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Urban Sprawl Causes and Impacts on Agricultural Land in Wote Town Area of Makueni County, Kenya

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Abstract— *Urban sprawl on agricultural lands has become a global phenomenon plaguing all countries of the world, rich or poor and is mainly influenced by spatial growth of urban areas. Spatial growth in urban areas is an inevitable phenomenon hence the need to regulate it. The aim of this research was to establish the effects of urban sprawl and land use change in the area of Wote town in Makueni County, Kenya.Purposive sampling was used to subdivide the study area into two clusters (Kamunyolo and Unoa). The target population for the study were the natives who own land and live within the study area. The research identified increase in urban population (14%), low agricultural returns (29%), demand for housing (16%) and weak ineffective land institutions (13%) as the major causes of urban sprawl in Wote town. The major impacts of sprawl were found to be diminishing agricultural land (55%), pressure on the existing infrastructure (17%) and increase in land values (14%).The research points that the current urban sprawl is very prevalent and of major concern for attainment of two sustainable development goals (improved agricultural food production and affordable housing) in Kenya . The urban sprawl has both positive and negative effects. However, the negative effects far outweigh positive effects, with diminishing agricultural land being the greatest negative effect. There is need therefore, to regulate urban sprawl to optimize positive effects while minimizing the negative effects.*

Keywords— ***Urban sprawl, Land use change, sustainable development.***

I. INTRODUCTION

The word "Urban Sprawl" means more growth than the usual and what makes it different from urban growth is this excessive nature.Cities tend to grow and planned growth is reached while there is an appropriate proportion between urban growth and urban organism. However, when the growth is more than usual, the city will face new major problems' (Habibi and Asadi, 2011)

Third world countries are more affected by urban sprawl as compared to developed nations. This is due to the increasing population which consequently, leads to the depletion of resources especially agricultural land around cities.

Migration and urban sprawl have been a common phenomenon in the world for a long time. Cities and their suburbs are now becoming overcrowded because of urban sprawl and migration (Herzog, 2014).

A remarkable trait of the 21st century has been the high rate of urbanization that has characterized the growth and development of cities especially in developing countries (Rothwell, 2015).This situation has driven rapid physical development and expansion of peri-urban areas, as urban dwellers relocate to cities' peripheries. Urbanization affects the farmland resource and its management in many ways. According to Walton *et al* (2005),urban development directly displaces some trees and farmland, it increases population density and associated human activities and infrastructure.

The impact of urbanization on the peri-urban environment and livelihoods can be seen in two ways: positive and negative. According to Alaci (2010), well planned and managed urban growth and development can serve as a positive development factor. The benefits include; high demand for agricultural products, access to developed extension services, and opportunities for non-farm employment (Satterthwaiteand Tacoli, 2003). However, unguided urbanization in Kenya negatively affects the natural environment and livelihoods in peri-urban areas. The negative effects are due to the changes occurring in

land use, water resources management, waste dumping, and increasing competition for agricultural and residential use of natural resources (UN-HABITAT, 2010). As a result, urbanization could bring a dramatic increase in the concentration of poverty and environmental degradation in peri-urban zones (Marshall, 2009).

The causes of urban sprawl on agricultural land are many and varied, including rapid population growth, which results from two population growth factors that include natural increase in population, and migration to urban areas (Bhatta, 2010). Another cause of urban sprawl is the lack of laws and regulations of planning in providing solutions to reduce sprawl on agricultural land, this is because the decision-makers in the municipalities are not specialists in planning and regulation work (Jaradat, 2009).

Wote town being an administrative center of MakueniCounty has been experiencing a high influx of people seeking for better opportunities. Therefore, there is a great need for residential and commercial accommodation of the ever-growing population. This has led to the conversion of neighboring agricultural land to settlement areas. Poor implementation of land and environmental policy regulations has encouraged unsustainable urban sprawl.This research sought to examine the causes and effects of Urban sprawl on agricultural land in peri-urban areas of Wote town of Makueni County, Kenya.

II. MATERIALS AND METHODS

2.1 Study Area

Wote is a town in Eastern Kenya, Makueni County, and 106 Km East of Nairobi city. The town lies along latitude 1.7833 degrees south and longitude 37.6333 degrees east, at an altitude of 1151m above sea level, and covers an area of 2.75Km^2. It is the county headquarters of Makueni County under the devolved government system disaggregating the country into 47 units referred to as counties. The town is linked to Machakos town and Makindu town (on the Mombasa – Nairobi highway) by a C99 tarmac road and has an urban population of 5,542. (2009 Population census).

Woteperi-urban area is facing the problems of unauthorized construction and expansion of unplanned housing. Moreover, population of the study area has increased constantly as time passed by. As a result, existing developments are continuously expanding on agricultural hinterland. The situation is creating urban sprawl in the agricultural land which is affecting the overall planned look of the town and is deteriorating the natural environment of the area as well.

