



Review Article

Causes of Urban Sprawl and Its Consequences on Farmlands and Households at the Fringe in Ethiopia: A Review

Zegeye Mulu * & Kumar Das

Department of Economics, College of Business and Economics, Wollega University, Nekemte, Ethiopia.

Abstract	Article Information
<p><i>This paper examines urban sprawl in Ethiopia, which has witnessed rapid urban expansion and conflicts from uncontrolled growth around Addis Ababa. Factors driving sprawl include population growth, rural migration, industrialization, policies, and inadequate planning. Sprawl encroaches on forests, farmlands, and ecosystems. To address this, Ethiopia needs a national spatial strategy for equitable growth and a green belt policy. A farmland protection policy is vital to curb unregulated land conversion and inefficient expansion on fertile lands.</i></p>	<p>Article History: Received : 10-04-2023 Revised : 16-05-2023 Accepted : 20-06-2023</p> <p>Keywords: <i>Ethiopia, farmland, impact, causative factors, urban sprawl</i></p>
<p>Copyright©2023 STAR Journal, Wollega University. All Rights Reserved.</p>	
<p>*Corresponding Author: Zegeye Mulu E-mail: ziselam@gmail.com</p>	

INTRODUCTION

In 2020, urban areas were projected to host about 62% of the global population, underscoring the urgent need to bolster local governance and civil society capacities to address urban sprawl, especially in developing nations. This concern is compounded by the transition of farmlands into urban areas, raising food security issues (Ichimura, 2003).

A significant urban expansion is anticipated from 2000 to 2030, with urban areas growing from 200,000 to over 600,000 square kilometers and their populations doubling (Angel et al., 2005). This transformation entails the conversion of roughly 400,000 square kilometers into urban regions, necessitating a comprehensive plan to tackle urban sprawl in developing countries. The conversion of rural to urban land often involves expropriation, with landowners receiving limited compensation. Factors like investor demand for cheaper land, landowner compensation expectations, and government income from

expropriation play a role. Land grant fees significantly contribute to government revenues (Robinson & Liu, 2015). However, policies such as Proclamation No. 455/2005 tend to favor the state over displaced communities and environmental preservation.

The United Nations projects the global urban population to reach 6.4 billion by 2050 from 3.9 billion in 2014, and research by Seto predicts that urban land in developing nations will expand from 300,000 to 1,200,000 square kilometers between 2000 and 2050. These projections emphasize the urgency of addressing urban sprawl, especially in developing countries.

Urban sprawl is a significant challenge in many developing nations, driven by a global population increase from 3.68 billion to 7.76 billion, with the urban population surging from 275,067,697 to 4,299,438,618 in 2019. This demographic shift necessitates more urban living space at the expense of arable farmland, resulting

Zegeye, M. et al

in reduced crop production, higher food prices, and local food shortages. Addressing urban sprawl is crucial to mitigating these challenges.

In Ethiopia, urban expansion, particularly in cities like Addis Ababa, has led to conflicts, resource depletion, and adverse impacts on the country's GDP. Expansion in towns like Bahirdar has caused farmland shortages, territorial disputes, and increased involvement of displaced individuals in unlawful activities, compromising peace and security (Haregeweyna et al., 2012). This review aims to consolidate existing knowledge and evidence on the causes of urban sprawl and its consequences on farmland and households in fringe areas.

What is urban sprawl?

Defining urban sprawl is a complex task due to its multifaceted nature, encompassing both macro- and micro-spatial dimensions. At the macro level, factors like population growth, migration patterns, rising incomes, and associated dynamics contribute to urban sprawl, while at the micro level, climate variations, geography, and the impact of local public policies intersect with city expansion.

Urban sprawl can be understood as the outward growth of metropolitan areas through diverse land use practices at their periphery (Rahman, Alam, & Islam, 2008). It predominantly involves the unregulated proliferation of housing, commercial developments, and road infrastructure across vast expanses of land, often with limited regard for urban planning (Hogan, 2012).

