -

i. How does urban planning influence urban agriculture performance in Mathare Sub County?

ii. What is the influence of food security in determining urban agriculture performance in Mathare Sub County?

iii. What role do income factor play in determining urban agriculture performance in Mathare Sub County?

iv. How does the gender factor determine urban agriculture performance in Mathare Sub County?

1.6 Significance of the Study

As discussed, urban agriculture is growing as populations increase. By 2030, almost half of the population of Kenya will be residing in the urban environments and it remains to
be seen how urban agriculture will play out in highly populated settings already receiving massive infrastructure developments (e.g. expansion of road networks). Urban planning then becomes a critical area of concern in the hope of creating sustainable cities of the future. This study therefore hopes to contribute knowledge needed for urban planning. It is the belief that the findings increased awareness of the potential and constraints inherent in agricultural practices in urban areas and not only in Nairobi but across other cities and towns as well.

The study also sought to inform policy on the development of urban agriculture, and to assist stakeholders, financiers, entrepreneurs and investors in formulating and planning areas of intervention and support. Furthermore, it is the hope that findings of the study informed farmers on the weaknesses and strengths of the existing activities of agriculture in urban areas. The study also contributed to the existing literature. For academicians and researchers, they can do an in-depth investigation on the extent of the effect of agricultural practices in urban areas on the residents’ poverty rate in Kenya.

1.7 Limitations of the Study

The study comprised of households from Mathare slums in Nairobi County in Kenya who engage in urban agriculture, this limited the study in such a way that the results may not be representative to other urban centres in the country. The study faced limited research time that limited a comprehensive assessment into the nature and practice of agriculture in urban areas. The researcher worked extra time to ensure the task is complete on time. The study was unable to look into the details of the quantities of food produced or livestock reared across time to be able to have an objective analysis of the function of agricultural practices in urban areas in food security discourses. The study involved
relevant authorities and stakeholders related to agriculture and food security and gather information from them.

1.8 Delimitations of the Study

This study targeted households within Nairobi who practice urban agriculture. This facilitated faster, easier and accurate identification of the study population. Data was specifically collected from the households practicing urban agriculture in Nairobi County. The aim was to collect accurate data from the respondents with a view to establish factors influencing urban agriculture performance in Nairobi City County.

1.9 Assumptions of the Study

The assumption made by the study is that the respondents were cooperative, honest and provided reliable responses. The researcher assumed that the sample population is a representative of the general population. The researcher also assumed that respondents were aware of determinants of urban agriculture in Nairobi and that they were not barred by their contractual agreement to talk on the topic of study in a way that affected them. It also assumed that the respondents were honest in their reporting and in answering the research instruments.

1.10 Definition of Significant Terms

Food security- is a condition related to the supply of adequate, reliable and safe food, and individuals' access to it.

Gender – it’s the social ascription of being male or female. For this study we shall define it as the state of being male or female and carrying out urban agriculture
**Household** - A household consists of one or more people who live in the same dwelling and also share at meals or living accommodation and may consist of a single family or some other grouping of people. In the context of the study, a household may not necessarily include persons who are related by blood or marriage, but the definition is broad to include friendship acquaintances among others.

**Income** - is money that an individual receives in exchange or for selling products from the urban agriculture

**Livelihood**- A livelihood is a means of making a living. It encompasses people’s capabilities, assets, income and activities required to secure the necessities of life

**Urban Agriculture**: is the practice of cultivating, processing, and distributing food in or around a village, town, or city

**Urban Planning** - is a technical and political process concerned with the development and use of land, protection and use of the environment, public welfare, and the design of the urban environment, including air, water, and the infrastructure passing into and out of urban areas such as transportation and communications

**1.11 Organization of the Study**

The research is separated into five parts. Section one of the examination contains introduction, giving a foundation of the investigation while putting the subject of concentrate in context. It gives the problem statement and goals of the study, impediments, delimitations, study of the assumption and the study significance. Section two explains the theories anchoring the investigation. It audits the literature on variables
impacting urban horticulture execution. Part three comprises of research procedure which is utilized in the examination. It covers design, study populous, procedures of sampling, methods of gathering data, procedures of the research, methods of analysing the data and ethical considerations. Part Four comprises of analysis of the data, presentation and findings interpretation. Part Five comprises of summary, conclusion and recommendation of the research.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, the study will highlight some studies that relate to the factors influencing urban agriculture performance in Nairobi City County. The main sections covered in this chapter include; factors influencing urban agriculture performance, theoretical framework, conceptual frame work, and brief literature review and research gaps.

2.2 Urban Agriculture Performance

Urban Agriculture is rising emphatically in Sub-Saharan Africa, where the quickest urban development will happen in nations slightest prepared to sustain their urban areas (Mbaye and Moustier, 2012). The fundamental determinants or preconditions, which are basic for the thought of urban farming as a survival procedure, must be met to enable agriculture to be implemented. These include: urban planning, food security, income and gender factor.

As indicated by Garrett (2010), urban agriculture adds to local financial improvement. It is more than simply food related: it gives agrarian and also non-agricultural business opportunities. In the last classification it is the commercialization of urban agriculture items. Urban production of food has preference contrasted with rural farming since it is found near customers waiting to purchase the produces. Besides, fast food items and drinks sold on food sheds represent an option for the advertising of urban agricultural products. Urban agriculture assumes a role in enhancing the urban weather condition. Urban production of food items also addresses non-nutritious requirements of the urban population, for example, maintaining a cool environment and natural green beauty in the
midst of concrete jungle. It adds to the greening of the city by keeping up green open spaces and upgrading vegetation cover therefore lessening the urban areas carbon dioxide impression. It might likewise be a wellspring of advancement and finding out about new techniques/advances for land and water-proficient food production which frequently incorporate the beneficial reusing of urban waste. In addition, urban farming only from time to time makes utilization of synthetic composites or pesticides due to the peril to wellbeing these items involve, particularly in thickly populated regions.

Families are regularly encouraged by Urban farming technique due to the security and supportability of access to food, and its potential commitment in meeting other family unit essential needs. Undoubtedly, local home production of food provides urban farmers with another source of additional income. As indicated by Ayaga (2013), the productive space may encounter regular varieties but by and large, it yields more income for urban farmers as they have the possibility of marketing their surplus produce while still saving on food and medical costs.

Garrett (2010), guaranteed urban farming activity is a naturally solid intercession to quantitatively improve and subjectively enhance urban diet. In addition, it is easy to carry out even for households with little resources including land since they can grow food crops and raise animals on their housetops, in basements, on little fixes of land or unused spaces. Bryld (2012), adds that the practice of urban farming works well for low income households because it’s cheap to implement and can survive hostile environment. Gagnon (2010), demonstrated that urban farming on little heaps of land can altogether add to food security by providing families with a vital level of every day suggested admissions of proteins, calories, nutrients and minerals.
2.3 Urban Planning

For urban farming to perform well it must be joined in government processes of urban planning. The job of urban planning falls under the National government and respective governments of the county where urban centres are found. Freeman (2011), noticed that presently there are no urban planning approaches that particularly address the issue of urban farming as means for food security yet new ideas keep on overwhelming the field of urban planning. Current urban planning structures have prompted dense infrastructural developments that have left little or no space to facilitate development of urban agriculture.

Various investigations have been done to ascertain on the role of urban planning in the practice of urban agriculture. Petra (2011), explored urban agriculture in defense of a project aimed to promote urban vegetable advancement venture in Tanzania, where the investigation discovered that urban improvement combined with shortage of resources regularly quickens degradation of environment, prompting quality loss of conditions of urban living, particularly for the poor in the urban areas. There is an expanding mindfulness about the critical need to orchestrate urban growth with protection of the environment. Githungunyi (2014) completed an evaluation of the commitment of urban agriculture to family units' livelihoods in Roysambu Ward, Nairobi County and discovered that the pattern of UA in Nairobi County demonstrated a decrease of 28% of the territory under forest and crop contrasted with an expansion of 35% of the zone under developed regions in the course of the most recent 20 years. This demonstrates all the agrarian regions in the County will before long be taken up by the developed zones. Health and natural concerns were noted particularly in the low income territories of
Mathare, Ruaraka and Njathaini which fortifies the reality that UA ought to be controlled if not banned in these regions.

Then again Nyambura (2010), researched the status of urban agriculture and its influence on policy reform in urban land use in Nairobi, Kenya. The investigation discovered that the pattern of urban agriculture in Nairobi indicated it was on the decrease because of rivalry of land by other land uses especially urban expansion. The waterway line region declined by 36.6% and rain fed agriculture declined by 42.1%, despite the fact that there was a development of irrigation farming which possessed a territory of 542.4 ha. Over 73.6% of urban dwellers were occupied with urban farming. Urban agriculture stays prominent because of its commitment to food security, generating income and jobs creation.

