



Understanding Urban Sprawl and Sustainable Urban Development in Indonesia

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Abstract

Along with increasing urbanization, many cities in Indonesia are experiencing rapid and uncontrolled expansion into the suburbs. This phenomenon, a form of urban sprawl, is particularly prevalent in metropolitan and surrounding peri-urban areas. The impacts of this phenomenon are quite diverse, ranging from the conversion of agricultural land and environmental degradation to disparities in access to public services and the increasing cost of infrastructure provision. This study was conducted to understand how urban sprawl develops in Indonesia, identify its causal factors, examine its impacts, and explore strategies to support sustainable urban development. This research uses a descriptive qualitative approach. Analysis was conducted through a review of literature, policy documents, and various reports from national and international institutions relevant to the research topic. The results show that the phenomenon of urban sprawl in Indonesia is influenced by various interrelated conditions, such as the growth of property investment, suboptimal spatial planning control, institutional fragmentation, infrastructure inequality, and the increasing preference of people to settle in suburban areas. Uncontrolled urban expansion also affects environmental and social conditions. The impacts are evident in the reduction of green open spaces, declining environmental quality, increasing socioeconomic disparities, and reduced efficiency of urban development. Uncontrolled urban expansion also affects environmental and social conditions. The impacts are evident in the reduction of green open spaces, declining environmental quality, increasing socioeconomic disparities, and reduced efficiency of urban development, strengthening coordination of metropolitan area governance, more optimal utilization of geospatial technology, and increasing the role of the community as part of an inclusive, resilient, and sustainable urban development strategy. This research shows that the success of urban development in Indonesia in the future depends heavily on the ability to control urban sprawl while also serving as a reference in policy development for metropolitan areas facing similar challenges in developing countries.

Keywords: Urban Sprawl, Sustainable Urban Development, Spatial Planning, Urbanization, Indonesia

INTRODUCTION

Cities are complex and dynamic entities that continuously undergo structural and functional changes over time [1]. As centers of economic growth and innovation, cities play a strategic role in advancing technology, transportation systems, communication, and the dissemination of information [2]. The attractiveness of cities as hubs of socio-economic activities makes them magnets for population movement, which in turn creates pressure on spatial planning, infrastructure, and the environment [3]. Migration to urban areas triggers increased density and the transformation of urban regions, affecting social and economic conditions as well as the



distribution of public services [4].

Modern urban areas are no longer defined solely in administrative terms, but function as continuously evolving service systems that adapt to population dynamics and spatial needs. Currently, around 55% of the global population lives in urban areas, and this figure is projected to increase to 66% by 2050, with the largest concentration in Asia and Africa [5]. Urban population growth in Southeast Asia also shows a similar trend, with an annual rate exceeding 2.5%. Table 1 illustrates how countries such as Laos, Cambodia, and Vietnam are experiencing very rapid urbanization.

Table 1. Average Annual Urban Population Growth in Southeast Asia (%)

Negara	1960- 1965	1970- 1975	1980- 1985	1990- 1995	2000 - 2005	2005- 2010
Indonesia	3,72	4,92	4,60	3,96	3,24	3,3
Thailand	3,53	5,59	4,66	4,02	3,70	1,8
Philippines	3,85	4,02	3,81	3,71	3,32	2,8
Malaysia	3,77	4,67	4,51	3,87	2,77	2,9
Myanmar	3,83	3,23	2,09	3,21	3,64	2,9
Cambodia	3,48	2,09	3,54	4,19	4,30	4,9
Vietnam	4,16	2,86	3,27	4,16	4,38	3,0
Laos	3,14	5,52	5,56	5,45	4,77	4,0
Southeast Asia	3,77	4,14	3,83	3,83	3,44	2,2

Based on Table 1, the data obtained from UNFPA show that the rate of urban population growth varies across countries in Southeast Asia. It can be seen that the urban population growth rate in all countries within the Southeast Asian region exceeds 2.5 percent per year. Laos is the country experiencing the highest urban population growth. If this growth is not accompanied by the provision of adequate urban facilities and infrastructure, it is highly likely to face various urban-related problems that are more severe than those experienced by other countries. This is supported by the view of Abu Hatab, who state that over the coming decades, particularly in developing countries, this population movement will become a defining trend [6].

An increase in population is certainly accompanied by an increase in residential housing development [7]. Land-use change, commonly referred to as land conversion Sugestiadi & Basuki, is also a related consequence [8]. The availability of space within cities does not increase and tends to remain limited [9]. This can lead to land constraints within urban areas and expansion into surrounding suburban regions [10]. A key characteristic of suburban areas in developing countries includes soil and water pollution, poverty, and informal settlements [11]. The following table presents an overview of urban conditions in Indonesia.