2.2 Research Design

The research was designed to undertake collection of data from satellite imagery, physical observation and key informant interviews oneffects of urban sprawl on agricultural land in peri- urban areas of Wote town.The remote sensing (RS) data was used to study and analyze spatial and temporal variations in land use. Landsat imagery scenes for the area were acquired from the Regional Center for Mapping of Resources for Development (RCMRD) Nairobi, and were processed and analyzed using various computer software programmes to identify and classify the impacts of sprawl.Data collected from the various sample points was compared with each other to determine the extent of urban sprawl impacts in Wote town. This was done using R software.

The sample size (n) for administration of questionnaires was determined using the Fisher formula (Mugenda & Mugenda, 2003) where 288 residents were selected for the research.

The data on the effects of urban sprawl on agricultural land was analyzed using SPSS and tested for significance and means separated using chi square tests at 5% level of significance. Simple descriptive statistics such as tables, graphs and photographs were used to display, describe and present the research findings through classification of the raw data into some purposeful and usable categories. Qualitative data was presented as narratives. Tables were preferred since they present data in an orderly manner. Photographs were used to help present results in a manner that as much as possible reflect the existing state on the ground at the time of research.

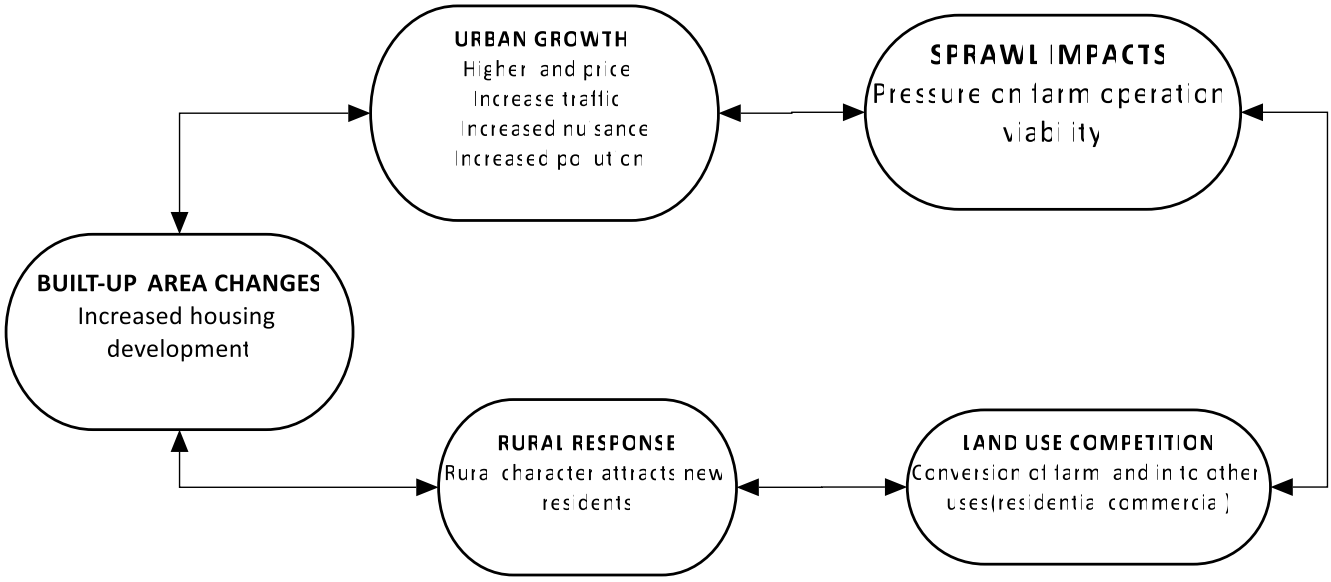

Fig.1: Conceptual framework of the study.

III. RESULTS AND DISCUSSIONS

3.1 Causes of Urban Sprawl

The research point that low economic returns from agricultural activities (29%) wasthe greatest influence on urban sprawl in the area. The productivity and profitability of many farms (especially small scale) is too low, making peasant farmers remain poor. Further, the study revealed that there are no incentives (87%) for farmers to preserve their agricultural land against conversions into other users. For instance, the respondents (100%) revealed that land values increase once agricultural land is converted into other uses. Consequently, agricultural land use is considered inferior to other land uses; hence, farmers are motivated to convert their farms to obtain higher returns. Many developers are paying the farmers a lot of money to acquire agricultural land for residential estate development. According to various real estate valuation firms operating in the study area, an acre of agricultural land after conversion can sell at approximately Kenya shillings 8 million, depending on location.

Demand for housing (16%) is the second greatest influence on agricultural land use conversions. With the increase in demand for affordable housing, farmers are being enticed by developers to sell their farms for a better and immediate return on their investment in real estate.

The study revealed that increase in urban population is the third greatest influence (14%) on agricultural land use conversions. In addition, ancillary data showed that total urban population has increased over the years by up to 32.3% of the total Kenyan population and it is expected to rise to 61.5% in year 2030 (Kenya National Bureau of Statistics, 2009 and the Nairobi Metro 2030 Strategy, 2008). It is inevitable that increased population has led to increased demand for housing thus putting pressure on agricultural land in the peri-urban areas.