The Constitution of Kenya (2010) likewise calls attention to that the State may manage the utilization of any land, or any enthusiasm for or directly over any land, in light of a legitimate concern to safeguard, morality of the public, public order, safety, health and planning for land use. This implies the state has forces to control utilization of land for farming in light of a legitimate concern for general wellbeing. This study demonstrated that urban farming presented individuals to a considerable measure of health dangers particularly in low income areas and the State should come in to ensure individuals' lives and security. Agriculture Act, Cap 318 has since been revoked, coming about to The Agriculture, Fisheries and Food Authority Act (2013) and The Crops Act (2013). In spite of the fact that these two new acts are not extremely unequivocal on urban agriculture, they have given a great deal of room for its improvement (Rees, 2013).
According to Ng’ang’a (2008), it is suggested that urban agriculture in Kenya should be enhanced and incorporated into formal planning of the city. This should be possible at individual dimension, city level and at the dimension of national government with the Nairobi City Council (now Nairobi City County Government) drawing up an urban food strategy for Nairobi and refreshing its physical improvement plan. There is need to revise the city council by-laws, empowering enactment and addition of different Acts of Parliament, for example, Local Government Act (Cap 265) and Public Health Act (Cap 242) to encourage and improve urban agriculture practice.

Many urban farmers believe that urban farming is illegal in most urban areas. With this sense of illegitimacy such farmers have less motivating force to make expensive upgrades. For instance, rather than introducing exorbitant water system frameworks urban farmers regularly utilize wastewater water system that, whenever contaminated, can present health dangers to consumers (Rees, 2013). Given the potential advantages of urban agriculture, government strategies for urban planning need to address farmers land tenure and give access to clean water system water, while likewise ensuring general health. Murphy (2009), sets that, urban agriculture can profit immensely if it is consolidated in urban waste reuse system.

In the twentieth century, due to a predominant view on urban planning and an absence of access to data and information, among different reasons, makers of policies regularly had a misjudged perspective of urban agriculture as an impermanent situation from relocation of rural farmers to the city that would fade in due course. Urban agriculture was viewed as incongruent with urban growth, an annoyance and hazard factor; consequently, enactments and strategies on urban agriculture were chiefly prohibitive and, best case
scenario, farming was transiently endured as a hold zone for future urban extension (Mbiba, 2010).

As per Pascal and Mwende (2009), the administration of Kenya has legitimized the circumstance on urban agriculture. However, an observation of the Local Government and Public Health Acts, and additionally the Nairobi by-laws, demonstrates that urban farming might be faced with hurdles. In the midst of the vulnerability be that as it may, farming exercises have kept on flourishing in urban regions in Kenya frequently with little respect for related medical problems, for example, coming from pathogens and poisonous materials among the waste materials utilized in cultivating and illness transmission from livestock kept in unhygienic conditions. Encounters picked up from different urban communities elsewhere where urban and peri-urban agriculture is legitimized and is better controlled through joining into the urban planning process show the advantageous impact of cultivating in urban areas towards the provision of better nourishment, poverty elimination and work creation.

2.4 Food Security

Food is a fundamental human requirement for humankind and it's hence not unexpected that every individual endeavor to guarantee access to adequate, solid and safe food for their survival. As indicated by Garrett (2010), food security exists when all individuals, consistently, have physical and economic access to adequate, safe and nutritious food, making it possible to meet their dietary needs and food inclinations for a functioning and sound life. Food and Agriculture Organization (FAO, 2010) in its meaning of food security features accessibility and availability of food consistently to all individuals in the household as the key factors in food security. FAO includes that generation of food in
urban areas is as a result of the urban poor reacting to insufficient, inconsistent and sporadic access to food and the absence of purchasing power. Its therefore not suprising that urban farming is currently an essential livelihood of choice in urban settings.

In his investigation Hagey (2010) focused on developing urban agriculture and discovered that in some low income groups, the main points to purchase food are convenience stores. A few societies have no food crop merchants of any sort. This absence of access to food that is healthy makes it difficult for families to eat well, filling the nation's developing overweight epidemic and the serious medical issues that go with it. Then again, Mougeot (2010) noticed that food self-reliance isn't necessarily a show of food independence, yet it can go far towards diminishing the food instability of defenseless societies. He however admitted that urban farming practices can't be sufficient to fulfill the urban interest for staple products like grains and tubers, which can undoubtedly be put away and transported with constrained misfortunes from rural areas where it’s easier to grow them.

The commitment of urban agriculture to food security and nourishment is likely its most critical resource. In his examination Githungunyi (2014) discovered that some middle and upper income individuals favor developing their own foods for health reasons. Renewed enthusiasm for focusing on elective systems for urban livelihood, for generation of money and for urban food security among others has emerged with the expansion in urban poverty, food instability and lack of healthy diets currently observed as moving from rural to urban regions (Rees, 2013). Numerous urbanites have therefore swung to urban agriculture as a source of employment and livelihood in general.
Encounters picked up from numerous urban communities of the world where urban agriculture is sanctioned and is better directed show the helpful impact of cultivating in urban communities towards the provision of better diet, alleviation of poverty and creating job opportunities (Mougeot, 2010). Urban conditions are favorable for serious generation of transitory nourishments (organic products, vegetables, fish, meat and dairy items), in limited spaces and adverse ecological conditions. These foods, which are wealthy in basic supplements, are devoured by urban inhabitants. Some are consumed by the family units engaged with their production, thus ensuring their food security.

Urban agriculture, up to the present has offered family units the methods for survival while depending solely on underutilized urban land and under-utilized urban forces of labour, while in the meantime making commitment towards food independence for Africa's urban communities. As indicated by Freeman (2011), urban farmers create generous measures of food items for urban buyers. In the late 90s it was assessed 800 million urban tenants were effectively occupied with urban agribusiness somehow.

2.5 Income Factor

The act of urban farming particularly among the low income households is to a great extent a monetary adjustment either to enhance the incomes by either lessening the weight of food stuff buying or giving an additional income of pay through the sale of the UA items. Monetary conditions in urban agriculture allude to the urban market of labour and the deficiency of satisfactory and available salary opportunities and an unsatisfied interest for farm items in amount and quality. Various studies completed by different associations, for example, the World Bank and IMF in the past demonstrate that joblessness and underemployment are qualities of urban economies, and that the
populations which are becoming most in urban territories are those which can't get to the formal labour jobs. Moreover, growing populations in most urban areas in developing nations can't meet the expanded requests for food rations and other amenities. This has prompted expansion of informal settlement like Mathare slums a common characteristic in Nairobi County.

Levels of earning assume an imperative job in deciding the degree to which UA can be upgraded to encourage better efficiency. The accessibility of information sources, access to formal or casual credit and urban extension services are vital angles in helping of urban agriculture (Murphy, 2009). Family units with better earnings will probably have better access to adequate land (particularly house terraces) and water to do UA. The nature of water and land not just alludes to the general appropriateness for urban agricultural use but even better urban farming practices and production. At the same time households with good economic conditions will be in a much better position to adopt advanced technologies such as modern irrigation systems and hydroponic technology to improve their urban farms productivity.

Huge family sizes are a typical normal for families involved in UA. Foeken and Mboganie (1998) discovered that urban farmers family units were larger compared to the normal size of a Nairobi household. This they understood could in a way affirm the theory expressed by Dennery (1995) saying that "the more mouths to feed, the additional time is given to production of food". Expansive family sizes might be a pointer of the poor monetary states of a few families (which may result from powerlessness to manage the cost of utilization of family planning) and UA goes about as a way to enhance the low
pay by giving nourishment to bolster the numerous individuals and going about as a wellspring of that vital pay to the family units through surplus selling.

As indicated by Murphy (2009), the economic significance of urban agriculture is as incredible as the healthful and ecological advantages. Food is the biggest single component of the urban economy in the larger part of towns and urban areas in the developing world, and one of the main three components in high-pay nations. Adding to the financial base of a city with production and processing of agriculture gives it a strong establishment. For example it is evaluated that crops worth over US$ 3.2 million are produced every year from irrigated urban agriculture in the city of Rosario, Argentina (Ayaga, 2013). For many entrepreneurs all over the world urban farming provides a competitive economic activity of choice. It gives salary producing chances to individuals with low abilities and minimal capital, and also for individuals with restricted versatility, incorporating the female gender with kids and the elderly. Urban agriculture regularly exploits unused assets in the city wastewater, solid waste, empty land, waterways, and housetops. It puts inert land to gainful utilization, either by paying lease or through usufruct utilization, and keeps up the land in great condition for the proprietor. For nations with remote trade issues, urban farming can be an import-substituting industry that ought to be empowered and bolstered.

2.6 Gender Factor

Gender factor is a social-cultural factor also alluded to as socio-cultural factor which are the bigger scale powers inside societies and social orders that influence the ideologies, emotions and practices. They speak to the conviction and esteem frameworks, states of mind, standards and cultural assimilation levels. They can be very wide in extension,
however the absolute most striking ones that impact the execution of urban agriculture incorporates; gender, family size, religion, ethnicity, education, and governance issues. The focus for this study however was on gender.

Urban cultivating is a critical means for the mix of impeded individuals or social gatherings (for example, single mothers, the jobless, seniors, and incapacitated) since it advances and facilitate their interest in the social surface and gives them better living conditions (Novo and Murphy 2000).

