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Urbanization Rapidity and Its Impact on Shuklagandaki Municipality

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Abstract

This study examines the trends and causes of urbanization as well as how they affect Nepal's Shuklagandaki Municipality, which is urbanizing quickly. Using a mixed-methods approach, the study incorporates data from both qualitative and quantitative sources. Quantitative information was gathered from field survey and qualitative data were collected from public reports, census records, and government statistics to examine demographic and economic developments in the municipality during the previous 20 years. Through in-depth interviews with important stakeholders, such as public servants, company owners, and community leaders, qualitative data were acquired. Regression analysis and other descriptive and inferential statistics were used in the data analysis process. The results show that throughout the past 20 years, Shuklagandaki Municipality has had notable increase in both demographic and economic metrics. Urban expansion was primarily driven by population increase and economic development; infrastructural improvements, while significant, were secondary. The necessity for planning and policy initiatives that support sustainable growth while attending to the needs and well-being of present and future inhabitants is highlighted by the difficulties and possibilities brought about by the fast urbanization. The article finishes with a summary of the key results, a discussion of the research limitations, and references for future research topics to fill in the gaps in the body of knowledge and address unresolved issues with urban expansion in Shuklagandaki Municipality.

Keywords: *Urban, rapidity, land use, sprawl, urbanisation, expansion*

Background

Urbanization is the movement of people from rural to urban areas. The name comes from the Latin "Urbs," which was a term used by the Romans to describe a city. Urban sociology is the study of individual interactions, group dynamics, and urban social contexts. the migration of people from rural regions, where agriculture is the main source of income, to urban areas with a concentration of government, trade, and industrial enterprises (Nottridge, 2013).

Cities across the world are growing economically and physically, and they have to make many crucial decisions to shape this progress. The idea of urban sprawl and its detrimental effects on several towns serve as a warning that unchecked city expansion would have dire repercussions (Gurin, 2003). Decision-makers in development must have a thorough understanding of sprawl's causes, effects, and mitigation strategies. This goes double for the stakeholders that their initiatives touch. The fact that sprawl occurs in very diverse ways in many parts of the world attests to its extreme complexity (Nechyba & Walsh, 2004).

The concentration of people in urban areas and urbanization are the main causes of societal problems on a global scale. The population of the globe has expanded six times in the last 200 years, with over half of people living in cities. This has put pressure on both natural and social systems (Pickett et al., 2011). In Nepal's main cities, urbanization—the result of population growth and rural-to-urban migration—is recognized as a critical socioeconomic development. The entire human environment is impacted by urbanization in a number of ways. According to Dewees et al. (2020), although it may not be desired, it is inevitable in the context of normal economic conditions, therefore the outcomes might be mostly either positive or negative. It is one of the observable variables in population and economic expansion where social life enhancement, commercial attractiveness, and many other aspects are triggered throughout time.

A country's land resources are its most vital natural resource and the foundation of its economy. It consists of the physical environment, which includes plants, soils, water, climate, relief, and vegetation, all of which have an impact on the capacity for land use. The economic histories of many countries demonstrate the strategic importance of land resources in shaping human progress on the economic, social, and cultural fronts. Since the beginning of time, agricultural land has been one of the most important land resources, employing the greatest proportion of the global population. There is an urgent need to manage every piece of land responsibly due to the expanding needs for food and raw materials as well as the strain that population is placing on the land. This necessitates the use of land resources in a way that is reasonable, scientific, and economically sound. In the past, trial and error tactics have frequently been used exclusively in the development of land resources. This has inevitably led to inappropriate land usage in many regions of the world, which has caused the degradation of a vital fundamental resource over time. via thorough mapping and categorization of land, nations striving to modernize agriculture via the use of scientific methods have a great chance to rectify previous land-use errors and

eliminate additional errors. When there is a downward tendency in the ratio of humans to land, land is regarded as both a natural resource and a capital. While it is not often evident, land plays a crucial part in any country's economy. Sustainable development cannot exist in the absence of stable land rights. There are several perspectives from which to study land and its use. Resistance and inertial factors have resisted several attempts to manage this occurrence. The government often imposes restrictions on land usage in certain jurisdictional domains, issuing reserve orders in some regions to allot them for industrial, agricultural, and game purposes (Sivakumar, 2005).

In recent years, urbanisation has grown to be a significant global trend. 14% of people on Earth lived in cities in 1920; by 1950, that number had increased to 25% (Weber et al., 2003). Presently, 3.3 billion people, or 50% of the world's population, reside in cities (UN, 2008). Generally speaking, urbanization is the percentage of a nation's population that resides in cities. On the other hand, it has been called a spatial diffusion process in certain research.