Table 2. Overview of Urban Areas in Indonesia

Year	Urban Population Density (per km ²)	Urban Population (million)	Urban Waste (million tons)	Urban Poverty (million)	River Water Quality Index	Air Quality Index	Number of Urban Slum Settlement s
2011	126	118.09	35.7	10.95	50.23	84.32	23.6 %
2012	128	120.5	38.5	10.51	50.36	79.61	24.2%
2013	130	122.1	23.69	10.63	51.82	80.17	25.9%



2014	132	125.32	46.8	10.36	52.19	80.54	26.5%
2015	134	137.6	64	10.62	65.86	83.84	27.1%
2016	135	141.8	66	10.49	60.38	81.61	28.3%
2017	137	143.3	65	10.27	58.68	87.03	29.5%
2018	138	147.6	64	10.13	72.77	84.74	30.6%
2019	140	150.9	67	9.86	52.62	86.56	31.9%
2020	141	154.2	67.8	12.04	53.53	87.21	32.4%
2021	142	158.7	66	11.86	53.33	87.23	32.8%

Source: Wordometers, Asian Development Bank, Ministry of Environment and Forestry (KLHK), Statistics Indonesia (BPS)

This serves as evidence that urban planning has failed, as reflected in the emergence of uncontrolled new urban centers and high levels of poverty [12]. Unplanned urban development is clearly inevitable in most cases [13]. This is characterized by changes in spatial structure and land-use patterns in suburban areas of both medium-sized cities and metropolitan regions [14]. The land area per capita in major cities in Indonesia averages only 40 square meters, which is the smallest figure among countries in East and Southeast Asia [14]. Along with the increase of millions of urban residents, Indonesia faces increasing vulnerability in soil quality, resulting in limited nutrient systems available for human needs, rising sea levels, coastal flooding, and other climate-related hazards, indicating that Indonesian cities are becoming increasingly urbanized [15].

Over time, these newly developed areas will continue to grow exponentially into satellite urban regions of the main city [16]. Eventually, urban agglomeration is formed Akintunde, which represents the integration of satellite cities and the core city [17], [18]. This population expansion displaces residents living in urban centers, pushing them toward rural areas and impacting the use of agricultural land in rural regions [19]. This is in line with the World Bank projection that approximately 220 million people in Indonesia will live in urban areas by 2045, accounting for 70% of the total population [20].

With urban development progressing as it is, concerns have emerged regarding its sustainability [21]. Almost all major cities in Indonesia are facing rapidly deteriorating environmental and living condition problems [22]. This deterioration is manifested in the form of slum settlements, urban sprawl, informal settlements, increased traffic congestion, flooding, erosion, and infrastructure damage [15]. Urban sprawl is the effect of the expansion of large urban areas and an urbanization process arising from the polarization of socio-economic activities in the city center, which shifts toward suburban areas separated by vacant land without considering environmental consequences or impacts [23].

The spread of urban sprawl is accompanied by a lack of compact urban form and insufficient consideration of the relationships among factors such as transportation, employment, health, and needs. Urban expansion is characterized by uneven growth patterns, driven by multiple processes, and results in inefficient use of resources [24]. Growth resulting from urban sprawl often involves the development of residential and commercial buildings in rural areas or undeveloped land on the urban periphery [25]. Urban sprawl in suburban areas occurs due to several factors, namely relatively low land prices and relatively low population density [26].

Sustainable urban development refers specifically to development that meets present needs



without compromising the ability of future generations to meet their own needs [27]. Sustainable development implies economic growth alongside the protection of environmental quality, where each reinforces the other, particularly through changes in three main areas, namely finance, social responsibility, and ecology, which are interlinked and interdependent [28], [29].

The importance of sustainable urban development lies in the long-term stability of the economy and the environment, which does not reduce the prospects of future generations to enjoy quality of life [30]. Meanwhile, Tomislav states that sustainable development can only be achieved through three concepts, namely environmental, social, and economic dimensions [31]. Environmental sustainability focuses on maintaining environmental quality required to support economic activities and societal well-being; social sustainability aims to ensure human rights, equality, and respect for cultural, racial, and religious diversity; and economic sustainability is necessary to maintain natural, social, and human resources needed for income generation and livelihoods. Therefore, achieving stable economic, environmental, and social development requires avoiding the depletion of a country's natural resources, and this is where sustainable development plays a crucial role [32].

Sustainable urban development as a holistic development that enhances social, ecological, and technological well-being [33]. Sustainable urban development can be characterized by several changes, including efficient land use, intensive use of automobiles but with improved accessibility; efficient resource utilization; reduced pollution and waste; restoration of natural systems; healthy housing and living environments; a sustainable economy; public participation and engagement; and the preservation of culture and local wisdom [34].

METHOD

This study uses a descriptive qualitative approach supported by normative-conceptual analysis to examine the phenomenon of urban sprawl and its relationship to sustainable urban development in Indonesia. The data used in this study comes from various secondary sources, including scientific literature, government policy documents, international organization reports, and laws and regulations related to spatial planning and urban development.

In this study, a descriptive qualitative approach was employed to examine the development of urban sprawl, the factors influencing its occurrence, and its impacts on social, economic, and environmental conditions. A normative analysis was conducted to assess the extent to which existing spatial planning policies are capable of accommodating the various challenges arising from urbanization processes.

This study also considers the experiences of other countries facing similar issues to identify strategies that can be implemented to control urban sprawl. The analysis emphasizes how public participation can support better planning processes while encouraging development that maintains environmental sustainability. The results of this study are expected to inform the development of urban policies that are more responsive to community needs and the challenges of sustainable development.



RESULTS AND DISCUSSION

1. Emergence and Trends of Urban Sprawl in Indonesia

Cities have always been a reflection of human dynamics, a place where people seek livelihoods, build hopes, and create their future. In Indonesia, cities have developed rapidly, accommodating millions of residents driven by mobility and aspirations for a better life. However, behind this seemingly impressive growth, an invisible phenomenon has emerged and continues to expand urban sprawl.

