

Factors and actors of urban expansion: The case of Dukem Town, Ethiopia

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ABSTRACT

Urbanization is continuous worldwide phenomenon which influenced by various economic activities. This study aimed to assess driving reasons and performers that throw in a bunch for the spreading out of Dukem Metropolis. The firsthand data sources were gathered by means of questionnaires and secondhand data sources were gathered from reports, legal documents, previous study documents, and socio-economic data. The findings of the study revealed that establishment of industries and industrialization, position of the municipality, and increases in populace dimension were the dominate factors for the expansions of the town. Besides, private investors, government officials' brokers and speculators were the key actors for expansion of the town. Hence, monitoring and controlling horizontal expansion of the town using land use planning principles are the pinnacle remedy.

Keywords: urban expansion, factors, actors, peri-urban, Ethiopia

INTRODUCTION

Urban expansion is the word for the rapid growth and development of cities as a result of global urbanization in order to accommodate their growing populations (European Environment Agency, 2006; UN-Habitat, 2006). Therefore, locations or sites close to metropolitan centers may be required for social, economic, industrial, and communication purposes, as well as for the development of roads and other infrastructure and investments, which may require the relocation and displacement of the local rural farming population. The primary driver of urban expansion is natural population growth in metropolitan areas (Todaro, 1997). Therefore, the primary motivators (causes) for urban growth include elements like population growth, economic pressure, industrialization, a shortage of cheap housing, a need for additional existing place, a be short of effective planning rules, and property grabbing.

Geographers and earth system scientists argued that the interplay of anthropogenic and biophysical driving variables was responsible for land use and land cover (LULC) alterations (Geist et al., 2006). As a result, the primary forces behind urban growth can be divided into three categories: various agricultural operations, timber harvesting, and infrastructural development. These variables fall under the category of direct causes of LULC. The second root causes of changes in land use

and cover are complexities of fiscal, scientific, demographic, and organizational, along with socio-cultural influences. The third one is referred to as "biophysical elements that drive LULC conversions," and they include terrain, landslides, droughts, and natural fires (Awoke & Bewket, 2014; Lambin et al., 2006). As a result, Ethiopia, like many other developing nations, has been dealing with issues related to environmental deprivation, such as changes in land use and land wrap, the beating of forests, flora, as well as problems with wet resources (Awoke & Bewket, 2014).

Studies have examined the elements that influence urban growth, which can be divided into socioeconomic and natural components (Li et al., 2018). Geological conditions (Poelmans & van Rompaey, 2009), slope elevation (Li et al., 2013), and climate (Morollón et al., 2015) are among the natural features that are thought to be fundamental for urban development and that determine some of the suitability (Gao et al., 2014). Socioeconomic factors such as national policies and institutions (Adamiak, 2016), population growth (Chen & Feng, 2010), social processes (Filion et al., 2010), infrastructure and transport (Li et al., 2015), and economy growth are the main driving forces. However, it was discovered that the factors influencing urban growth varied between nations and cities. The issue of whether the factors influencing urban growth differ spatially as a result of the variety of realistic situations is then brought up. China, the greatest developing nation in the world, has a wide range of physical

circumstances, levels of economic and social development, and regional cultures (Chu et al., 2019).

Actors are people who participate in the implementation of development plans by using their influence, motivations, and tactics (Husen, 2018; Kenate, 2013; Mahiteme, 2009). In regard to the implementation of programs and policies, they want to safeguard and advance their interests. The actors' abilities to do this vary. Their ability to exert political influence is probably influenced by the supplies they control plus their eagerness to utilize them (Husen, 2018). It is shrewd to consider the roles participated by the regime and its agencies, the farmers who donated their land, the speculators who purchased it, the land brokers or possessions traders, and the developers when examining the factors influencing land utilize and land swathe vibrant from the performers side (Mahiteme, 2009).

Labiso (2020) and Bhatta (2010) claim that one of the common expressions of the unintended consequence of urbanization is the informal and/or unlawful possession of property plus dwellings, which is especially prevalent in the periphery. Due to fast land use changes and intense urban growth brought on by rising population and economic growth, Ethiopia is seen similarly to other developing nations. Ethiopia's metropolitan regions are expanding quickly, which has its own effects, most notably a hammering of undeveloped land and output (Mengesha & Getachew, 2017).

Lastly, the following particular aims are considered in order to acquire the accurate findings:

1. To demonstrate the key influencing variables that led to the town's urbanization.
2. To locate the major players responsible for the town's growth.