Around the world, it is assessed that 65 % of urban farmers are ladies (van Veenhuizen 2006). Most of the urban farmers in Nairobi are ladies and this isn't a reserve for Nairobi only, but mirrors a general example all through Sub-Saharan Africa (Foeken and Mboganie 1998). Especially among the low-income farmers, the level of female-headed family units is generally high. Hasna (1998) detailed that Ghanaians, “assert categorically that women do not own land either in their marital or natal ancestral home” and implied that women are not able to cultivate as much as men because they do not own the land. His investigation uncovered that a somewhat extraordinary circumstance won regarding urban open– space cultivating whereby despite the fact that a few networks deny ladies from owning land, particularly public grounds in peri-urban and rural regions, this has next to zero impact on access to land for cultivating in the open spaces inside the urban communities. The lands cultivated in the urban areas belong to the government or local authorities and access to these lands is not based on gender variances. This may infer that the urban circumstance some way or another discriminates culture and customs or decreases their significance concerning access to land. One other intriguing finding by
Hasna was that as a rule, ladies utilize their territory essentially for subsistence harvests to feed their families while men develop cash crops for money.

2.7 Theoretical Framework

This section examines the various theories used to inform the study on factors influencing urban agriculture performance in Mathare slums in Nairobi City County. The study is guided by the Innovation-Diffusion Theory and Sustainable Livelihood theory

2.7.1 Innovation-Diffusion Theory

Innovation-Diffusion theory was developed by Everett Rogers, a professor of communication. It’s composed of four components with each focusing on a different element of the innovation process; the innovation decision process, the apparent properties of the innovation, the rate of adoption and individual innovativeness (Rogers, 1995).

The innovation decision process is portrayed by five phases: learning, influence, choice, execution and affirmation. In the learning stage, the individual, family unit or organization gets information of the advancement's presence and usefulness. Information around a development does not really mean an appropriation of the equivalent and consequently people should be induced. The result of the influence is either selection or dismissal of the advancement. The execution process results when an individual embraces and puts a development into utilization. The last stage is affirmation amid which the individual looks for fortification for the choice made.

The works of Rogers (1995) recognized five properties whereupon an innovation is evaluated. These traits are; Relative advantage, similarity, unpredictability, triability and
observability. Relative advantage is often expressed in terms of economic or socio-cultural benefits and it refers to the degree to which an innovation is alleged to be better than its predecessor. Similarity alludes to how much a development is seen by potential adopters to be reliable with their current qualities, standards and practices. A development that is good with what is as of now set up guarantees that the new practice picks up trust effectively and along these lines winds up less demanding to embrace. Unpredictability alludes to how much an innovation is considered as a trouble to comprehend and utilize. On the off chance that potential adopters see an innovation as unpredictable, its selection rate is low. Triability alludes to the degree to which a development might be exposed to restricted experimentation. Lastly observability alludes to how much the aftereffects of a development are obvious to other people.

This theory sets that development spreads slowly after some time and inside a specific social framework bringing about different adopter classes. Rogers (1995), grouped adopters into five classes: trend-setters, early adopters, early lion's share, late lion's share and slow pokes. Pioneers are depicted as people who are bold and daring people. Early adopters are depicted as the general public opinion shapers who fill in as good examples. They rush to see the estimation of a development. Early lion's share represents the biggest class of adopters. This specific class just settles on a choice when they are persuaded of the advantages from an innovation. Then again late lion's share is the general population who will in general be mindful and distrustful and won't receive an innovation until the point when the early dominant part has done as such. They are typically generally poor contrasted with different individuals from the general public. Lastly, the slow pokes are suspicious of developments and even change operators. They are typically poor.
The innovation diffusion model has a few constraints. One of the real deficiencies of the model is that it for the most part accepts that the most vital variable is information and the ability of the person to change. An individual is described by his conduct without considering factors that impact his conduct. For example for an urban farmer to adopt an innovation in UA s/he would consider what the objectives for farming are, endowment and access to resources (land, finances), availability of support systems and the characteristics of the innovation. For example, farmers in low income areas such as Mathare slum may be hindered from accessing certain urban farming innovations due to lack of land or monetary resources necessary to acquire the innovation. The hypothesis likewise does not give data on the best way to survey advancement attributes of urban farming particularly in developing nations. Moreover, this hypothesis has been reprimanded for its absence of specificity, Gagnon, (2010).

2.7.2 Sustainable Livelihoods Theory

Sustainable Livelihoods (SL) theory also referred in some studies as the Sustainable livelihoods framework is attributed to the work of Robert Chambers in the mid-‘80s in a 1987 paper presented to The Institute of Development Studies (IDS). The SL framework is a largely a tool for development work that highlights how to understand, analyse and describe the main factors that affect the livelihoods of the poor people. As indicated by this structure, a livelihood contains individuals, their capacities and their methods for living, including food, income and resources – both substantial and impalpable resources. Substantial resources incorporate assets and stores while impalpable resources incorporate such perspectives as claims and access. A livelihood is viewed as ecologically manageable when it keeps up or improves the neighborhood and worldwide
resources on which livelihoods depend, and has net helpful consequences for different livelihoods. A livelihood is socially maintainable which can adapt to and recuperates from pressure and stuns, and accommodates who and what is to come (Chambers and Conway 1991). The SL approach owes its roots and development to research institutions (e.g. Institute of Development Studies), NGOs (CARE, OXFAM), and donors (DFID, UNDP) (Ashley & Carney, 1999: 5).

Carney explains the assumption behind the framework: that people pursue a range of livelihood outcomes by drawing on a range of assets to pursue a variety of activities. The livelihood options they pursue depend on their overall priorities, preferences and influences from being vulnerable to shocks (for example unemployment), and processes (such as government policy and cultural factors). These combined factors are what determine access to assets and livelihood opportunities as well as the way in which they can be converted into important outcomes (Carney et al., 1999: 3).

Krantz (2001) has highlighted some Strengths and weaknesses of the SL approach. The SL approach produces a more holistic view on what resources or combinations of resources (physical/natural resources, social and human capital) are important to the poor to come up with a viable livelihood. The approach also facilitates an understanding of the underlying causes of poverty by focusing on the variety of factors, at different levels, that directly or indirectly determine or constrain poor people’s access to resources/assets of different kinds, and thus their livelihoods.

The sustainable livelihood theory has been criticized for failing to highlight how to identify the poor that need assistance. Also the SL approach which starts with a broad and open-ended analysis has been criticized because it requires a highly flexible planning
situation which rarely exists in actual application. Finally the SL approach is accused of being largely an initiative of donors and their consultants in its approach failing to actually address the needs of the supposed beneficiaries. One measure to neutralize this would be to ensure the active involvement of indigenous staff from the beginning when discussing how and if such a strategy should be applied, start with a simplified version of the approach and also ensure they are adequately trained on its use.

2.7.3 Synthesis of the two Theories

The theories of Innovation-Diffusion and Sustainable Livelihoods complement each other in highlighting the Factors that influence the performance of urban agriculture. The Innovation-Diffusion theory is relevant to the study because it explains the steps and process of adoption and diffusion of an innovation in urban agriculture. In the innovation decision process at the knowledge stage the urban farmer get the opportunity to learn of the existence of an innovation in urban farming and depending on various factors, such as availability of resources, makes decision to adopt it to enhance production.

For the policy makers and other stakeholders, such as government and donors, understanding how to persuade the late adopters and laggards’ category is important to ensure they equally benefit from any invention in urban agriculture as their early adopters counterparts. Sustainable Livelihoods theory on the other hand plays an important role in ensuring that any innovation brought forward is sustainable to the environment and takes cognizance of the various factors at play to the intended urban farmers beneficiaries such as ; their priorities, preferences, overall trends and cultural factors which may determine the overall livelihood options they pursue. This is the compatibility attribute of an innovation. SL approach is also important in highlighting the issues of access and rights
to resources to the urban agriculture participants in relation to the use of innovations in their practice.