Urban sprawl is not merely the physical expansion of urban areas, but also a representation of shifts in social structure, governance, and the relationship between people and their space. In Jakarta, Surabaya, and Makassar, residential areas and shopping centers have emerged on land that was previously green. Urban peripheries are transformed into new activity centers, while core cities become increasingly dense and place greater pressure on open spaces.

This phenomenon does not emerge suddenly. Urban sprawl in Indonesia is the result of a combination of development policies, large-scale migration to urban areas, property investment pressures, and weak control over land conversion. Population growth and preferences for larger housing in suburban areas are the main driving factors [35]. Miao et al. add that weak spatial planning systems exacerbate the rate of this spatial expansion [36]. Meanwhile, Yao et al, view it as a consequence of overlapping regulations and weak inter-regional coordination [37].

The historical trajectory of urbanization in Indonesia shows that since the New Order era, development has been concentrated in major cities. Urban areas became the epicenter of national development. However, this growth has not always been aligned with spatial planning readiness. Informal settlements have proliferated, suburban areas have expanded without proper planning, and infrastructure has lagged behind. In the post-reform era, decentralization strengthened regional autonomy, but without a coordinating framework, it has instead accelerated the disintegration of spatial.

For example, this can be observed in Jabodetabek. Residential areas in Cibubur, Depok, and Tangerang have grown rapidly, yet they are not well connected to adequate transportation modes. Residents spend hours on the road commuting to the city center. In Makassar, coastal reclamation has eliminated fishermen's fishing grounds. In Yogyakarta, rice fields in Sleman and Bantul have been converted into property and tourism areas. This is not merely urban growth, but an uncontrolled transformation of space.

Data from the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) and the Ministry of Environment and Forestry (KLHK) (2023) show that more than 1.2 million hectares of metropolitan land have undergone land-use change over the past two decades. This has resulted in a decline in environmental quality, including air and water quality, and even an increase in urban temperatures. Inequality has also become more pronounced: formal areas enjoy infrastructure development, while informal areas remain left behind in access to basic services.

Urban sprawl is not only a physical problem, but also a structural issue. It reflects a weak long-term vision, disconnection between regions, and a lack of community participation in urban planning. Therefore, understanding the emergence and trends of urban sprawl is not merely a technocratic effort, but a strategic step to redirect urban development toward a more humane, equitable, and sustainable.



2. Urban Sprawl and Sustainable Urban Development in Indonesia: How Far Has the Journey Progressed?

Imagine someone living on the outskirts of Jakarta who must leave before dawn to endure a two-to-three-hour commute just to arrive at the city center on time for work. Or a fisherman on the outskirts of Makassar who has now lost access to the sea because reclamation projects have altered the coastline where he once earned his livelihood. Urban sprawl has become part of the daily story of millions of urban residents in Indonesia. This phenomenon not only transforms the physical urban landscape but also profoundly disrupts the social, economic, and environmental foundations of cities as a whole.

Sustainable urban development, which should serve as the new direction of urbanization, requires the integration of ecology, social equity, and economic efficiency. However, in reality, the direction of development is still characterized by uncontrolled spatial expansion. Sprawl leads to the conversion of agricultural land and green areas into residential and commercial zones. In Jakarta, for instance, green open space now accounts for only 9% of the total city area, far below the ideal standard set by the WHO. The impacts are clearly evident flooding, increased urban heat, declining air quality, and ecosystem degradation.

Not only from an ecological perspective, urban sprawl also creates widening social inequality. Many low-income residents are forced to move to suburban areas due to continuously rising land prices in city centers. However, there, they face a lack of basic facilities such as clean water, schools, healthcare services, and public transportation. A World Bank study notes that daily workers in the outskirts of Jakarta can spend up to 2.5 hours commuting back and forth [38]. Time that should have been spent with family is instead lost on the road.

In densely populated areas such as Jabodetabek, waste management has become a serious challenge. In many places, household waste is directly dumped into rivers because waste collection services do not reach those areas. According to the Ministry of Environment and Forestry (KLHK) (2023), only about 59% of urban waste is properly managed. The remainder pollutes rivers, lakes, and the sea.

Economically, urban sprawl also creates difficulties for the government. The development of infrastructure such as roads, electricity networks, and clean water systems in dispersed and sparsely populated areas is very costly. Often, these facilities are not utilized optimally due to planning that is not based on accurate demographic data. Ironically, while cities expand, productivity does not increase proportionally.

Urban sprawl also reflects weak spatial governance institutions in Indonesia. Major cities that share administrative boundaries with other regencies, such as Bandung and Malang, often lack a joint planning system. As a result, the development of new areas proceeds in an overlapping manner, without considering environmental carrying capacity and regional infrastructure.

Various government programs such as KOTAKU and Smart City Indonesia do exist. However, their impacts remain limited and tend to emphasize physical aspects. Their approach is often reactive repairing what has already been damaged rather than preventive and systemic. There is still no comprehensive strategy capable of preventing the emergence of urban sprawl from the outset.