As of right now, there are more people living in urban regions than in rural ones worldwide, and by 2050, it is expected that 70% of people would live in urban areas. Despite having a high pace of urban expansion, Nepal's population distribution is still unequal among its urban areas, with the Kathmandu Valley acting as the center of the nation's urbanization. A recent study of Ministry of Urban Development states that with over a million residents, Kathmandu city has the greatest population density in 2011 (19,726 people per km2) (CBS, 2011). The uneven distribution of population across ecological and development zones is a problem for towns trying to manage population expansion with limited resources, as the paper emphasizes.

Urbanization is highest in the hilly region of the country (21.7%), followed by Tarai (15.1%) and the highlands (2.8%). The Central Bureau of Statistics reports that while the rural population decreased from 86% in 2001 to 83% in 2011, the urban population grew significantly from 4% in 1971 to 17% in 2011. Furthermore, in 2011 the growth rate in rural areas was just 2% whereas it was 7% in metropolitan areas. Consequently, the number of people living in urban areas in Nepal has increased from 0.23 million to 4.5 million, with municipal areas found in 72 of the 77 districts in the nation. (NBC, 2011).

Nepal is a rapidly urbanizing country, ranking in the top ten least urbanized in the world. With 5,130,000 people living in cities and an urbanization rate of 3% in 2014, the degree of urbanization was 18.2% (UNDESA, 2014). Nepal's 1.9 percent yearly pace of urbanization is expected to keep it in the top ten fastest-urbanizing nations between 2014 and 2050. The extent of urban agglomerations is determined by balancing the demands of agglomeration and congestion (Ellison et al., 1999). Urban development can result from any changes to the economy as a whole or to a city in particular that increase agglomeration factors or reduce limitations related to congestion. One example that is frequently used in the literature is the decrease in the cost of commuting, which results in cities that are larger in terms of area, population, and output (Das et al., 2021).

Due to an expansion in population and infrastructure, Shuklagandaki, which was formerly a tiny market area connected to the surrounding cities of Pokhara and Damauli, has expanded into a significant hub for trade in recent years. Shuklagandaki, which located in Nepal's Tanahun district, has grown quickly into an urban center that serves as a hub for trade and commerce for a number of nearby rural communities, including Thaprek, Kotre, Bankiya, Dhorphirdi, Raipur, Firfire, and others. The town is a prime example of a developing urban center as it is going through major changes in its infrastructure, economics, and urbanization.

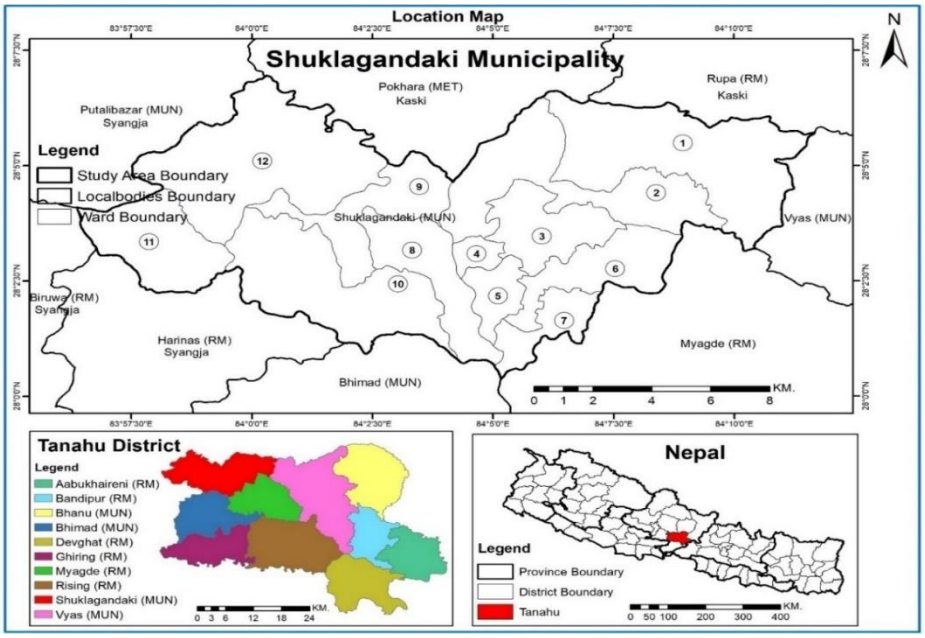
Despite urbanization, Shuklagandaki maintains strong connections to its rural outskirts, serving as a market center that provides access to various goods and services for surrounding rural areas. Many residents from these rural regions commute to Shuklagandaki for employment, which contributes to the town's economic growth. This creates a symbiotic relationship where both the town and the rural areas benefit from each other's resources and opportunities.