2.8 Conceptual Frame Work

The conceptual framework is a diagrammatical presentation of variables in the study. The framework illustrates the interrelationship between dependent and independent variables. The independent variables for the study are urban planning, food security, income factor and gender factor while the dependent variable is the urban agriculture performance. Government policy is the moderating variable.
Figure 1: Conceptual Framework of Factors influencing urban agriculture performance in Nairobi City County.
2.9 Research Gap

Table 2.1: Research Gap

<table>
<thead>
<tr>
<th>Variable</th>
<th>Author and Year</th>
<th>Findings</th>
<th>Knowledge gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Planning</td>
<td>Freeman (2011) Ng’ang’a, (2008) (Mbiba, 2010).</td>
<td>The directions in regards to crop development, in any case, are as yet prohibiting saving for agrarian land that came to be situated within boundaries in urban areas after expansions. Urban farming in Kenya is should be enhanced and coordinated into formal city planning</td>
<td>The examination just focused on planning of urban areas. The examination ought to have consolidated different elements affecting urban horticulture execution, for example, salary, gender and sustenance security as secured by this investigation.</td>
</tr>
<tr>
<td>Food Security</td>
<td>(Rees, 2013) Garrett (2010)</td>
<td>Urban farming adds to sustenance security and nourishment enhancing urban jobs. Nourishment security exists when all individuals, consistently, have physical and monetary access excessively adequate, protected and nutritious sustenance, making it impossible to meet their dietary needs and sustenance inclinations for a functioning and sound life.</td>
<td>This research was limited to investigating sustenance security and sustenance and in this way neglected to cover alternate factors that assume a job in impacting urban horticulture execution.</td>
</tr>
<tr>
<td>Income Factors</td>
<td>(Ayaga, 2013) Freeman</td>
<td>For nations with the lowest pay permitted by law issues, urban horticulture can be an import-substituting industry. The pay elements of urban agribusiness are as incredible as the environmental and nutritional advantages Urban agribusiness gives pay</td>
<td>There is need to explore the pay factors impacting urban horticulture execution, anyway these examinations ought to have extended to investigate different components that are vital in urban farming execution.</td>
</tr>
</tbody>
</table>
In summary, Urban Agriculture is emerging strongly in Sub-Saharan Africa, where the countries involved are experiencing the fastest urban growth with no tangible measures on how to feed their cities. Although new concepts continue to dominate the field of urban planning there are no urban planning policies specifically geared towards addressing the issue of UA (Freeman, 2011). Petra (2011), on the other hand, found that with scarce resources urban development is accelerating environmental degradation, leading to loss of quality of urban living conditions, especially for the urban poor. On the other hand, Nyambura (2010), found that the trend of urban agriculture in Nairobi showed it was on the decline due to competition of land by other land uses particularly urban development. Similarly, Garrett (2010), noted that food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

### 2.9.1 Summary of Literature Review

| Gender Factor | (van Veenhuizen 2006). Pascal and Mwende (2009) (Rees, 2013). | Most of the urban ranchers are and mirrors a general example all through Sub-Saharan Africa. The investigation uncovered that a somewhat extraordinary circumstance won regarding urban open–space cultivating whereby despite the fact that a few networks refuse ladies from owning land. | The study focused on job of urban horticulture in work creation. Concentrate should be done to fuse gender factor of urban horticulture execution. |

Creating chances to individuals with low aptitudes and minimal capital, and in addition for individuals with constrained portability, incorporating ladies with kids and the elderly. Most of the urban ranchers are and mirrors a general example all through Sub-Saharan Africa. The investigation uncovered that a somewhat extraordinary circumstance won regarding urban open–space cultivating whereby despite the fact that a few networks refuse ladies from owning land.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This section detailed the overall methodology that was used in the study. This included the research design, study population, procedures of sampling, data collection methods, research procedures, method of data analysis and ethical considerations.

3.2 Research Design

The investigation utilized descriptive survey research design. A descriptive survey (Mugenda and Mugenda, 2003) enables the researcher to describe the characteristics of the variables of interest due to its suitability in data collection to answer the research questions. This study was about factors influencing urban agriculture performance in Nairobi City County. It therefore justified that descriptive design was most suited and justifiably adopted in this study. Surveys are useful in describing the characteristics of a large population and also ensures observer subjectivity is greatly eliminated.

3.3 Target Population

A study population can be defined as the entire collection of cases or units about which the researcher wishes to draw conclusions. One of the major steps in formulating a research design is to define the population according to the objectives of the study. According to Nairobi Planning Innovations (2015), there are over 5000 household's heads from Mathare slums Nairobi County in Kenya who engage in urban agriculture. This study focused on a population of 5000 urban agriculture farmers who also represent...
the households they head from Mathare slums Nairobi County in Kenya who engage in urban agriculture for both consumption and/or commercial purposes.

3.4 Sample Size and Sampling Procedures

This section details the systematic selection of the population

3.4.1 Sample Size

The sample size was determined by using Krejcie and Morgan’s method of determination of a sample size for a given population size. The target population had 5000 households (Nairobi Planning Innovations, 2015), therefore by use of Krejcie and Morgan’s method of determination of a sample size the eventual sample size obtained was composed of 357 respondents.

3.4.2 Sampling Procedure

Sampling alludes to the methodical choice of a set number of components out of a hypothetically determined population of components. The premise is to reach determinations about the whole population utilizing the sample drawn.

The sample size was determined by using Krejcie and Morgan’s method of determination of a sample size for a given population size. The target population has 5000 households (Nairobi Planning Innovations, 2015), therefore by use of Krejcie and Morgan’s method of determination of a sample size the eventual sample size obtained was composed of 357 respondents as indicated in appendix II
3.5 Research Instruments

Primary data was collected by means of a semi-structured questionnaire. The questionnaires were self-administered via drop and pick later method to the respective households where the respondents could read and write. With assistance from research assistants and focus group discussions, those respondents who could neither read nor write were assisted to fill the questionnaire. The questionnaires permitted more noteworthy consistency in the manner in which questions were asked, guaranteeing more noteworthy similarity in the reactions. The structured questionnaires were in the type of a five-point Likert scale, whereby respondents were required to indicate their views on a scale of 1 to 5. The study also used observation as a data collection instrument.

3.5.1 Pilot Study

A pilot test was conducted in order to test the validity of the questionnaire and it was carried out with the help of research assistants. The principle explanations behind the pilot test was to distinguish any potential insufficiencies, exclusions and mistakes in the questionnaires and dispose of them before it was utilized to gather the real information (Kothari, 2004). The researcher selected a pilot group of 25 households from the target population to test the reliability of the research instrument. According to Cooper and Schindler (2003), the pre-test group can range from 25 to 100 subjects, but it does not need to be statistically selected. The respondents were conveniently selected since statistical conditions were not necessary for the pre-test, (Cooper & Schindler, 2003).
3.5.2 Validity of Instruments

Validity measures the accuracy of the research instruments, in this case, the questionnaire. The researcher used content validity to examine whether the instruments answered the research questionnaire. Adjustments and additions to the research instruments consultations and discussions with the supervisor were done to establish content validity. According to Denscombe (2008), content validity of an instrument is improved through expert judgment. Content validity refers to whether an instrument provides adequate coverage of a topic. Expert opinions help to establish content validity.

3.5.3 Reliability of Research Instruments

For reliability, the researcher used internal consistency measure known as Cronbach’s Alpha (α) which indicated the extent to which a set of measurement items could be treated as measuring a single latent variable. Reliability provided a measure of the internal consistency and homogeneity of the items comprising the scale. According to Kothari (2004), a Cronbach’s Alpha (α) of 0.7 is considered adequate.

3.6 Data Collection Procedures

Appointments were made with the households on appropriate days to carry out the interviews. The researcher attached a transmittal letter in each questionnaire. The researcher visited each household at different times and sought for permission to collect data as pertains the different ways discussed. The respondents were assured that strict confidentiality would be maintained in dealing with the responses. The filled-in questionnaires were collected after one week.
3.7 Data Analysis Techniques

Data analysis, according to Sekaran (2005), involves a number of closely related operations which are performed with the purpose of summarizing the collected data and organizing them in such a manner that they answer the research questions. The operations include editing, coding, classifying and tabulating. It also entails categorizing, ordering, manipulating and summarizing data, to find answers to the research questions.

The research yielded both qualitative and quantitative data. The qualitative data collected was analyzed through content analysis where a thematic framework was developed. The quantitative data generated was analyzed using descriptive statistics with the help of Statistical Package for Social Sciences (SPSS) version 20. The findings were presented using tables, frequencies and percentages.

3.8 Ethical Considerations

Throughout this study the researcher strived to adhere to ethical research considerations and professional guidelines. This involved avoiding acts of misconduct in research, such as data fabrication, falsification and plagiarism. Permission to conduct the study was obtained from the relevant authorities before commencement of data collection. During data collection the researcher explained the aim and significance of the study to the respondents, and consent for participating in the interviews and focus group discussions was sought from them. The researcher ensured that the information collected was treated with due confidentiality and was used purely for research work.
3.9 Operationalization of Variables

This segment analysed the operational meaning of factors influencing urban agriculture performance in Mathare Sub-county in Nairobi County. The variable’s operationalization is demonstrated as follows.
### Table 3.1: Operationalization of Variables

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Variables</th>
<th>Indicators</th>
<th>Measurement</th>
<th>Measurement scale</th>
<th>Type of Analysis</th>
<th>Tool of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>To establish the influence of government policy on urban agriculture performance in Nairobi-Mathare sub-county.</td>
<td>Government Policy-Moderating variable</td>
<td>Policies promoting AU</td>
<td>Number of policies promoting AU</td>
<td>Nominal</td>
<td>Content analysis</td>
<td>Spss</td>
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<td></td>
<td></td>
<td>Public health policy</td>
<td>effectiveness of Health status outcome</td>
<td>Ordinal</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The crops act</td>
<td>Level of Crop yields</td>
<td>Ordinal</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
<tr>
<td>To establish the influence of urban planning on urban agriculture performance in Nairobi-</td>
<td>Urban Planning-Independent variable</td>
<td>Available Urban food policies</td>
<td>Number of policies</td>
<td>Interval</td>
<td>Content analysis</td>
<td>Spss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Land use regulation</td>
<td>Number of regulations</td>
<td>Ordinal</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
<tr>
<td>Mathare Sub-county.</td>
<td>Urban farmers with Land access</td>
<td>Number of farmers with land access</td>
<td>Interval</td>
<td>Content analysis</td>
<td>Spss</td>
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<tr>
<td>To determine the influence of food security on urban agriculture performance in Nairobi-Mathare sub-county.</td>
<td>food security-Independent variable</td>
<td>Households with access to food</td>
<td>Number of households with access to food</td>
<td>Nominal</td>
<td>Descriptive</td>
<td>Spss</td>
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<td></td>
<td></td>
<td>Households with access to food</td>
<td>Number of households with access to food</td>
<td>Nominal</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households with reliable food supply.</td>
<td>Number of households with reliable food supply.</td>
<td>Interval</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
<tr>
<td>To determine the influence of the income factor on urban agriculture performance in Nairobi-</td>
<td>Income factors-Independent variable</td>
<td>Farmers with credit facilities</td>
<td>Level of resource mobilization</td>
<td>Nominal</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demand for quality and quantity</td>
<td>Level of produce</td>
<td>Nominal</td>
<td>Content analysis</td>
<td>Spss</td>
</tr>
</tbody>
</table>
To determine how gender factor, determine urban agriculture performance in Nairobi-Mathare sub-county.