Furthermore, urban lifestyles and culture also exacerbate the situation. Dependence on private vehicles, the perception that large suburban houses are more prestigious, and the growth of exclusive suburban areas have accelerated horizontal urban expansion. A Kompas Research



and Development survey (2022) found that 67% of the productive-age population prefer to live in suburban areas with affordable housing prices, even if it requires sacrificing time and access to services.

Nevertheless, there is a glimmer of hope. The city of Semarang has begun implementing disaster risk-based zoning. Surabaya has expanded its public transportation system and bicycle lanes. Bandung is developing its downtown area using a green and mixed-use concept. These steps indicate that a transformation toward sustainable cities is possible.

Urban planning experts such as Mulyadi emphasize the need for institutional reform and the involvement of citizens in spatial decision-making [39]. The study by Raharjo and Aulia adds the importance of consistent enforcement of spatial plans (RTRW) and inter-city coordination [40]. Meanwhile, Gunawan and Sari highlight that climate adaptation and controlling the rate of land-use conversion are two key components of environmental sustainability [41].

Building sustainable cities is not merely about infrastructure. It is about creating living spaces that are fair, comfortable, and livable for everyone. Society, the government, and the private sector need to come together to formulate a development direction that does not only benefit a few, but uplifts the lives of all urban residents. With the right steps, sprawl can be halted, and inclusive and resilient cities can truly be realized.

3. Planning Strategies and Policy Recommendations to Address Urban Sprawl

When we talk about the future of cities, what we envision is not merely skyscrapers or highways. The future of cities is about how space is designed so that everyone can live decently, safely, and with dignity. Unfortunately, urban sprawl has moved us away from this ideal. Behind the rows of cluster housing spreading across suburban areas lie issues of transportation, social alienation, and increasing ecological pressure.

In order to control urban sprawl and promote sustainable urban development, we are not only talking about technical plans and government policies, but also about how urban residents experience daily realities being stuck in traffic, difficulties in accessing basic services, or the increasing distance between housing and workplaces. By understanding this real-life context, the strategies designed can be more grounded and truly responsive to societal needs. Therefore, a comprehensive set of planning strategies and public policies is required. These strategies must cover various dimensions, ranging from spatial and ecological aspects to social and governance systems. Based on findings and comparisons of best practices from various countries, as well as expert inputs, the following are several strategic approaches that can be applied in Indonesia:

First, strengthen the spatial planning system through compact city policies and land-use conversion control. Local governments should encourage vertical development and the revitalization of already built-up urban core areas, rather than opening new areas on the outskirts. This can be supported by fiscal incentives for developers who build affordable housing in city centers, as well as a moratorium on new permits in areas that are not yet integrated with basic infrastructure.

Second, implement a Transit-Oriented Development (TOD) approach. This strategy integrates residential, commercial, and public transportation systems within a single interconnected area. A study by Priambodo and Rizki shows that the implementation of TOD in the Jabodetabek area was able to reduce dependence on private vehicles by up to 30% within the first five years [42].



Third, establish a metropolitan governance system that crosses administrative boundaries. Many major Indonesian cities are located within agglomeration areas, such as Greater Bandung (Bandung Raya) or Gerbangkertosusila. A strong metropolitan authority is needed with a mandate to develop joint master plans, coordinate spatial planning, and manage collective budgets. A model such as the Metropolitan Planning Organization (MPO) in the United States can be adapted within Indonesia's decentralization framework.

Fourth, integrate a community-based participatory planning approach. Planning can no longer be formulated in a top-down manner. The use of digital mapping, community deliberation (musyawarah kampung), and strengthening local capacity can open space for citizen participation in determining the development orientation of their areas. A study by Lestari et al, shows that active citizen participation can improve the effectiveness of spatial control by up to 60% [43].

Fifth, utilize geospatial technology and big data for evidence-based planning. The government needs to develop a spatial monitoring system capable of detecting the growth of built-up areas in real time. This information system should also be integrated with demographic, infrastructure, and disaster risk data to serve as a basis for preparing spatial plans (RTRW) and detailed spatial plans (RDTR) based on spatial intelligence.

Sixth, direct urban financing toward green and climate-resilient development approaches. Local governments can access green financing schemes such as Green Sukuk, Climate Bonds, and Urban Climate Finance developed by various international institutions. These funds can be utilized for projects such as degraded land restoration, strengthening urban green open spaces, lowcarbon transportation systems, and climate-adaptive infrastructure.

Seventh, institutional reform and enforcement of spatial planning regulations. The government needs to strengthen the institutional position of supervisory bodies and enforcement agencies for spatial planning (RTRW) at the local level. Law enforcement against spatial planning violations must be consistent, transparent, and accompanied by strict sanctions. The implementation of digital technology for online reporting of spatial planning violations can also enhance public transparency.

Eighth, integrate education and public awareness on the importance of sustainable cities. Educational curricula from primary to higher education should include issues of spatial planning, climate change, and environmental sustainability. Large-scale public campaigns through digital media, local communities, and CSR activities can also help shift public mindsets toward more responsible and efficient urban lifestyles.

By implementing these eight strategies simultaneously, Indonesia can slow down and even reverse the trend of urban sprawl toward a more compact, inclusive, resilient, and sustainable development pattern. These policy recommendations are expected not only to serve as a guideline for policymakers, but also to inspire cross-sector collaboration between government, the private sector, academia, and civil society in creating a better urban future.