The primary goal of this study is to analyze the land use changes and urban growth in the Shuklagandaki municipality over a twenty-year period from 1999 to 2020. It also aims to interpret the rapid urbanization and its impact on the municipality, which is developing rapidly along the Prithvi Highway in a linear pattern. The study seeks to identify trends in urban development and examine changing land use patterns using methods adopted by various researchers. Additionally, it aims to measure the current rate of change by reviewing the historical trend of urban growth through images from different years.

Study Area

The village development committees (VDCs) Dhorphirdi, Dulegauda, and Khairanitar were merged on May 18, 2014, to become the municipality of Shuklagandaki, which is located in the Tanahun district of Gandaki Province, Nepal. The Thaprek, Raipur, and Phirphire VDCs were included into the municipality on March 5, 2017, marking a further expansion (Fig. 1.1). Shuklagandaki lies between latitudes 28° 04' 12"N and 28° 04' 42"N and longitudes 84°05' 24"E and 84°11' 40"E. It is located along the Prithvi Highway. It is connected to the other major towns and cities in the area, such as Kotre, Khairenitar, and Dulegauda, via its location. The population has grown significantly as a result of the expansion. There were 37,109 people living in Shuklagandaki as per the 2011 Nepal Census. But after the merger, the population increased to 48,456.

Figure 1
Study Area



Methods and Materials

Both primary and secondary data sources are used in this investigation. Field surveys were used to collect primary data; these surveys comprised structured interviews, questionnaires, observations, and photos. To further examine the causes and effects of land use change and fast urbanization, a checklist was created, locations were noted, focal group discussions were held, and informed people were recruited as key informants.

Secondary data were gathered from a number of sources, including the Shuklagandaki Municipality website, the Tanahun district website, the Central Bureau of Statistics (CBS), and local publications. The majority of the secondary data came from trustworthy sources, such as photographs, maps, and socioeconomic and physical documents. To create maps, the study uses two kinds of secondary data, namely satellite data (table 1).

Table 1
Satellite data

Data Use	Path/Rows	Spatial Resolution	Swath Wide (km)	Date of Acquisition
Land sat 8 OLI/TIRS C1 Level-1	142/041	30	185	11/10/2020
Land sat 7 ETM+ C1 Level-1	142/041	30	185	12/11/2010

Source: glovis.usgs.gov.

Additional secondary sources were used to obtain ancillary data on changes in land use and urban growth. These sources included Topographical sheets, District Profiles, Cadastral Maps from the Department of Survey, Government of Nepal, Demographic data from the Central Bureau of Statistics for 2018, Nepal, and Others - Research Reports, Journal Books, and Documents. The data was gathered using satellite data.

Results and Discussion

Land use pattern of 2000-2020

The land use pattern of Shuklagandaki municipality in the year 2000 is detailed in Table 1. The municipality covers a total area of 164.9486 square kilometers and includes various land use types such as forest, cultivated land, urban areas, grasslands, barren land, bush, cliffs/cuttings, water bodies, ponds, and sandy areas.

The forested area is the largest, comprising 47.21% of the total land, indicating a significant forest cover that likely helps maintain the ecological balance of the region. Cultivated land is also substantial, covering 46.64% of the total area, highlighting agriculture as a primary livelihood for residents.

Urban areas occupy only 1.12% of the land, suggesting that the municipality was predominantly rural at that time. However, with ongoing urbanization and population growth, these land use patterns may have changed, making it interesting to observe recent trends in the municipality's land use (Table 2).

Table 2

Change of Land Use Pattern from the Year 2000-2020

LU Type	Year 2000		Year 2010		Year 2020	
	Area in Sq. Km	%	Area in Sq. Km	%	Area in Sq. Km	%
Barren Land	0.010606	0.01%	0.0106058	0.01%	0.010606	0.01%
Bush	2.093001	1.27%	2.0930009	1.27%	2.061786	1.25%
Cliff/Cutting	0.262039	0.16%	0.2620395	0.16%	0.262039	0.16%
Cultivated Land	76.92818	46.64%	75.50394	45.77%	60.31932	36.57%
Edge of Waterbody	1.353314	0.82%	1.3504306	0.82%	1.353314	0.82%
Forest	77.87582	47.21%	77.845424	47.19%	78.86548	47.81%
Grass Area	1.485047	0.90%	1.4731968	0.89%	0.833283	0.51%
Pond	0.002189	0.00%	0.0021893	0.00%	0.002189	0.00%
Sandy Area	3.087056	1.87%	3.0475847	1.85%	2.93296	1.78%
Urban	1.851341	1.12%	3.3601647	2.04%	18.30763	11.10%
Total	164.9486	100.00%	164.94859	100%	164.9486	100%