<table>
<thead>
<tr>
<th>Urban agriculture performance</th>
<th>Gender factors-Independent variable</th>
<th>Number of farmers with substantial income</th>
<th>Nominal</th>
<th>Descriptive</th>
<th>Spss</th>
</tr>
</thead>
<tbody>
<tr>
<td>urban agriculture performance</td>
<td>No. of women growing crops for food</td>
<td>Number of women growing crops for food</td>
<td>Interval</td>
<td>Content analysis</td>
<td>Spss</td>
</tr>
<tr>
<td></td>
<td>Gender engaging in UA</td>
<td>Male to female ratio engaging in UA</td>
<td>Interval</td>
<td>Content analysis</td>
<td>Spss</td>
</tr>
<tr>
<td></td>
<td>Male and female engaging in UA</td>
<td>Number of Male and female engaging in UA</td>
<td>Interval</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>urban agriculture performance</th>
<th>urban agriculture performance-Dependent variable</th>
<th>No of households practicing UA</th>
<th>Interval</th>
<th>Descriptive</th>
<th>Spss</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume of products from UA</td>
<td>No of households practicing UA</td>
<td>No of households practicing UA</td>
<td>Interval</td>
<td>Descriptive</td>
<td>Spss</td>
</tr>
</tbody>
</table>
4.1 Introduction

This chapter discusses the interpretation and presentation of the findings obtained from the field. The chapter presents response rate, background information, Descriptive analysis, and inferential statistics that have been used to discuss the findings of the study.

4.1.1 Response Rate

The study targeted a sample size of 357 respondents from which 320 responded which constituted 89.6%. This response rate was satisfactory to make conclusions for the study. The response rate was representative. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was considered to excellent.

Table 4.1: Questionnaire Return Rate

<table>
<thead>
<tr>
<th></th>
<th>Questionnaires Administered</th>
<th>Questionnaires filled &amp; Returned</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents</td>
<td>357</td>
<td>320</td>
<td>89.6</td>
</tr>
</tbody>
</table>

4.2 Demographic Characteristics of the Respondents

The study sought to establish the demographic data of the respondents: which included; gender, age, level of education and period the respondent had been involved in urban
agriculture.

4.2.1 Gender Distribution

The study sought to establish the gender distribution of the respondents in the sample households.

Table 4.2: Gender of the respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>206</td>
<td>64.4</td>
</tr>
<tr>
<td>Female</td>
<td>114</td>
<td>35.6</td>
</tr>
<tr>
<td>Total</td>
<td>320</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.4 shows that majority of the respondents were male as shown by 64.4% while 35.6% were female. This is an indication that both genders were equitably engaged in this research and therefore the findings of this research did not suffer from gender biasness.

4.2.2 Age Distribution

The study sought to establish the age bracket of the respondents in the households.

Table 4.3: Age Bracket

<table>
<thead>
<tr>
<th>Age Bracket</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18 years</td>
<td>16</td>
<td>5.00</td>
</tr>
<tr>
<td>19-30 years</td>
<td>40</td>
<td>12.5</td>
</tr>
<tr>
<td>31-40 years</td>
<td>98</td>
<td>30.62</td>
</tr>
<tr>
<td>41-50 years</td>
<td>75</td>
<td>23.44</td>
</tr>
<tr>
<td>51-60 years</td>
<td>37</td>
<td>11.56</td>
</tr>
<tr>
<td>61-70 years</td>
<td>22</td>
<td>6.87</td>
</tr>
</tbody>
</table>
Above 70 years 32 10

| Total       | 320 | 100 |

From the results, majority of the respondents as shown by 30.62% were aged between 31 and 40 years, 23.44% were aged between 41 and 50, 12.5% of the respondents aged between 19 and 30, 11.56% aged between 51 and 60, 6.87% aged between 61 and 70, 10% aged above 70 years whereas 5% of the were 18yrs and below. This implies that most of the participants are middle aged and thus able to give correct information with regards to the questionnaire.

4.2.3 Education Level

The study sought to establish the education level of the respondents in the sample households

**Table 4.4: Level of Education**

<table>
<thead>
<tr>
<th>Education level</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>127</td>
<td>39.7</td>
</tr>
<tr>
<td>Diploma</td>
<td>111</td>
<td>34.7</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>76</td>
<td>23.7</td>
</tr>
<tr>
<td>Masters</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td>Total</td>
<td>320</td>
<td>100</td>
</tr>
</tbody>
</table>

From the results, majority of the respondents as shown by 39.7% had attained certificates, 34.7% had college diploma certificates, 23.7% of the respondents indicated to have attained undergraduate, whereas 1.9% of the respondents reported to have attained masters level. This implies that most of the respondents were literate and thus able to respond to the questionnaires.
4.2.4 Period engaged in Urban Agriculture

The study sought to establish the period which the respondents had practiced urban agriculture.

Table 4.5: Period which the Respondents had engaged in urban agriculture

<table>
<thead>
<tr>
<th>Education level</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 years</td>
<td>51</td>
<td>15.9</td>
</tr>
<tr>
<td>3 to 5 years</td>
<td>64</td>
<td>20.0</td>
</tr>
<tr>
<td>5 to 7 years</td>
<td>98</td>
<td>30.6</td>
</tr>
<tr>
<td>Over 7 years</td>
<td>107</td>
<td>33.4</td>
</tr>
<tr>
<td>Total</td>
<td>320</td>
<td>100</td>
</tr>
</tbody>
</table>

From the results, majority of the respondents shown by 33.4% had engaged themselves in urban agriculture for more than 7 years, 30.6% had engaged themselves in urban agriculture for 5 to 7 years, 20% had engaged themselves in urban agriculture for 3 to 5 years whereas 15.9% had engaged themselves in urban agriculture for not more than 3 years. This showed that significant number of the participants had engaged themselves in urban agriculture for a period that is considerable to take part in the research.

4.2.5 Purpose for agriculture

The study sought to establish which classification of urban agriculture was practiced by the respondents.

Table 4.6: Type of Agriculture

<table>
<thead>
<tr>
<th>Agriculture</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsistence</td>
<td>289</td>
<td>90.31</td>
</tr>
</tbody>
</table>
Commercial purposes 10 3.12
Both subsistence and commercial purposes 31 6.57

| Total | 320 | 100 |

From the results, majority of the respondents as shown by 90.31% had engaged themselves in subsistence urban agriculture, 6.57% had engaged themselves in urban agriculture for both commercial and subsistence purposes whereas 3.12% had engaged themselves in urban agriculture for commercial purposes. This is an indication that significant number of the participants had engaged themselves in urban agriculture for subsistence purposes and thus able to contribute to answering the research questions appropriately.

4.3 The influence of Urban Planning on Urban Agriculture Performance in Mathare Sub County

Respondents were asked to indicate the influence of urban planning on urban agriculture performance in Mathare Sub County. Findings are shown in table 4.7.