4. Research Implications and Directions for Future Policy

Every city holds stories of hope, growth, and challenges. Urban sprawl has brought us to the reality that growth without direction not only expands city boundaries but also widens inequality and leaves behind an ecological footprint that is difficult to erase. From this perspective, the findings of this study have important implications for the future of spatial planning and urban development policies in Indonesia. First, urban sprawl is not merely a physical



urban growth phenomenon, but a reflection of governance crises and a lack of long-term planning. Therefore, structural reform and a transformation of the development paradigm are inevitable. The government must shift from a reactive and fragmented development approach toward more systemic, preventive, and sustainable policies.

Second, the results of this study indicate that addressing urban sprawl cannot be carried out solely through sectoral and local approaches. A cross-regional and multisectoral regulatory framework is required, along with strengthened institutional capacity at the metropolitan level. This will enhance collaboration between core cities and satellite cities and ensure that every development decision does not conflict with others or create negative spatial effects.

Third, this study provides strong arguments for the importance of spatial data, digital technology, and big data analytics in supporting evidence-based decision-making. Central and local governments are encouraged to develop an integrated, transparent, and participatory spatial information system as a basis for formulating, revising, and evaluating spatial planning policies in a sustainable manner.

Fourth, from a social and cultural perspective, the findings of this study highlight the importance of reshaping society's orientation toward urban space. Urban literacy campaigns, environmental education, and community participation are key to transforming spatial consumption patterns, which have been largely exploitative, into more adaptive and ethical ones. Thus, sustainable urban development does not only depend on state actors, but also on the transformation of collective urban awareness.

Fifth, this study suggests that the development of new cities, industrial zones, and national strategic projects should consider ecological and social integration from the early stages of planning. The principles of Social Impact Assessment and Environmental Impact Assessment should be adopted as minimum standards in every regional development project. Policies that do not take sustainability into account will only extend the list of environmental problems and social inequalities in the future.

Sixth, academically, this study opens opportunities for further in-depth and interdisciplinary research. Quantitative studies using spatial mapping based on satellite imagery, social surveys on citizens' perceptions of urban space, and evaluations of spatial planning policy impacts at the micro level need to be developed. These studies will enrich empirical evidence and support more contextual and responsive policymaking.

Thus, the implications of this study not only offer a critical reflection on the current conditions, but also encourage concrete and measurable actions to create Indonesian cities that are sustainable, equitable, and livable in the long term.

5. Factors Causing Urban Sprawl in Indonesia

Behind the face of ever-expanding cities and towering buildings lies a complex dynamic driving the phenomenon of urban sprawl in Indonesia. Urban growth is not only about population size or spatial demand, but also about policy directions, societal behavior, and how we perceive shared living spaces. This phenomenon is not merely a physical process, but a reflection of the economic, cultural, and institutional choices that have been collectively made over time.

Urban sprawl in Indonesia is the result of a complex interaction between economic, social, institutional, cultural, and spatial planning factors that are not yet well integrated. Understanding these causal factors is essential for formulating targeted policies. The following is a



comprehensive mapping of the main causes of urban sprawl in Indonesia:

- a. **Economic Factors and Property Investment**
The high land values in city centers encourage developers and consumers to seek more affordable locations in suburban areas. This triggers waves of residential, commercial, and industrial development in peri-urban regions. A study by Hadi and Santosa shows that land prices in Central Jakarta can be up to ten times higher compared to border areas such as Cibubur or Cileungsi [44]. This price disparity serves as a strong incentive for horizontal.
- b. **Weak Governance and Institutional Frameworks**
Urban sprawl cannot be separated from weak monitoring and enforcement of spatial planning. An evaluation by Bappenas shows that around 60% of built-up areas in metropolitan regions are not in accordance with their designated land use in spatial plans (RTRW) [45]. Weak coordination among local governments, as well as high levels of political intervention in land permit issuance, further exacerbate this condition. In many cases, developers obtain permits even though spatial plans are not yet ready or have not been updated.
- c. **Uneven Transportation and Infrastructure Patterns**
Infrastructure inequality between regions encourages the formation of isolated zones. The absence of effective mass transportation systems in many cities leads to dependence on private vehicles, which in turn expands the reach of residential areas. According to data from the Directorate General of Land Transportation (Ditjen Perhubungan Darat), less than 25% of major cities in Indonesia have optimally functioning public transport corridors. This condition reinforces the preference for living in suburban locations, with the consequence of long daily commutes [46].
- d. **Consumer Culture and Suburban Housing Preferences**
Societal culture that associates large houses with prestige also encourages the selection of residential locations in suburban areas. Cluster housing developments, which offer security and exclusive facilities, are becoming increasingly popular among the middle class. A survey conducted by the Demographic Institute of the University of Indonesia (2022) found that 61% of respondents of productive age prefer to live in suburban areas with spacious houses rather than in the city center in small apartments that are well connected by transportation.
- e. **Weak Control of Agricultural Land Conversion**
The conversion of productive land into residential and commercial areas is a significant contributor to urban sprawl. Weak implementation of Law No. 41 of 2009 concerning Sustainable Food Agricultural Land has resulted in the loss of large areas of agricultural land without adequate ecological compensation. Data from the Ministry of Agriculture (2023) shows that Indonesia loses more than 100,000 hectares of rice fields every year, most of which is due to urban expansion.
- f. **Regional Planning Fragmentation**
Overlapping or poorly coordinated urban and regional planning leads to uncontrolled spatial growth. Each region formulates its own spatial plan (RTRW) without considering functional and ecological linkages with neighboring regions. This occurs in many metropolitan areas such as Jakarta Bogor Depok Tangerang Bekasi (Jabodetabek) and Gerbangkertosusila in East Java, where each area operates under its own independent planning framework.
- g. **Weak Public Participation and Transparency**

The lack of community involvement in the formulation and monitoring of spatial planning makes planning processes elitist and technocratic. This results in policies that are not sensitive to local needs and are easily influenced by capital interests. A study by Wahyuni (2021) notes that only 17% of urban residents have ever participated in public consultations related to spatial planning (RTRW) in their cities.