Alternatively, urban sprawl can be defined as cities expanding towards their neighboring regions or beyond established boundaries (Stella Consulting, 2015). The urbanization entails increased human habitation, intensified per capita energy and land resource consumption, and significant landscape alteration (Emma, 2015).

According to Batty (2004), urban sprawl signifies unregulated urban growth without consideration for the environment, resulting in ecological impacts. Harper and Guttmann assert

Sci. Technol. Arts Res. J., April - June 2023, 12(2), 85-92

that urban expansion involves cities extending into their peripheries, leading to shifts in land use. This phenomenon stems from economic development, population surges, and spatial expansion.

In various sources, it is described as the unchecked and unregulated propagation of a city (Houghton Mifflin Harcourt Publishing Company, 2016) or the unrestrained proliferation of urban development into neighboring territories (Dictionary.com, 2019). Similarly, Merriam-Webster's English Learners Dictionary (2019) encapsulates urban sprawl as the emergence of significant commercial establishments and residential clusters in areas adjacent to the city that previously had sparse human habitation.

The beginning of urban sprawl

Adnan Weber's 1899 work, 'The Growth of Cities,' using statistical methodologies, marked a pivotal moment in urban studies, emphasizing urban expansion's significance. Park Burgess and McKenzie's collaborative effort produced the 'Ecological Theory of City,' focusing on urbanization trends and formulating a model for understanding expansion. 'Theory of the Central Places' examined spatial progression, settlement locations, and economic interactions, incorporating optimum population theory to address urban sprawl. Ebenezer Howard's 'Garden City Theory' prioritized economic dynamics for urban prosperity.

The 'Theory of Garden City Suburb' in England advocated residential areas separate from industry, influencing urban planning (Batchelor, 1969). Angel's 2005 perspective detailed urban land expansion's determinants, including geographical and environmental constraints, land demand from households and businesses, and regulatory policies governing land use in urban contexts. These theories collectively enhance our understanding of the multifaceted factors shaping urban expansion.

Causes of Urban Sprawl

Inadequate management, weak planning, and ineffective urban policies contribute to urban

sprawl (Ichimura, 2003). Factors like lower land prices, rapid development, tax regulation, and reduced industry taxes drive this phenomenon (Rahman et al., 2008). Urbanization, marked by increased urban residents, is closely tied to urban sprawl due to industrialization, job opportunities, transportation access, and migration trends (Emma, 2015). Rapid urbanization leads to land depletion and urban sprawl (Qian, 2016).

Urban sprawl has become a central topic in electoral campaigns, as seen in New Jersey's allocation of approximately \$25 billion for U.S. land conservation efforts between 1998 and 2002 (Kaifangshi et al., 2016). The Overseas Development Institute (ODI) highlights the dual impact of urbanization, with both benefits and challenges, including the influence of political dynamics on urban sprawl (Murali et al., 2018). Political factors have similarly contributed to unplanned urban expansion in Ethiopia.

In developing countries, cities face the complex challenge of urban sprawl driven by diverse factors, including population growth, rural-urban migration, infrastructure expansion, economic growth, industrialization, legal disputes, regulations, road development, housing preferences, government policies, investments, speculative practices, weak planning regulation enforcement, credit market fluctuations, living and property costs, and rural settlement reclassification (Woldegebrel, 2017; Bhatta, 2010). In summary, urban sprawl's drivers encompass a wide range of influences, each manifesting in distinctive forms and foundations.

Consequences of urban growth and sprawl

The consequences of urban sprawl extend far and wide, affecting both society and the environment. Issues such as reduced air quality, water contamination, and increased flooding stem from unchecked urban expansion. Additionally, this expansion leads to the irreversible depletion of critical ecosystems, impacting hydrological and carbon cycles, as well as causing conflicts within rural communities adjacent to urban areas

(Ichimura, 2003). Urban expansion brings additional burdens, including potential greenhouse gas emissions and encroachment on ecologically sensitive environments and fertile farmlands (Angel et al., 2005). It's not just land that is affected; the livelihoods of agricultural workers are also at stake. As urban areas encroach on agricultural lands, the workforce faces displacement, often leading to hardships (Rahman et al., 2008).