Table 4.7: Urban Planning

<table>
<thead>
<tr>
<th>Urban Planning</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Moderately Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are available urban food production policies</td>
<td>129</td>
<td>101</td>
<td>57</td>
<td>21</td>
<td>12</td>
<td>2.01</td>
<td>0.15</td>
</tr>
</tbody>
</table>
in Mathare Sub-County
Land use regulations in Mathare Sub-County are in place
Every urban farmer in Mathare Sub-County has land access
Urban farmers in Mathare Sub-County have access to clean water
In Mathare Sub-County there are legislations and policies encouraging or inhibiting urban agriculture

<table>
<thead>
<tr>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use regulations in Mathare Sub-County</td>
<td>1.72</td>
<td>0.21</td>
</tr>
<tr>
<td>Every urban farmer in Mathare Sub-County has land access</td>
<td>2.04</td>
<td>0.17</td>
</tr>
<tr>
<td>Urban farmers in Mathare Sub-County have access to clean water</td>
<td>1.97</td>
<td>0.18</td>
</tr>
<tr>
<td>In Mathare Sub-County there are legislations and policies encouraging or inhibiting urban agriculture</td>
<td>1.87</td>
<td>0.26</td>
</tr>
</tbody>
</table>

The study sought to determine the extent to which urban planning influence urban agriculture performance in Mathare Sub County, from the research findings, majority of the respondents strongly disagreed that land use regulations in Mathare Sub-County are in place as shown by a mean of 1.72, In Mathare Sub-County there are legislations and policies encouraging or inhibiting urban agriculture as shown by a mean of 1.87, urban farmers in Mathare Sub-County have access to clean water as shown by a mean of 1.97. Others disagreed that there are available urban food production policies in Mathare Sub-County as shown by a mean of 2.01, and every urban farmer in Mathare Sub-County has land access as shown by a mean of 2.04. The above findings are in line with Ng’ang’a (2008), who recommended that urban agriculture in Kenya should be improved and integrated into formal city planning. He recommended this to be done at individual level, city level and at the level of central government with the Nairobi City County government drawing up an urban food policy for Nairobi and updating its physical development plan.
4.4 The influence of Food Security on Urban Agriculture Performance in Mathare Sub County

Respondents were asked to indicate the influence of food security on urban agricultural performance in Mathare Sub County. Findings are shown in table 4.8

Table 4.8: Food Security

<table>
<thead>
<tr>
<th>Food Security</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Moderately Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Mathare Sub-County households easily access food</td>
<td>200</td>
<td>87</td>
<td>17</td>
<td>7</td>
<td>9</td>
<td>1.55</td>
<td>0.25</td>
</tr>
<tr>
<td>Mathare Sub-County households have reliable food supply</td>
<td>72</td>
<td>194</td>
<td>36</td>
<td>9</td>
<td>9</td>
<td>2.02</td>
<td>0.24</td>
</tr>
<tr>
<td>Mathare Sub-County households have access to Safe foods</td>
<td>101</td>
<td>200</td>
<td>11</td>
<td>5</td>
<td>2</td>
<td>1.76</td>
<td>0.27</td>
</tr>
<tr>
<td>Mathare Sub-County households have access to Sufficient and nutritious foods supply</td>
<td>132</td>
<td>129</td>
<td>26</td>
<td>15</td>
<td>18</td>
<td>1.93</td>
<td>0.19</td>
</tr>
<tr>
<td>The food production in Mathare Sub-County is good</td>
<td>250</td>
<td>69</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1.22</td>
<td>0.33</td>
</tr>
</tbody>
</table>

The study sought to establish the extent to which respondents agreed with the above statements relating to effects of food security on urban agriculture performance, from the research findings, majority of the respondents strongly disagreed that the food production in Mathare Sub-County is good as shown by a mean of 1.22, in Mathare Sub-County households easily access food as shown by a mean of 1.55, Mathare Sub-County households have reliable food supply as shown by a mean of 2.02.
households have access to safe foods as shown by a mean of 1.76, Mathare Sub-County households have access to sufficient and nutritious foods supply as shown by a mean of 1.93. Others disagreed that Mathare Sub-County households have reliable food supply as shown by a mean of 2.02. The above findings concur with findings by Kutiwa et al. (2010) who stated that urban agriculture is one way to escape the food insecurity and poverty cycle in a cash demanding setting. Mougeot (2010) also noted that food self-reliance is not necessarily self-sufficiency, but it can greatly assist in reducing food insecurity amongst vulnerable groups.

4.5 The influence of Income Factor on Urban Agriculture Performance in Mathare Sub County

Respondents were asked to indicate how their income factor influences urban agricultural performance in Mathare Sub County. Findings are shown in table 4.9

<table>
<thead>
<tr>
<th>Income Factor</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Moderately Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible income opportunities and an unsatisfied demand for agricultural products in quantity and quality pose as a major challenge in urban agriculture</td>
<td>27</td>
<td>52</td>
<td>55</td>
<td>87</td>
<td>99</td>
<td>3.55</td>
<td>0.09</td>
</tr>
</tbody>
</table>
The availability of inputs, access to formal or informal credit, urban extension services are important aspects in support to urban agriculture as shown by a mean of 3.96, urban farming is a competitive economic activity and the industry of choice for many of urban entrepreneurs as shown by a mean of 3.93.

The quality of water and land refers to the general suitability for urban agricultural land use as shown by a mean of 4.23, the economic importance of urban agriculture is as great as the nutritional and environmental benefits as shown by a mean of 4.03.

Urban agriculture can benefit if it is incorporated in urban nutrient recycling (organic waste management in cities).

The study sought to determine the extent to which income factor influence urban agriculture performance. From the research findings, majority of the respondents agreed that the quality of water and land refers to the general suitability for urban agricultural land use as shown by a mean of 4.23, the economic importance of urban agriculture is as great as the nutritional and environmental benefits as shown by a mean of 4.03, the availability of inputs, access to formal or informal credit urban extension services are important aspects in support to urban agriculture as shown by a mean of 3.96, urban farming is a competitive economic activity and the industry of choice for many of urban entrepreneurs as shown by a mean of 3.93. Others agreed that urban agriculture can
benefit if it is incorporated in urban nutrient recycling (organic waste management in cities) as shown by a mean of 3.82, accessible income opportunities and an unsatisfied demand for agricultural products in quantity and quality pose as a major challenge in urban agriculture as shown by a mean of 3.55. These findings are in line with Murphy (2009) who indicated that income levels play an important role in determining the extent to which UA can be enhanced to facilitate better productivity. The availability of inputs, access to formal or informal credit and urban extension services are important aspects in support of urban agriculture.

4.6 The influence of Gender Factor on Urban Agriculture Performance in Mathare Sub County

Respondents were asked to indicate how gender factor affects urban agricultural performance in Mathare Sub County. Findings are shown in table 4.10

Table 4.10: Gender Factor

<table>
<thead>
<tr>
<th>Gender Factor</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Moderately Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>More women practice urban agriculture to produce food for the family than for sale as compared to men in Mathare sub county</td>
<td>7</td>
<td>12</td>
<td>35</td>
<td>140</td>
<td>126</td>
<td>4.14</td>
<td>0.20</td>
</tr>
<tr>
<td>Women have equal access rights to urban farm space as men in Mathare</td>
<td>1</td>
<td>10</td>
<td>19</td>
<td>98</td>
<td>192</td>
<td>4.46</td>
<td>0.25</td>
</tr>
</tbody>
</table>
The study sought to determine the extent to which gender factor influence urban agriculture performance in Mathare Sub County. From the research findings, majority of the respondents strongly agreed that women have equal access to farm inputs as men in Mathare Sub County as shown by a mean of 4.93, In Mathare Sub County the percentage of female-headed households is relatively high as shown by a mean of 4.51. Others agreed that women have equal access rights to urban farm space as men in Mathare Sub County as shown by a mean of 4.46, and more women practice urban agriculture to produce food for the family than for sale as compared to men in Mathare Sub County as shown by a mean of 4.14. From the findings a small number of respondents agreed that men practice urban agriculture than women in Mathare Sub County by a mean of 3.78.

These findings concur with Hasna (2011) who asserted that women use their land primarily for subsistence crops to feed their families while men cultivate cash crops for income. Particularly among the low-income farmers, the percentage of female-headed households is relatively high.

The findings also indicated that gender has other effects on urban farming namely; providing food security in the homes, promoting good diet, and minimizing idleness. The study highlighted the importance of food security to majority number of people in urban
areas. Women participating in urban agriculture for domestic use ensure food security in the homes as well as a good diet for the family. Both men and women in Mathare participate in urban agriculture, hence reducing the rate of idleness. The findings were consistent with the results obtained by Novo and Murphy, (2000) that concluded that urban agriculture improves the lives of people.

4.7 Factors affecting Urban Agriculture Performance in Mathare Sub County

Respondents were asked to indicate factors affecting urban agriculture performance in Mathare Sub County. Findings are shown in table 4.11

<table>
<thead>
<tr>
<th>Urban Agriculture Performance</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Moderately Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
</table>

Table 4.11: Urban Agriculture Performance
There are many households practicing urban agriculture in Mathare sub county

Volume of products from urban agriculture in Mathare sub county are sustainable

Mathare sub county households rely on urban agriculture fully

In Mathare sub county a large percentage of households sell products for cash

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean 1</th>
<th>Mean 2</th>
<th>SD 1</th>
<th>SD 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are many households practicing urban agriculture in Mathare sub county</td>
<td>96</td>
<td>85</td>
<td>10</td>
<td>59</td>
</tr>
<tr>
<td>Volume of products from urban agriculture in Mathare sub county sustainable</td>
<td>100</td>
<td>53</td>
<td>19</td>
<td>50</td>
</tr>
<tr>
<td>Mathare sub county households rely on urban agriculture fully</td>
<td>100</td>
<td>77</td>
<td>11</td>
<td>90</td>
</tr>
<tr>
<td>In Mathare sub county a large percentage of households sell products for cash</td>
<td>92</td>
<td>61</td>
<td>48</td>
<td>64</td>
</tr>
</tbody>
</table>

The study sought to establish the extent to which respondents agreed with the above statements relating to urban agriculture performance. From the research findings, a fair number of the respondents disagreed that the volume of products from urban agriculture in Mathare sub county are sustainable as shown by a mean of 2.97, Mathare sub county has a large percentage of households that sell products for cash as shown by a mean of 2.77. Others disagreed that there are many households practicing urban agriculture in Mathare Sub County as shown by a mean of 2.75, and Mathare sub county households rely on urban agriculture fully as shown by a mean of 2.67.