Overall, the factors above indicate that urban sprawl does not occur naturally, but rather as a consequence of policy choices, development culture, and property market dynamics that are not directed within a sustainability framework. Therefore, efforts to address urban sprawl require comprehensive reforms across all stages of the urban development process, from planning, implementation, to policy evaluation.

6. Operational Recommendations for Realizing Sustainable Cities

To strengthen the effectiveness of the strategies and policies outlined earlier, concrete, applicable, and actionable operational recommendations are needed that can be adopted by local governments, urban planning practitioners, and other development actors. The following is a set of technical recommendations that can be implemented in stages:

- a. **Periodic Evidence-Based Revision and Harmonization of Spatial Plans (RTRW and RDTR)**
Local governments need to conduct comprehensive evaluations of spatial planning documents using the latest spatial data and demographic projections. Planning must take into account disaster-prone areas, conservation zones, as well as environmental carrying capacity and carrying load. The integration of spatial plans (RTRW) across metropolitan regions must be prioritized.
- b. **Implementation of Incentives and Disincentives in Land and Development Regulations**
Developers who build in city center areas or utilize idle land for affordable housing should be provided with incentives such as tax reductions or accelerated permitting processes. Conversely, developments that promote urban sprawl may be subject to fiscal disincentives in the form of higher environmental levy rates or restrictions on utility access.
- c. **Strengthening Digital Monitoring Systems Based on Geospatial Technology**
The utilization of satellite imagery, drones, and Geographic Information Systems (GIS) should become part of land-use monitoring systems at the district/city level. Local governments can develop spatial dashboards that enable real-time visualization of built-up area growth to prevent violations of spatial planning regulations.
- d. **Provision of Integrated and Accessible Public Transportation**
Investment in public transportation systems such as Bus Rapid Transit (BRT), commuter trains, and bike-sharing services must be carried out simultaneously with the development of new urban areas. Every new residential area must have access within a maximum of 500 meters to a public transport stop or station, in accordance with TOD principles.
- e. **Designation of Green Buffer Zones and Ecological Corridors**
Each city must have a master plan for green open spaces that is integrated into an inter-regional ecological corridor system. These areas should not only serve as natural boundaries for urban expansion, but also function as carbon sinks, temperature regulators, and biodiversity conservation zones.
- f. **Reformulation of Urban Renewal and Old City Revitalization Approaches**
Rather than continuously opening new land on the outskirts, the government should focus its



budget on revitalizing city centers, upgrading dense residential areas, and redeveloping former industrial zones into mixed-use areas. This can reduce horizontal expansion pressure and optimize the use of existing infrastructure.

- g. **Multisectoral Collaboration and Establishment of Metropolitan City Forums**
The government needs to establish a cross-administrative boundary forum involving district/city governments, the private sector, academics, and civil society. This forum can be used to develop regional spatial plans, synchronize budgets, and formulate a shared roadmap toward sustainable cities.
- h. **Implementation of Spatial Planning Literacy and Public Awareness Program**
Through media campaigns, citizen training, school curricula, and community engagement, urban residents need to be encouraged to understand the importance of spatial control and their role as social monitors of development policies. These recommendations are designed to strengthen institutional capacity, improve spatial efficiency, and accelerate the transition of Indonesian cities toward a more resilient, equitable, and sustainable future. Regular evaluation and policy learning must be an inseparable part of every implementation process.

CONCLUSION

Public awareness of the importance of spatial planning needs to be continuously built through education, training, public campaigns, and direct involvement in various development activities. These steps have the potential to increase institutional effectiveness, encourage more efficient use of space, and support a more sustainable urban development direction. Furthermore, regular evaluation is crucial so that the various programs designed can be continuously refined and adapted to actual needs.

Urban sprawl no longer simply describes the expansion of urban areas. In Indonesia, this phenomenon also highlights various challenges in spatial governance, development planning, and efforts to meet the needs of a growing population. Rapid urban development often brings various consequences, from declining environmental quality to the reduction of open spaces that support community comfort and quality of life.

This research found that urban sprawl is related to various problems in development governance, including sub optimal spatial control, limited inter-regional coordination, and a lack of attention to sustainability principles in the development process. Therefore, handling urban sprawl needs to be carried out in an integrated manner by paying attention to the relationship between environmental, social, economic and institutional aspects in urban area management.

While urban sprawl still faces challenges in various regions, the experiences of several Indonesian cities demonstrate that a more sustainable development path is still achievable. The success of these initiatives is inextricably linked to government support, innovative policies, and active community participation.