LITERATURE REVIEW

Over the past 50 years, there has been unprecedented urban land expansion worldwide, and it is expected to get substantially worse (Seto et al., 2011). Urban land expansion,

one of the most obvious and irreversible forms of land transformation, has had significant effects on the Earth system at all scales, including environmental pollution, human health effects, and loss and degradation of natural habitats (Litteral & Wu, 2012). It has also altered the climate, atmospheric chemistry, and hydrology (Gong et al., 2012). Many of the aforementioned consequences are felt far beyond the limits of the city and are causing the biggest changes to the ecosystem on a global scale. However, cities do offer a variety of benefits, such as decreased infrastructure costs and increased production efficiency brought on by knowledge spillover (Siedentop & Fina, 2010). Besides, understanding urbanization's process, as well as its origins and effects, has significant ramifications for the long-term viability of densely populated areas (Lambin et al., 2001).

Understanding the spatiotemporal patterns of urban expansion has been the subject of numerous studies. However, there have not been many thorough studies of what causes urban growth. In fact, the majority of studies on the factors influencing urbanization have focused on static qualitative analysis (Long et al., 2008), and only a few have looked at their temporal dynamics (Schweizer & Matlack, 2014), spatial disparities (Ju et al., 2016), and cross-city comparisons (Batty, 2004; Dadi et al., 2016; Pickett et al., 2001; Zhao et al., 2017). The individual and combined effects of the numerous driving forces, which are crucial for understanding the mechanisms behind urban expansion, are poorly understood. In addition to being a requirement for understanding the urbanization process and its ecological effects, a thorough grasp of urban expansion drivers and dynamic mechanisms serves as the cornerstone of effective urban planning and management strategies (Zhao et al., 2017).

MATERIALS AND METHODS

Study Area Description

According to **Figure 1**, Dukem Municipality is situated 37 kilometers Southeast of Addis Ababa next to the main road to Adama.

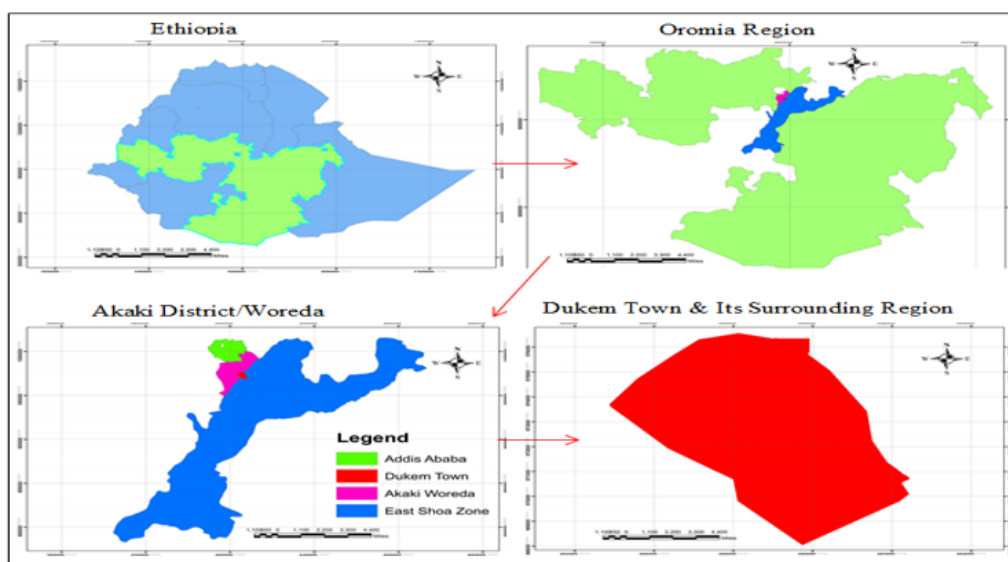


Figure 1. Location map of Dukem Town (Source: Field survey, 2022)

Table 1. Depiction of the study variables

Variables	Measuring methods
Address, gender, age, birthplace, level of educations, prerequisite background, occupation, workplace, work position, & year of services	Descriptive statistics graphs were used.
Population growth, investment pressure in business and services, the establishment of industries and manufacturing, the development of road infrastructure and transportation, housing preferences, informal access to land, prepared plans, the location of the municipality, & the municipality's landscape	Using five-point Likert scales from strongly agree to strongly disagree, ranked data were used, & descriptive statistics were applied to the findings.
Private investors, government officials, professionals, society, neighboring farmers, and land brokers	Ranked data were five points of Likert scales from strongly agree to strongly disagree used, & descriptive statistics were used to describe their results.
Characteristics of LULC: Urbanized area, farmland, forest, green space, & bare land	There were maps, graphs, & charts to be used.
Rate of alter	Graphs and charts were used.