According to urban harvest (2004), a third of Kenyan urban dwellers are involved in urban agriculture. More people are expected to turn to urban agriculture as a means to supplement food supplies and income levels. Lee-Smith (2010) asserts that UA provides direct access to fresh and nutritious food, within the household environment, that can be harvested, prepared and fed to family members, almost on a daily basis. The importance
of this is that it supplements the dietary need of most households, reduces expenses on food purchases and ensures people have access to fresh healthy food items.

4.8 Urban Agriculture as a Reliable Venture

The study sought to establish if urban agriculture was a reliable venture. Majority of the respondents agreed it was a reliable venture as it can supplement the inadequate, unreliable and irregular access to food supplies. They further stated that urban agriculture is thus an instrument geared towards tackling household food insecurity, increasing urban employment, and encouraging productive participation in local and urban development. However, they mentioned concerns on the success of the continued practice of urban agriculture in their area as there are no longer amenities to facilitate it such as land, clean water, farm inputs and access to modern farming technology.
CHAPTER FIVE

SUMMARY OF FINDINGS CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

From the analysis and data collected, the following discussions, conclusion and recommendations were made. The responses were based on the objectives of the study. The study sought to establish the factors influencing urban agriculture performance in Mathare sub-county, Nairobi County, to establish how urban planning influence urban agriculture performance, how food security influence urban agriculture performance, establish how income factor influence urban agriculture performance and to explore how gender factor influence urban agriculture performance in Mathare sub-county, Nairobi County.

5.2 Summary of the Findings

This section presents the key findings as considered under each objective.

5.2.1 Urban Planning

From the findings the study established that no land use regulations in Mathare Sub-County are in place, and there are no legislations and policies encouraging or inhibiting urban agriculture. In addition, farmers in Mathare Sub-County have minimal access to water. Also, there are unavailable urban food production policies and not every urban farmer in Mathare Sub-County has land access. The findings are in line with Ng’ang’a (2008) who stated that urban agriculture in Kenya should be improved and integrated into the formal city planning.
5.2.2 Food Security

On food security, it was found that the food production in Mathare Sub-County is not adequate; households have no access to food and also they have no access to safe foods. It was also found that Mathare Sub-County households have no access to sufficient and nutritious foods supply and households have unreliable food supply. The above findings concur with findings by Kutiwa et al. (2010) who stated that urban agriculture is one way to escape the food insecurity and poverty cycle in a cash demanding setting. Mougeot (2010) also noted that while food self-reliance is not self-sufficiency, it does go a long way towards reducing food insecurity to vulnerable groups.

5.2.3 Income Factor

On income factor, the study revealed that the quality of water and land refers to the general suitability for urban agricultural use; the economic importance of urban agriculture is as great as the nutritional and environmental benefits. The availability of inputs, access to formal or informal credit urban extension services are important aspects in support urban agriculture, urban farming is a competitive economic activity and the industry of choice for many of urban entrepreneurs. The study also established that urban agriculture can benefit if it is incorporated in urban nutrient recycling (organic waste management in cities), and accessible income opportunities and an unsatisfied demand for agricultural products in quantity and quality pose as a major challenge in urban agriculture. These findings are in line with Murphy (2009) who indicated that income levels play an important role in determining the extent to which UA can be enhanced to facilitate better productivity. The availability of inputs, access to formal or informal credit and urban extension services are important aspects in support of urban agriculture.
5.2.4 Gender Factor

Relating to gender factor, it was found that women have equal access to farm inputs as men; the percentage of female-headed households is relatively high. Women have equal access rights to urban farm space as men and more women practice urban agriculture to produce food for the family than for sale as compared to men. These findings concur with Hasna (1998) who asserted that women use their land primarily for subsistence crops to feed their families while men cultivate cash crops for income and also that in the urban setting the women have equal access to urban space for farming as men thus their active participation UA. Among the low income earners, urban farmers composed of female headed households were significantly high. Other effects of gender on urban agriculture included reduction of idleness, promotion of food security and the practice of good dieting, which ultimately improves the lives of the people of Mathare. The findings were similar to the results of Novo and Murphy, (2000) that opined, urban agriculture improves the lives of people.

5.2.5 Factors affecting Urban Agriculture Performance

From the findings the study revealed that the volume of products from urban agriculture in Mathare Sub County are fairly sustainable, Mathare Sub County does not have large percentage of households that sell products for cash. There are fewer households practicing urban agriculture in Mathare Sub County, and some of Mathare sub county households rely on urban agriculture fully. According to urban harvest (2004), a third of Kenyan urban dwellers are involved in urban agriculture. The findings found that majority of the people turned to urban agriculture to supplement their food supplies and income levels; confirming conclusions by Lee-Smith (2010) who asserted UA plays a
pivotal role in supplementing the dietary need of most households, cuts expenses on food purchases and ensures that people have access to fresh healthy food items on a daily basis.

5.3 Conclusions

From the analysis and summary, the study established that no land use regulations in Mathare Sub-County are in place, and legislations and policies encouraging or inhibiting urban agriculture are also lacking. In addition, farmers in Mathare Sub-County have minimal access to safe water that can be used in urban farming. Also, it was found that there are no available urban food production policies in place and not every urban farmer in Mathare Sub-County has access to land to carry out urban farming.

The study concludes that food production in Mathare Sub-County adequate; most households generally have no access to food and also the foods available are not safe. From the study also it can be deduced that majority of Mathare Sub-County households have no access to a reliable, sufficient and nutritious foods supply.

The study further concludes that economic importance of urban agriculture is as great as the nutritional and environmental benefits. The availability of inputs, access to formal or informal credit urban extension services are important aspects in support of urban agriculture, urban farming is a competitive economic activity and the industry of choice for many of urban entrepreneurs. The study also concludes that urban agriculture can benefit if it is incorporated in the urban nutrient recycling system.

The study revealed that women have equal access to farming space and inputs as men in the urban areas; and that the percentage of female-headed households involved in UA is
relatively high. Women have equal access rights to urban farm space as men and more women practice urban agriculture to produce food for the family than for sale as compared to men. Therefore it can be concluded that women use their land largely for subsistence crops to feed their families while men mainly cultivate cash crops for income.

From the findings it can be concluded that the volume of products from urban agriculture in Mathare Sub County are fairly sustainable for domestic consumption and that Mathare Sub County does not have large percentage of households that sell products for cash. There are fewer households practicing urban agriculture, and some of the households rely on urban agriculture fully for their dietary needs and economic well-being.

5.4 Recommendations

Based on the study findings, the study recommends that; the government of Kenya should increase awareness of the potential and constraints inherent in urban agriculture not only in Nairobi but across other cities and towns as well. This is because urban agriculture is growing as populations’ increases in the urban settings and the cost of living become increasingly high to the majority especially in the informal settlement and low income earners. A number of studies have shown that by 2030, almost half of Kenya’s population will live in the urban environments and it’s important to ensure there is a place for urban agriculture in the midst of the massive infrastructure developments taking place to take care of the dietary need of the growing populations more so the vulnerable groups.

Having already experienced a lot of uncontrolled development that did not factor in urban agriculture space, the government should adopt modern techniques that can allow UA to be practiced in small restricted spaces. Given the potential benefits of urban agriculture,
government policies for urban planning need to address land tenure for farmers and provide access to clean irrigation water, to protect public health from food grown through sewer water and other contaminations.

The government should lead in empowering urban dwellers to practice sustainable urban farming and reap the benefits of an urban green space. It should put in place a framework that will enable cities to facilitate the carrying out of urban farming practices while balancing the needs of those living in urban areas with the needs of the larger environmental concerns, thus sustainable livelihoods. Also, it should promote and encourage innovative and out of the box ways to practice urban agriculture such as hanging gardens, vertical gardens, stacked greenhouses, greenways and use of hydroponic agriculture as opposed to the conventional methods of farming which require larger space and resources such water which are increasingly becoming scarce with increasing demand from growing populations.

The policy makers should start formulating and planning areas of intervention and support on the development of urban agriculture. This should be carried out in the full knowledge of the importance local production of food has in savings in transportation costs, storage, and in product loss, which results in food cost reduction. Their policies should take consideration that local food production also improves the quality of the urban environment through greening and thus, results in the reduction carbon emissions effect. This has the importance in reducing climate change adverse effects in the long run.