Therefore, future urban development should be directed not only toward physical and economic growth but also toward improving the quality of life of urban residents and ensuring environmental sustainability. Ultimately, the success of urban development will depend on the ability of various stakeholders to work collaboratively and maintain a long-



term commitment to sustainable development, enabling Indonesian cities to continue growing without compromising the needs of future generation.

DECLARATION OF GENERATIVE AI

The author used generative AI tools solely for language refinement and translation purposes. All ideas, analyses, and conclusions presented in this manuscript are the original work of the author.

REFERENCES

- [1] R. Russ, S. Kellert, and M. Bissell, "City complexity and change: The ecology of urban development. Urban Ecosystems," *Urban Ecosyst.*, vol. 18, no. 4, pp. 787–803, 2015.
- [2] K. Loughran, "Imbricated Spaces: The High Line, Urban Parks, and the Cultural Meaning of City and Nature," *Sociol. Theory*, vol. 34, pp. 311–334, Dec. 2016, doi: 10.1177/0735275116679192.
- [3] E. Glaeser and B. Steinberg, "Transforming cities: does urbanization promote democratic change?," *Reg. Stud.*, vol. 51, pp. 58–68, Jan. 2017, doi: 10.1080/00343404.2016.1262020.
- [4] A. Marta, R. Gunawan, and M. Lestari, "Population mobility and urban transition in Indonesian metropolitan areas," *J. Kependud. Indones.*, vol. 15, no. 1, pp. 45–49, 2020.
- [5] M. Coccia, "A Theory of the General Causes of Long Waves: War, General Purpose Technologies, and Economic Change," *Technol. Forecast. Soc. Change*, vol. 128, pp. 287–295, 2018, doi: <https://doi.org/10.1016/j.techfore.2017.11.013>.
- [6] A. Abu Hatab, M. Cavinato, and C. Lagerkvist, "Urbanization, livestock systems and food security in developing countries: A systematic review of the literature," *Food Secur.*, vol. 11, pp. 279–299, Mar. 2019, doi: 10.1007/s12571-019-00906-1.
- [7] H. Buhaug and H. Urdal, "An urbanization bomb? Population growth and social disorder in cities," *Glob. Environ. Chang.*, vol. 23, no. 1, pp. 1–10, 2013, doi: 10.1016/j.gloenvcha.2012.10.016.
- [8] A. Sugestiadi and A. Basuki, "Lahan perkotaan dan konversi fungsional di Indonesia," *J. Agrar. dan Tata Guna Lahan*, vol. 14, no. 1, pp. 27–38, 2019.
- [9] W. Rauws and G. De Roo, "Adaptive planning: Generating conditions for urban adaptability. Lessons from Dutch organic development strategies," *Environ. Plan. B Plan. Des.*, vol. 43, no. 6, pp. 1052–1074, 2016, doi: 10.1177/0265813516658886.
- [10] A. Hantono, S. Wibowo, and T. Rahmawati, "Urban fringe development and the impact on agricultural land," *J. Tata Ruang dan Lingkung.*, vol. 10, no. 1, pp. 33–35, 2018.
- [11] A. Forsyth, "Defining suburbs," *Routledge Companion to Suburbs*, no. 3, pp. 13–28, 2018, doi: 10.4324/9781315266442.
- [12] M. Ravi, "The Failure of Spatial Planning And The Emergence Of New Urban Peripheries," *Urban Res. J.*, vol. 9, no. 2, pp. 135–149, 2014.
- [13] D. Muis, B. Utomo, and M. Hamzah, "Ketidakteraturan Pertumbuhan Kota Dan Kerusakan Ekologis," *J. Tata Kota dan Wil.*, vol. 7, no. 1, pp. 77–89, 2015.
- [14] Y. Surya, "Luas lahan hunian dan tantangan urbanisasi di Asia Tenggara," *J. Perkota. Trop.*, vol. 6, no. 2, pp. 55–71, 2021.
- [15] H. Prayitno, "Urban Vulnerability and Resilience in Indonesia's Climate Change Context," *J. Lingkung. dan Pembang.*, vol. 8, no. 2, pp. 105–120, 2019.
- [16] A. Wandl and M. Magoni, "Sustainable Planning of Peri-Urban Areas: Introduction to the Special Issue," *Plan. Pract. Res.*, vol. 32, pp. 1–3, Jan. 2017, doi: 10.1080/02697459.2017.1264191.
- [17] O. Akintunde, S. Fadare, and R. Jimoh, "Urban agglomeration and sustainable development in sub-Saharan Africa," *African J. Sustain. Cities*, vol. 10, no. 2, pp. 56–68,