Physically, the study vicinity spans an area of 9,630.6 hectares between latitudes 8045'25"N and 8050'30"N and longitudes 38051'55"E and 38056'5"E. It is situated 2,100 meters above sea level on average. The town is bordered by the towns of Bishoftu and Gelan in the Southeast and most of the north, respectively. Four nearby peasant organizations of the Akaki District define the remaining eastern and western portions of the municipality (OUPI, 2017).

Data Collection, Analysis, and Methods

The study's methodology is a survey method. The primary data were gathered using questionnaires. Five Likert ratings of powerfully agree to muscularly disagree were used to gauge respondents' perceptions of the factors and individuals that significantly influenced the rapid expansion of Dukem Town. Reports, court records, old study materials, and socioeconomic data were the primary sources for the secondary data. After the appropriate data had been gathered, SPSS 20 and Excel software had been used to process the data. The mean, mode, median, and standard deviation were used to arrange and analyze the data using expressive and inferential arithmetical techniques. Also included were tables, graphs, and descriptive analyses that displayed ordered data.

Methods

Urban land intensity were derived from Landsat imagery for six epochs (approximately 1980, 1990, 1995, 2000, 2005, and 2010) while considering the availability of cloud-free photos and the scientific necessity (Homer et al., 2015; Liu et al., 2014). Urban land expansion of the town during the past three decades was calculated using cloud-free multispectral scanner satellite pictures from before 1985 and cloud-free thematic mapper and enhanced thematic mapper satellite data from after 1985.

Sampling Techniques

A purposive sampling technique is used to choose the representativeness of the mark cluster from administrators, professionals from the land improvement and administration office, elderly people, and Kebele managers in order to generate data about the main motivating reasons and performers in charge for Dukem Municipality extension (Melka Dukem, Tedecha, Koticha, and Gogecha Kebeles). As a result, a total of 445 respondents were considered for the poll, including 66 office workers and 379 residents of the town.

Out of the 445 respondents scheduled for the survey (66 from bureau workers and 379 from populace), 388 (61 from

office workers and 327 from communities) were personally surveyed from all four kebele's in the municipality. Additionally, open- and closed-ended questions were created to gather data. Five Likert scales of powerfully agree to strappingly disagree were used to determine how the community of the town saw the officials, experts, Kebele administrators, and other stakeholders. The survey's questionnaire was mostly written in English before being translated into Amharic and the regional oromigna. All respondents to the chosen sample were given the same questionnaire by the researcher.

Study Variables and Measuring Methods

As can be seen in **Table 1**, the kinds of variables that were employed for this research, as well as their scrutiny and measurement methods, are identified along with provided in depth.

RESULTS

Driving Factors

Data obtained from officials and expertise revealed that forced urban expansions are increase in populace dimension, outlay pressure in business and services, the construction of industries and manufacturing, the development of roads and transportation, housing preferences, informal access to property, the town's established plans, as well as the town's location and terrain. Besides the rate of urban driving factors according to the respondents were presented in the **Figure 2**. According to the findings, increase in population size is the dominate factors that forced urban expansion while topography of the town is the least (**Figure 2**).

Driving Actors

Survey results and data obtained from expertise showed that the most dominant actors in urban expansion are private developers/investors (93.9%), population of the municipality (89.4%), government officials (86.4%), professionals (78.8%), and neighboring farmers (57.6%) (**Figure 3**).