Source: Land Sat Image, 2000-2010 & 2020

Table 2 and Figure 2 illustrate the changes in the land use pattern of Shuklagandaki Municipality from 2000 to 2020. The table provides data on different land use categories for each of the three years, including their respective areas in square kilometers and percentages. The land use types in 2010 are similar to those in 2000, with only minor changes in area and relatively constant percentages. However, there are notable shifts in land use patterns by 2020 compared to 2000 and 2010.

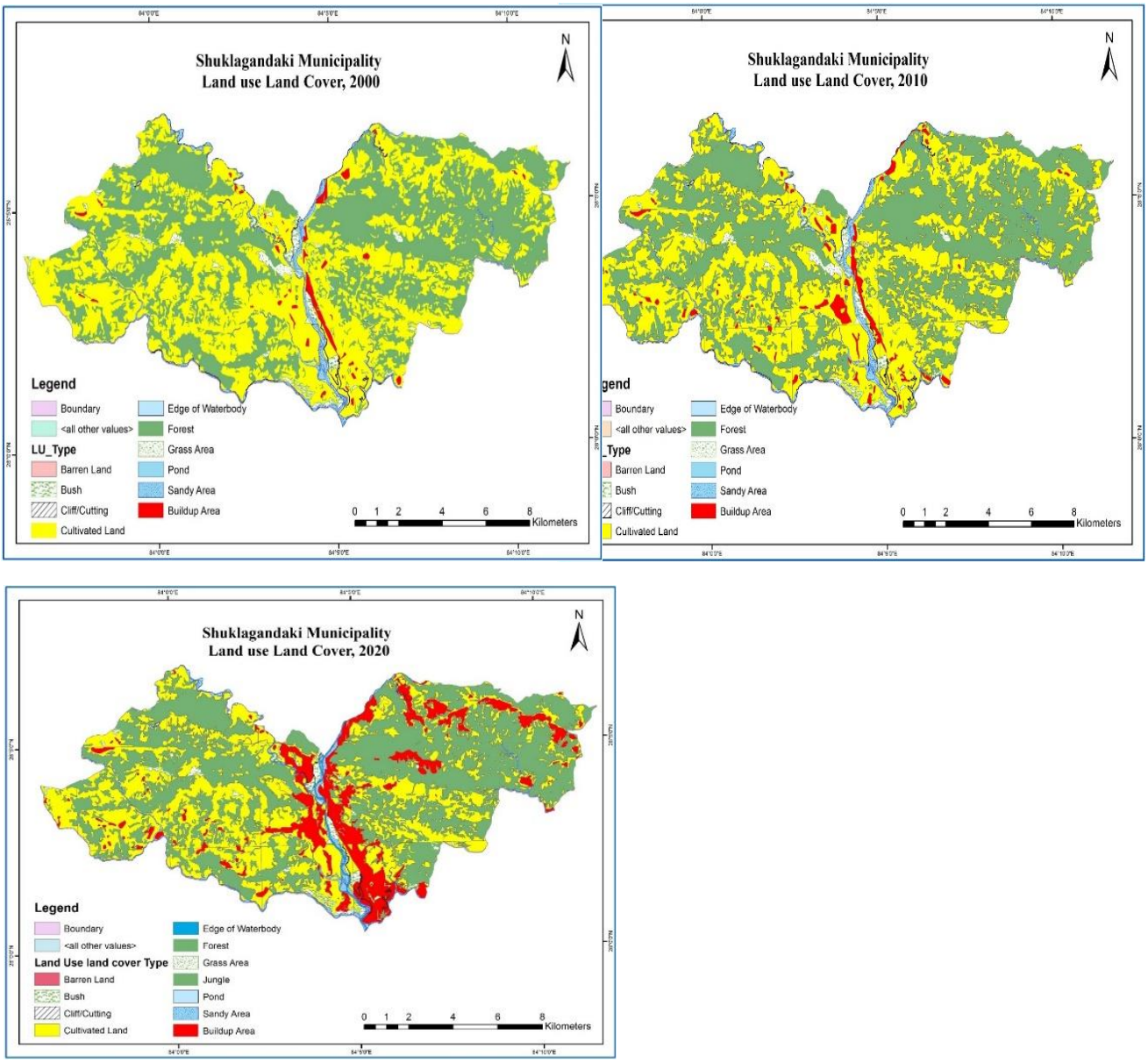
The most significant change is in the "Cultivated Land" category, which decreased from 46.64% in 2000 to 36.57% in 2020. The "Urban" category saw a substantial increase, rising from 1.12% in 2000 to 11.10% in 2020, indicating significant urban expansion. The "Forest" category also experienced a slight increase, from 47.21% in 2000 to 47.81% in 2020. Other land use categories such as "Bush," "Cliff/Cutting," "Edge of Waterbody," "Grass Area," and "Sandy Area" experienced relatively minor changes in area and percentage over the years. The total area of the municipality remained constant at 164.9486 square kilometers throughout the three years.