Unchecked urban sprawl results in farmland loss, displacement, environmental pollution, and an increase in criminal activities (Woldegebrel, 2017). Conflicts arise as rural and urban life clash, leading to the unraveling of traditional practices. This unchecked sprawl has detrimental consequences, disrupting natural landscapes and affecting air, water, biodiversity, and human health. Soil, a vital foundation, is damaged by pollution, compaction, and sealing, leading to degradation and reduced productivity.

Ethiopia's experience in Bahirdar town highlights the consequences of urban sprawl, including resource loss, social turmoil, and illegal activities (Haregeweyna et al., 2012). The displacement of farmers in Addis Ababa underscores the severity of the issue (Oromia Media Network, 2018).

Despite scholarly assessments, urban sprawl persists, with expansion rates outpacing population growth. The conversion of fertile agricultural lands into urban areas emphasizes the need for prudent urban expansion management, affecting residents' well-being and food security (Güneralp et al., 2020). The balance between urban development and rural sustenance holds the key to a harmonious future.

Forms of urban sprawl

Urban sprawl takes on various forms, each with distinct spatial expansion patterns. One aspect is "greenfield" development, which occurs in previously undeveloped areas. This can either connect seamlessly with existing urban regions or leapfrog over them, creating gaps between urban

areas. Urban sprawl often encroaches on critical habitats like wetlands, watersheds, forests, and farmlands, necessitating protective measures. It also varies in patterns, resulting in star-shaped, elongated, or circular cities with unique layouts (Angel et al., 2005).

Concentric expansion involves cities gradually expanding without significant barriers, while autonomous expansion leads to satellite cities connected to their parent cities by roads. Polynucleotide cluster concentrations near the central city are linked by road networks. Linear expansion follows specific directions, like coastal or riverine areas, guiding growth. Scatter expansion establishes multiple dispersed urban centers with low population density (Abdulahim, 2017). These expansion modes highlight the multifaceted nature of urban sprawl and its wide-reaching consequences.

Remedies for uncontrolled urban sprawl

Urban sprawl, characterized by low population densities, extensive outward expansion, isolated land use, leapfrog development, and wide stripe developments, can negatively impact urban life quality (Wagner, 2003). To address these challenges, a national spatial development plan is essential, considering future population distribution, rural settlement, land development, resource allocation, water and energy provision, infrastructure, housing, and community welfare. Zoning techniques are imperative, including sensitive land resource designation, buffer zones, hazard-prone land management, cultural resource protection, open space conservation, urban green management, and agricultural land management (Ichimura, 2003).

As the global population increasingly gravitates towards cities, the "compact city" model gains prominence as a solution to combat sprawl. It includes green belts to set clear urban boundaries and protect natural resources, as seen in European countries (Cambridge to Protect Rural England and Natural England, 2010). Strategies to mitigate sprawl involve managing rural-urban migration,

international migration, population distribution, and agricultural productivity (Angel et al., 2005). Developed nations adopt farmland protection policies, like China's state-owned urban land and collectively owned rural land (Robinson & Liu, 2015).

Floating cities and sea-based agriculture offer solutions to land scarcity, especially by 2050 due to urbanization, climate change, and growing food demands (Roeffen et al., 2013). Government intervention can control land expansion by acquiring lands owned by high-income individuals and promoting urban agriculture (Emma, 2015). Various policy instruments, such as urban growth boundaries, land development transfers, infrastructure limitations, and development impact fees, help regulate urban sprawl in the United States (Qian, 2016). Combating sprawl involves strategies like controlling vacant land expansion, promoting urban agriculture, and determining the appropriate sizes of cities (Abdulahim, 2017). A comprehensive, balanced approach is crucial to navigate the complexities of urban sprawl and ensure sustainable urban growth.