It is worth noting that the Nairobi City County Urban Agriculture Promotion and Regulation Bill, 2014 (and the revised 2015 edition) has been drafted. It seeks to provide for the promotion of urban agriculture within the Nairobi City County; provide the
necessary regulatory framework for the practice of urban agriculture in the county and to establish the Nairobi City county urban agriculture promotion advisory board. It should be in the interest of the government concerned to ensure that the full mandate of this bill is realized through its full implementation.

5.5 Recommendation for Further Studies

The study sought to establish the factors influencing urban agriculture performance in Mathare sub-county, Nairobi County. This study comprised of the households from Mathare sub-county in Nairobi County in Kenya who engage in urban agriculture, this made the research limited in the sense that the findings may not be generalized to other urban centers in the country. Therefore, another study should be done in other areas of the city to cover both the affluent areas as well as other low-income areas such as Kibra slums and other informal settlements. Comparative studies should also be carried out in other emerging towns in the country to check out how the aspect of urban agriculture is playing out. This will in turn assist to come up with a comparative analysis which will enable to come up with measures that will help the city dwellers in better urban agriculture practices.
REFERENCES


Hasna, M.K. 1998. NGO Gender capacity in urban agriculture: Case studies from Harare (Zimbabwe), Kampala (Uganda) and Accra (Ghana). Cities feeding people Series Report 21


Nyambura, M. (2010). Status of urban agriculture and its implication for policy changes in urban land use in Nairobi, Kenya, School of Environmental Studies of Kenyatta University June 2010


APPENDICES I: LETTER OF TRANSMITTAL

Michael Mugo
P.O. Box 30197
NAIROBI
July 18, 2018

To whom it may Concern

Dear Respondent,

RE: FILLING OF QUESTIONNAIRE

My name is Michael Mugo and I am currently pursuing a Master’s Degree in Project Planning and Management of the University of Nairobi. I have obtained permission from the University Management to carry out research as part of the requirements for the award of the degree. As part of my study, it requires me to administer a questionnaire designed to generate some insights and equally offer support to my research proposal on the study topic, “factors influencing urban agriculture performance in Nairobi county, Kenya: a case of Mathare sub-county

Participation in the study is voluntary. Whatever information provided will be treated with confidentiality and will not be used for any other purpose other than the objectives of this study.

Your assistance in providing the required information will be highly appreciated. Thank you.

Yours faithfully,

Michael Mugo
APPENDICES II: INDIVIDUAL QUESTIONNAIRE

This questionnaire is to collect data for purely academic purposes. All information will be treated with strict confidence. Do not put any name or identification on this questionnaire. Answer all questions as indicated by either filling in the blank or ticking the option that applies.

SECTION A: DEMOGRAPHIC INFORMATION

1. What is your Gender?
   Male [ ] Female [ ]

2. Kindly indicate your age bracket
   Below 18 years [ ]
   19-30 years [ ]
   31-40 years [ ]
   41-50 years [ ]
   51-60 years [ ]
   61-70 years [ ]
   Above 70 years [ ]

3. Indicate your level of education
   Certificate [ ]
   Diploma [ ]
   Undergraduate [ ]
   Masters [ ]
   Other……… (Specify)

4. Indicate your job title
   …………………………………………………………………………………………………

5. How long have you engaged in urban agriculture?
   Less than 3 years [ ]
   3 to 5 years [ ]
   5 to 7 years [ ]
   Over 7 years [ ]

6. Is the agriculture for
Subsistence [ ]
Commercial purposes [ ]
Both subsistence and commercial purposes [ ]

SECTION B: Factors Influencing Urban Agriculture Performance
Indicate your level of agreement with the following statements relating to Urban Planning. Key Use a scale of 1-5, where (1= strongly disagree, 2= disagree, 3= moderately agree, 4= Agree and 5= strongly Agree)

<table>
<thead>
<tr>
<th>Urban Planning</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are available urban food production policies in Mathare Sub-County</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land use regulations in Mathare Sub-County are in place</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every urban farmer in Mathare Sub-County has land access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban farmers in Mathare Sub-County have access to clean water</td>
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<tr>
<td>In Mathare Sub-County there are legislations and policies encouraging or inhibiting urban agriculture</td>
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</tbody>
</table>

Indicate your level of agreement with the following statements relating to Food Security. Key Use a scale of 1-5, where (1= strongly disagree, 2= disagree, 3= moderately agree, 4= Agree and 5= strongly Agree)

<table>
<thead>
<tr>
<th>Food Security</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Mathare Sub-County households easily access food</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mathare Sub-County households have reliable food supply</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Mathare Sub-County households have access to Safe foods</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mathare Sub-County households have access to Sufficient and nutritious foods supply</td>
<td></td>
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</tr>
<tr>
<td>The food production in Mathare Sub-County is good</td>
<td></td>
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</tr>
</tbody>
</table>
Indicate your level of agreement with the following statements relating to Income Factors. Key Use a scale of 1-5, where (1= strongly disagree, 2= disagree, 3= moderately agree, 4= Agree and 5= strongly Agree)

<table>
<thead>
<tr>
<th>Income Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible income opportunities and an unsatisfied demand for agricultural</td>
<td></td>
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</tr>
<tr>
<td>products in quantity and quality pose as a major challenge in urban agriculture</td>
<td></td>
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<tr>
<td>The availability of inputs, access to formal or informal credit, urban</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>extension services are important aspects in support urban agriculture</td>
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<tr>
<td>The quality of water and land refers to the general suitability for urban</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>agricultural use</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Urban agriculture can benefit if it is incorporated in urban nutrient</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>recycling (organic waste management in cities).</td>
<td></td>
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<td></td>
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<tr>
<td>The economic importance of urban agriculture is as great as the nutritional</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and environmental benefits</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban farming is a competitive economic activity and the industry of choice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for many of urban entrepreneurs</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Indicate your level of agreement with the following statements relating to Gender Factor. Key Use a scale of 1-5, where (1= strongly disagree, 2= disagree, 3= moderately agree, 4= Agree and 5= strongly Agree)

<table>
<thead>
<tr>
<th>Gender Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>More women practice urban agriculture to produce food for the family than for</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>sale as compared to men in Mathare sub county</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Women have equal access rights to urban farm space as men in Mathare sub</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>county</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women have equal access to farm inputs as men in Mathare</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Mathare sub county the percentage of female-headed households is relatively high.

More men practice urban agriculture than women in Mathare sub county.

How else does gender influence urban agriculture performance in Mathare sub county?

Indicate your level of agreement with the following statements relating to Urban Agriculture Performance. Key Use a scale of 1-5, where (1= strongly disagree, 2= disagree, 3= moderately agree, 4= Agree and 5= strongly Agree)

<table>
<thead>
<tr>
<th>Urban Agriculture Performance</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are many households practicing urban agriculture in Mathare sub county</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Volume of products from urban agriculture in Mathare sub county are sustainable</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mathare sub county households rely on urban agriculture fully</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>In Mathare sub county a large percentage of households sell products for cash</td>
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</tbody>
</table>

Is urban agriculture a reliable venture? Explain

…………………………………………………………………………………………..
### APPENDIX III: SAMPLE SIZE DETERMINATION TABLE

<table>
<thead>
<tr>
<th>N</th>
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<th>N</th>
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<th>N</th>
<th>S</th>
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<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>100</td>
<td>80</td>
<td>280</td>
<td>162</td>
<td>800</td>
<td>260</td>
<td>2800</td>
<td>338</td>
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<td>14</td>
<td>110</td>
<td>86</td>
<td>290</td>
<td>165</td>
<td>850</td>
<td>265</td>
<td>3000</td>
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<td>24</td>
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<td>950</td>
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<td>340</td>
<td>181</td>
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<td>351</td>
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<td>360</td>
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<td>36</td>
<td>160</td>
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<td>380</td>
<td>181</td>
<td>1200</td>
<td>291</td>
<td>6000</td>
<td>361</td>
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<td>400</td>
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<td>1900</td>
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<td>80</td>
<td>66</td>
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<td>234</td>
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<td>85</td>
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<td>650</td>
<td>242</td>
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<td>327</td>
<td>50000</td>
<td>381</td>
</tr>
<tr>
<td>90</td>
<td>73</td>
<td>270</td>
<td>155</td>
<td>700</td>
<td>248</td>
<td>2400</td>
<td>331</td>
<td>75000</td>
<td>382</td>
</tr>
<tr>
<td>95</td>
<td>76</td>
<td>270</td>
<td>159</td>
<td>750</td>
<td>256</td>
<td>2600</td>
<td>335</td>
<td>100000</td>
<td>384</td>
</tr>
</tbody>
</table>

Source: (Krejcie & Morgan, 1970)
APPENDIX IV: LETTER OF AUTHORIZATION

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Ref: No. NACOSTI/P/18/53654/24959

Date: 30th August, 2018

Michael Mugo Kinyanjui
University of Nairobi
P.O Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Factors influencing urban agriculture performance in Nairobi City County, Kenya: A case of Mathare Sub-County,” I am pleased to inform you that you have been authorized to undertake research in Nairobi County for the period ending 30th August, 2019.

You are advised to report to the County Commissioner and the County Director of Education, Nairobi County before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a copy of the final research report to the Commission within one year of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.