CONCLUSION

This study concluded that the main drivers behind the town of Dukem's spectacular expansion were the establishment of industries and manufacturing, the town's

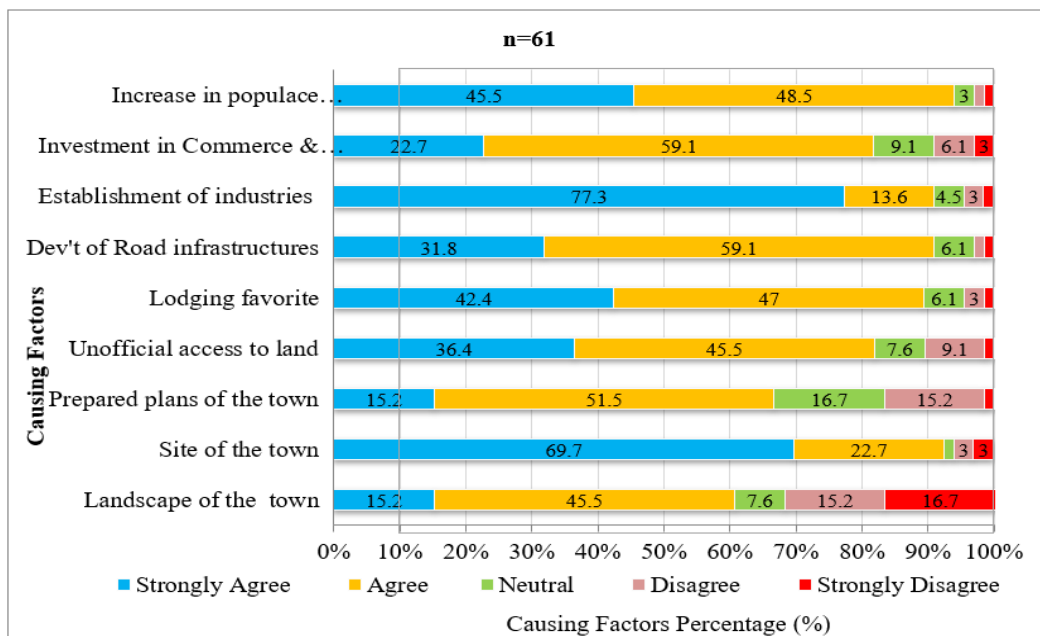


Figure 2. Driving factors of urban expansions (Source: Field survey, 2022)

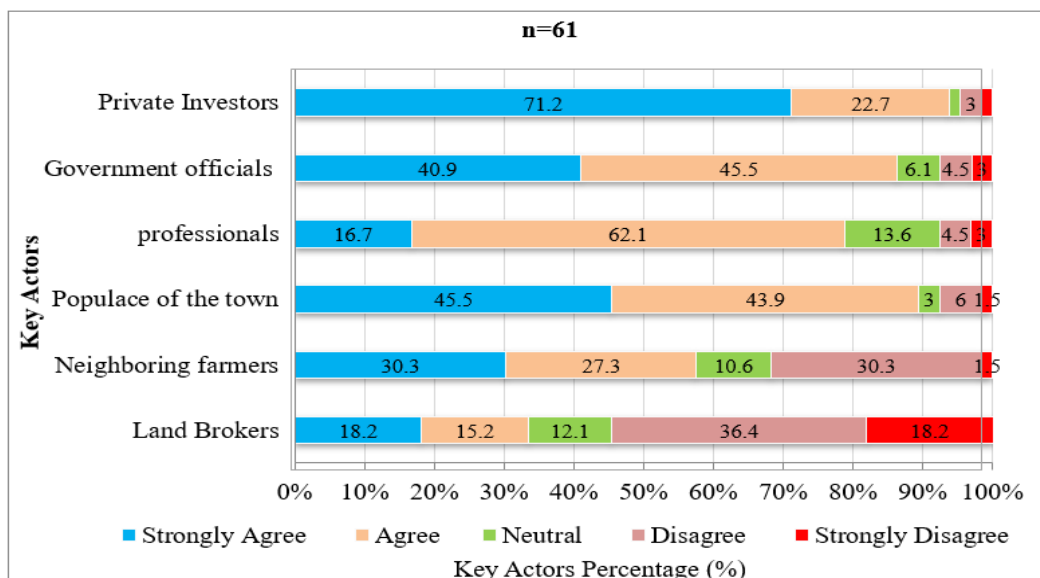


Figure 3. Driving actors of urban expansions (Source: Field survey, 2022)

location, and the growth in inhabitants. In addition, prominent contributors to the town’s quick expansions included private investors, government officials, brokers, and land speculators.

Recommendation

Therefore, in order to protect the productive agricultural land and natural habitats, all policy and planning issues should search for the concepts of infill development, high density mixed-use planning, compact cities, and smart growth.

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rules and regulations necessary for the execution of the study have been followed.

Declaration of interest: No conflict of interest is declared by the authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from corresponding author.

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