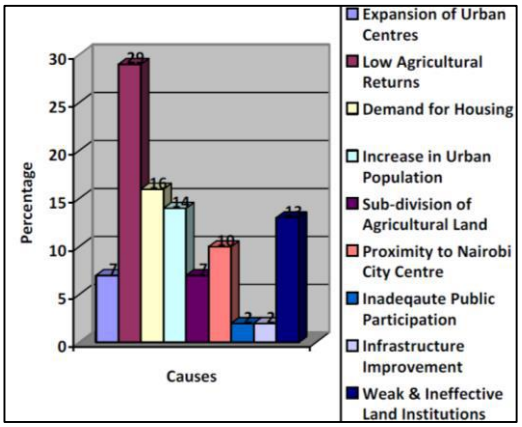

Fig.2: Responses on Causes of sprawl in Wote town

3.2 Impacts of Urban Sprawl

The research revealed that diminishing agricultural land is the highest impact(55%). This research also established that urban sprawl in the study area is very prevalent (75%). Reduction in agricultural land has many inherent and associated negative effects, which include food shortage; reduced agricultural exports hence reduced foreign exchange; lost job opportunities in agricultural sector, among others (The Agricultural Sector Development Strategy (ASDS) 2010-2020).

Pressure on the existing infrastructure (17%) has emerged as another major effect of urban sprawl. The road networks, supply of water and electricity are becoming inadequate and experiencing more pressure due to increased demand from the new residential estates. In an ideal situation, infrastructure and services should be provided before development takes place, however, in the study area provision of services and infrastructure is done in retrospect without improving capacity of the old infrastructure.

Increase in land values (14%) and housing cost/rentals (8%) were established to be impacts of urban sprawl. Increase in land values and housing cost/rentals brings higher returns to the real estate investors/ landowners. For instance, once a farm has changed user into residential user, the value would go up and the investor would earn more from his investment. Similarly, if the farm is developed, the resultant housing cost/rentals would be higher to enable the investor cover the higher cost/value of the land and make some profit margin.

Therefore, for Makueni to achieve the twin goals of food security and sustainable development; there is need to regulate urban sprawl sustainably.

Table 1 Impacts of Urban Sprawl in Wote Town

	Total Score	**Percentage (%)**
Diminishing Agricultural Land	158	55
Pressure on the Existing Infrastructure	49	17
Increase in Land Values	41	14
Increase in Housing Cost/Rentals	23	8
Job Creation	17	6
Total	288	100

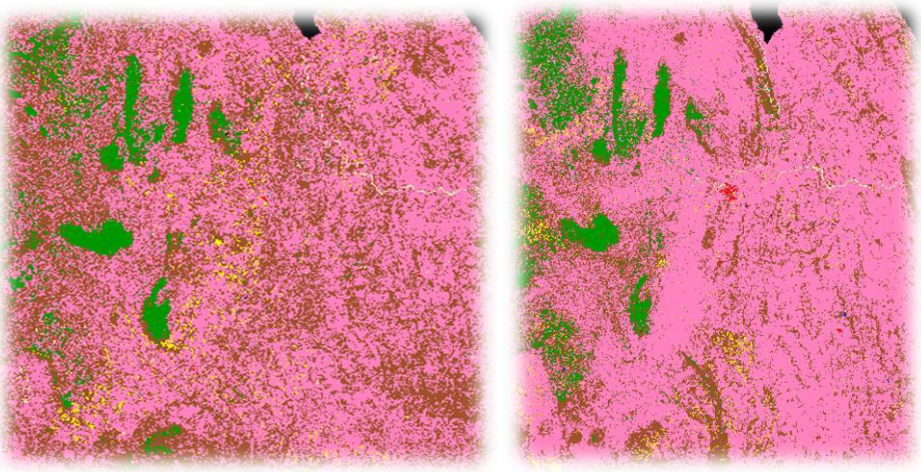

Fig.2: Wote land cover high-resolution image 2017Wote land cover high-resolution image 2010

IV. CONCLUSIONS

The main objective of this research was to investigate effects of urban sprawl on agricultural land in peri-urban areas of Wote town, Makueni County. The research point that the current urban sprawl is very prevalent and of major concern inattainment of twin goals of improved agricultural (food) production and sustainable development in the country. The urban sprawl has both positive and negative effects. However, the negative effects far outweigh positive effects, with diminishing agricultural land being the greatest negative effect. There is need, therefore, to regulate urban sprawl to optimize positive effects while minimizing the negative effects.

To ensure sustainable agricultural land use conversions, public awareness and participation of all stakeholders is necessary. Proper and effective means of notifying local residents of land use conversions should be devised, such as part of agricultural extension services. Effective public participation of all stakeholders is important to make development decisions more predictable, fair and objective.

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