- 2016.
- [18] L. Inostroza, "Urban Expansion and the Environmental Effects of Informal Settlements on the Outskirts Of Major Cities," *Landsc. Urban Plan.*, vol. 165, pp. 7–15, 2017.
 - [19] United Nations, "World Urbanization Prospects: The 2018 Revision," New York, 2018.
 - [20] World Bank, "Indonesia urbanization review: Managing growth for inclusive and sustainable cities," Washington, 2021.
 - [21] G. Nnaemeka, "Urban Sustainability And Governance In West Africa: Lessons For Indonesia," *African J. Urban Dev.*, vol. 10, no. 1, pp. 121–139, 2016.
 - [22] K. Otsuka, K. Kalirajan, and M. Kikuchi, "Challenges in sustainable urban development: Case studies from Southeast Asia," *World Dev. Perspect.*, vol. 15, pp. 100–115, 2019.
 - [23] S. Lai, "Urban sprawl and its ecological impact: A case study of East Asian metropolises," *J. Environ. Geogr.*, vol. 13, no. 4, pp. 55–66, 2020.
 - [24] Y. Liu, T. Li, and L. Xu, "Urban sprawl patterns and implications for sustainable urban development," *J. Urban Plan. Dev.*, vol. 144, no. 2, 2018.
 - [25] P. Pukowiec, "Rural-Urban Transformation And The Politics Of Land Conversion," *Eur. J. Spat. Dev.*, vol. 69, pp. 1–19, 2020.
 - [26] S. Assaf, M. Yusuf, and N. Karim, "Determinants of urban sprawl in Southeast Asian suburban regions.," *Asian Urban Res. J.*, vol. 12, no. 1, pp. 45–67, 2021.
 - [27] O. Lavrinenko, J. Smirnova, and L. Lavrinovicha, "Sustainable Urban Development: Trends And Challenges," *Environ. Res. Eng. Manag.*, vol. 75, no. 2, pp. 60–69, 2019.
 - [28] A. Rosha and N. Lace, "Cross-Sectoral Interconnection And Sustainability In Strategic Planning," *Econ. Manag.*, vol. 7, no. 1, pp. 92–98, 2015.
 - [29] A. Ohotina, N. Lace, and S. Guseva, "The Impact Of Sustainable Development Strategies On Regional Planning," *Entrep. Sustain.*, vol. 6, no. 2, pp. 522–537, 2018.
 - [30] R. Emas, "The concept of sustainable development: Definition and defining principles. Florida International University," *Br. GSDR*, 2015.
 - [31] M. Tomislav, "Environmental, Social And Economic Pillars Of Sustainable Urban Development," *Eur. Plan. Stud.*, vol. 26, no. 2, pp. 233–250, 2018.
 - [32] H. Ali, "Sustainable Development And Ecological Justice: An Integrated Approach For Emerging Economies," *J. Environ. Policy Plan.*, vol. 23, no. 2, pp. 145–161, 2021.
 - [33] S. E. Bibri and J. Krogstie, "Smart sustainable cities of the future: An extensive interdisciplinary literature review," *Sustain. Cities Soc.*, vol. 31, pp. 183–212, 2017, doi: 10.1016/j.scs.2017.02.016.
 - [34] R. P. J. Ron Schipper and A. J. Gilbert Silvius, "Characteristics of smart sustainable city development: Implications for project management," *Smart Cities*, vol. 1, no. 1, pp. 75–97, 2018, doi: 10.3390/smartcities1010005.
 - [35] Y. Zhang, Q. Liu, and M. Chen, "Urban Sprawl and the Shift of Residential Preference in Asia," *Int. J. Urban Sci.*, vol. 22, no. 4, pp. 553–570, 2018.
 - [36] Z. Miao, S. Su, and X. 2021Li, "Spatial planning inefficiencies in peri-urban expansion: Lessons from Southeast Asia," *Urban Geogr. Rev.*, vol. 44, no. 3, pp. 411–426, 2021.
 - [37] Y. Yao, J. Zhao, and X. Tang, "Fragmented Urban Planning And Governance Challenges In Developing Countries: A cross-city analysis," *Habitat Int.*, vol. 97, pp. 102–124, 2020.
 - [38] World Bank, "Indonesia urban mobility review: Equity, access, and resilience," Washington, 2022.
 - [39] M. Seto, "Kelembagaan tata kota dan kebijakan spasial di Indonesia," *J. Perenc. Kota Indones.*, vol. 19, no. 1, pp. 32–49, 2021.
 - [40] S. Raharjo and N. Aulia, "Konsistensi RT RW dan peran aktor lintas wilayah dalam tata ruang metropolitan," *J. Adm. Publik*, vol. 15, no. 3, pp. 204–222, 2022.
 - [41] D. Gunawan and N. A. Sari, "Adaptasi Iklim Dan Tata Kelola Ruang Dalam Kota Berkelanjutan," *J. Perenc. Wil.*, vol. 29, no. 2, pp. 112–128, 2023.



- [42] A. Priambodo and M. Rizki, “Efektivitas pendekatan TOD dalam mengurangi ketergantungan kendaraan pribadi,” *J. Transp. Perkota.*, vol. 13, no. 2, pp. 78–95, 2021.
- [43] M. Lestari, D. Pratama, and I. Ramadhani, “Partisipasi Warga Dan Efektivitas Perencanaan Ruang Di Kota Menengah,” *J. Urban dan Perubahan Sos.*, vol. 8, no. 1, pp. 65–84, 2022.
- [44] R. Hadi and R. Santosa, “Dinamika harga tanah di kawasan urban dan suburban Jakarta,” *J. Ekon. Perkota.*, vol. 11, no. 1, pp. 45–59, 2021.
- [45] Bappenas, *Evaluasi pelaksanaan RTRW wilayah metropolitan*. Jakarta: Kementerian PPN/Bappenas, 2022.
- [46] L. Ditjen Perhubungan Darat, “Laporan Tahunan Sistem Transportasi Publik Nasional,” 2023.