Experiences of some countries

In China, farmland expropriation and conversion to urban use reached 5,700 km² in 2011, causing 53 million farmers to lose their livelihoods (Ichimura, 2003). Low compensation for lost land and property exacerbated their challenges. This, along with an unclear land requisition process and significant discrepancies between compensation and government land sale prices, led to social unrest and injustice. To safeguard long-term food security, the Chinese central government aimed to protect 120 million hectares of land from urban conversion, focusing on controlling land-use conversion, misallocation, and inefficient urban expansion.

In Ethiopia, Addis Ababa City's expansion from 222.04 km² in 1984 to 530.21 km² in 1994 exceeded the planned 2007–2017 size of 526.99 km² (Minalu, 2014). The city had a built area of 294 km² in 2004, with annual new residents

estimated at 90,000–120,000 on average (Wessling, 2008). Government policies, from the military regime's nationalization of urban and rural lands in 1974 to the EPRDF government's agricultural-led development strategy in 1991 and the urban development policy in 2004, emphasized urban expansion without adequate consideration for displaced farmers (Tegenu, 2010).

In the United States, urban expansion from 2000 to 2015 resulted in the loss of nearly 7 million acres of farmland, 7 million acres of environmentally sensitive land, and 5 million acres of other land. This loss affected local food sources and habitats and caused various problems. In developing countries, such losses lead to displacement, reduced food supply, rising food prices, and unemployment, making it a critical issue (Bhatta, 2010).

Several countries have adopted policies and tools to control urban expansion. The United Kingdom established green belts to create a barrier between urban and rural areas. South Korea implemented tools like transferring urban functions, promoting new villages, and zoning for industry relocation and population control. Japan used land readjustment to suppress city growth (Robinson & Liu, 2015).

An urban expansion policy of some countries

In Addis Ababa, Ethiopia, urban agriculture is primarily focused on achieving food sovereignty and security, rather than curbing urban expansion. This approach repurposes fertile lands for non-agricultural uses (Abdulrahim, 2017). Mongolia has adopted a smart growth plan emphasizing high-density development within the city center from 2008 to 2030, promoting sustainable urbanization. China's compact cities policy employs remote sensing and geographic information systems for monitoring land use and environmental impacts resulting from urban expansion.

The New Town policy, implemented in various countries like Egypt, Britain, and Iraq, aims to alleviate urban population pressures by

constructing new cities, offering a systematic solution to address urban challenges. Additionally, the strategy of constructing urban villages, particularly in Britain since 1989, encourages mixed ownership and land use, fostering community pride and contributing to local area restoration. The Green Belt policy restricts urbanization in designated areas to protect arable land and the environment. This policy is employed in countries such as the United States, England, Germany, and Italy (Ibid.).

Green belt policy

The green belt policy, introduced by Ebenezer Howard in 1898 as planned garden cities surrounded by green belts, found its roots in late 19th-century urban planning. The Cambridge to Protect Rural England (CPRE) played a key role in its establishment in London, leading to its adoption in various countries like China, India, Korea, Canada, and the USA (Cambridge to Protect Rural England and Natural England, 2010). In the 1970s, satellite images highlighted green belts along the Finnish-Russian border, leading to the creation of twin parks after the fall of the Iron Curtain in 1989 through Finnish-Russian collaboration (Terry et al., 2006).

The green belt policy aims to curb urban sprawl by ensuring designated land remains open. In England, around 1,636,620 hectares were designated as green belt areas in 2014/2015. Local governments have the authority to define and uphold green belt land within their jurisdiction. While debates about its effectiveness and role in environmental management have persisted for over six decades in England, the policy remains relevant and subject to periodic review and intervention by regional and local governments. The policy serves five primary purposes: controlling urban expansion, preventing the amalgamation of neighboring towns, safeguarding rural areas, preserving the character of historic towns, and contributing to urban revitalization by repurposing derelict lands (Cambridge to Protect

Compensation for land holdings and properties on the land in Ethiopia

The Proclamation Number 455/2005, enacted to address urban population growth and development needs, contains several key provisions. Part Two defines "compensation" for individuals whose property is on expropriated land and "public purpose" as land use determined by an "appropriate body" in line with urban or development plans (Federal House of Representatives, 2005).

However, a key concern is the identity of this "appropriate body." It should ideally involve the community residing on the land (landowners), but they are often excluded from urban planning decisions, a matter that needs further attention. Part Two's "Notification of Expropriation Order" and 8th stipulation on displacement compensation appear to favor the state's interests over those of farmers. The compensation calculation fails to consider the ongoing connection of farmers to the land and their families' livelihoods.

Part Three, specifically number 11, addresses "Complaints and Appeals about Compensation." It states that complaints should go to the competent court in areas without an established administrative body, potentially causing difficulties for farmers unfamiliar with the complaint procedures. The current proclamation tends to favor the state's perspective and should involve the local community in decision-making for better effectiveness.

CONCLUSIONS

The term "urban sprawl" was coined in a 1955 article, initially used as a critical evaluation of London's urban development (Wikimedia, 2019). It is generally associated with negative aspects, representing the uncontrolled and poorly planned expansion of urban areas,

leading to various socio-economic and environmental challenges. Urban sprawl is often prevalent in areas where local governance lacks effectiveness in implementing government policies, often neglecting the rights and interests of peripheral inhabitants. Essentially, it involves the unchecked growth of urban territories, particularly affecting agricultural communities and the natural environment.

Multiple factors contribute to urban sprawl, but proactive city administrators, along with knowledgeable and skilled municipal professionals, can mitigate its adverse effects. Commitment from the executive branch, prioritizing societal welfare and environmental preservation, is crucial to addressing urban sprawl's challenges. Once capable leaders assume roles, they can employ strategies to mitigate their detrimental consequences.

The competence, experience, and dedication of both federal and local government bodies are pivotal in addressing this issue. In Ethiopia, political motivations often drive urban expansion, influenced by political dynamics. Careful selection of non-arable land for investment can protect the farming community and agricultural lands.

Implementing a comprehensive national spatial development plan equitably across regions is essential to mitigating urban sprawl's impact. Policies affecting rural-urban migration and modernizing the agricultural sector are critical for containment. Ethiopia's afforestation and reforestation efforts can benefit from a Green Belt policy, while a rigorous farmland protection policy should be established through thorough research on farmland issues.

ACKNOWLEDGEMENTS

We are grateful to Wollega University for providing the necessary facilities to complete this research work.

DECLARATION

There is no conflict of interest in this work.

DATA AVAILABILITY STATEMENT

All data included in the article are available from the corresponding author upon request

REFERENCES

- Abdulrahim, B. (2017). The urban expansion: Policies and solutions. *Global Scientific Journal*, 5(11), 38-45.
- Angel, S., Sheppard, S., Civco, D. L., Buckley, R., Chabaeva, A., Gitlin, L., & Perlin, M. (2005). *The dynamics of global urban expansion* (p. 205). Washington, DC: World Bank, Transport and Urban Development Department.
- Batchelor, P. (1969). The origin of the garden city concept of urban form. *Journal of the Society of Architectural Historians*, 28(3), 184-200.
- Batty, M. (2004). Scatter-casa-ucl.ac.uk. Retrieved October 18, 2019, from http://www.casa.ucl.ac.uk/scatter/download_final.html
- Bhatta, B. (2010). *Analysis of urban growth and sprawl from remote sensing data*. Springer Science & Business Media.
- Cambridge to Protect Rural England and Natural England. (2010). Green belts: A greener future. CPRE/Natural England.
- Dictionary.com. (2019). Urban sprawl. Retrieved October 18, 2019, from <https://www.dictionary.com/browse/urban-sprawl>
- Emma, A. (2015). Study on impact of urbanization and rapid urban expansion in Java and Jabodetabek megacity, Indonesia. Kyoto University.
- Federal House of Representative. (2005). A proclamation to provide for the expropriation of land holdings for public purposes and payment of compensation. Addis Ababa, Ethiopia: Birihanina Selam Printing Press.
- Güneralp, B., Reba, M., Hales, B., Wentz, E. A., & Seto, K. C. (2020). Trends in urban land expansion, density, and land transformation from 1970 to 2020: A global synthesis. *Environmental Research Letters*.
- Haregeweyna, N., Fikadu, G., Tsunekawa, A., & Tsubo, M. (2012). The dynamics of urban expansion and its impacts on land use/land cover change and small-scale farmers living near the urban fringe: A case study of Bahir Dar, Ethiopia. Elsevier.
- Hogan, F. E. (2012). *Human geography: People, place and culture*. Wiley.
- Houghton Mifflin Harcourt Publishing Company. (2016). *American Heritage® Dictionary of the English Language* (5th edition). Houghton Mifflin Harcourt Publishing Company.
- Ichimura, M. (2003). *Urbanization, urban environment and land use: Challenges and opportunities*. Institute for Global Environmental Strategies.
- Kaifangshi, C., Yun, Y., Xu, T., Li, L. (2016). Urban expansion and agricultural land loss in China. *A multiscale perspective. Sustainability*, 8(8), 727.
- Landscape Institute. (2018). *Landscape briefing: Green belt*.

- Robinson, G. M., & Liu, Z. (2015). Greening and “un” greening Adelaide, South Australia. *AIMS Environmental Science*, 2(3), 511-532.
- Marriam-Webster. (2019). Urban sprawl. Retrieved October 18, 2019, from <http://www.learnersdictionary.com/definition/urban%20sprawl>
- Minalu, Y. (2014). Performance evaluation of Addis Ababa city road network. Addis Ababa University.
- Murali, M., Cummings, C., Feyertag, J., Gelb, S., Hart, T., Khan, A., et al. (2018). 10 things to know about the impact of urbanisation. *Overseas Development Institute* (ODI).
- Oromia Media Network. (2018). Displaced farmers. Addis Ababa, Ethiopia.
- Qian, J. (2016). Urban land expansion and sustainable land use policy in Shenzhen: A case study of China’s rapid urbanization. *Sustainability*, 8(8), 727.
- Rahman, G., Alam, D., & Islam, S. (2008). City growth with urban sprawl and problems of management for sustainable urbanization. In 44th ISOCARP Congress.
- Roeffen, B., Dal Bo Zanon, B., Czapiewska, K. M., & De Graaf, R. E. (2013). Reducing global land scarcity with floating urban development and food production. In *Conference Proceedings: International Water Week*.
- Smith, L. (2016). Green belt (*Research Paper No. 00934*). House of Commons Library.
- Stella Consulting. (2015). Green infrastructure in Italy. European Commission.
- Tegenu, T. (2010). Urbanization in Ethiopia: Study on growth, patterns, functions and alternative policy strategy. Stockholm University.
- Terry, A., Ullrich, K., & Riecken, U. (2006). The green belt of Europe: From vision to reality. IUCN, Gland, Switzerland and Cambridge, UK.
- Wagner, F. D. (2003). Compact city and urban sprawl. *Built Environment*, 29(3), 308-323.
- Wessling, U. (2008). Ethiopia and its capital, Addis Ababa. World Bank.
- Wikimedia. (2019). Urban sprawl. Retrieved November 02, 2019, from <https://en.wikipedia.org>
- Woldegebre, M. (2017). Impact of urban expansion on surrounding peasant land the case of Boloso Sore Woreda, Areka Town, SNNPR, Ethiopia. *Global Journal of Human-Social Science Research*, 17(2), 53-65.