These changes suggest shifts in agricultural practices, urbanization, and potentially environmental conservation efforts in Shuklagandaki Municipality. Based on Table 3, the sandy area in the municipality, particularly in Ward Number 2 Kotre region, has undergone significant change from 2000 to 2020, being converted to built-up areas. The most notable change is the increase in land area used for urban development, which grew from 1.12% of the total land area in 2000 to 11.10% in 2020. This major change is likely due to the rapid population growth in Shuklagandaki Municipality.

Another significant change is the decrease in land area used for cultivation, which dropped from 46.64% in 2000 to 36.57% in 2020. This decline is likely due to the conversion of agricultural land to urban development and infrastructure. There was also a small decrease in forest land use, which increased from 47.21% in 2000 to 47.81% in 2020, likely due to reforestation efforts in the municipality.

Overall, the land use in Shuklagandaki Municipality has changed significantly over the past 20 years, with the most notable changes being the increase in urban land use and the decrease in cultivated land use. These changes are likely driven by rapid population growth and the increasing demand for land for urban development.

Figure 2
Land Use of 2000, 2010 & 2020



Causes of Land Use Change and Urban Growth

Due to a number of variables including institutional, developmental, demographic, and economic forces, Shuklagandaki Municipality has experienced considerable changes in land usage during the past few decades. One major force behind changes in land usage has been economic considerations. The municipality's economy has expanded quickly in recent years due to its importance as a trading hub. space used for agriculture has been converted into urban areas due to the growing demand for space for commercial and industrial uses (Table 3). This has resulted in significant changes in land use. The building of new roads, bridges, and other infrastructure has

raised land values, according to focus group discussions (FGD), which has attracted developers to buy agricultural property and turn it into commercial and residential space. Changes in Shuklagandaki's land usage have also been greatly influenced by demographic issues. The population has been rapidly increasing over the past few decades due to migration from rural areas. Data shows that the population has steadily risen over the years: from 33,317 in 1991 to 40,570 in 2001, then to 48,456 in 2011, and further to 55,620 in 2021 (CBS, 2021).

Table 3

Change of Land Use type from 2000-2020

LU_Type	Area 2000		2010		Area 2020	
Barren Land	0.01061	0.01%	0.0106058	0.01%	0.01061	0.01%
Bush	2.093	1.27%	2.0930009	1.27%	2.06179	1.25%
Cliff/Cutting	0.26204	0.16%	0.2620395	0.16%	0.26204	0.16%
Cultivated Land	76.9282	46.64%	75.50394	45.77%	60.3193	36.57%
Edge of waterbody	1.35331	0.82%	1.3504306	0.82%	1.35331	0.82%
Forest	77.8758	47.21%	77.845424	47.19%	78.8655	47.81%
Grass Area	1.48505	0.90%	1.4731968	0.89%	0.83328	0.51%
Pond	0.00219	0.00%	0.0021893	0.00%	0.00219	0.00%
Sandy Area	3.08706	1.87%	3.0475847	1.85%	2.93296	1.78%
Urban	1.85134	1.12%	3.3601647	2.04%	18.3076	11.10%
Total	164.949	100%	164.949	100%	164.949	100%

Source: Land Sat Image, 2000-2010 & 2020

A result of the rising housing demand brought on by the expanding population is the conversion of agricultural land into urban areas. Furthermore, as a result of the strain this population increase has had on natural resources like water and forests, their quantity and quality have declined (Table 3). In Shuklagandaki Municipality, changes in land usage have also been influenced by institutional considerations. Key Informant Interviews indicate that unplanned urbanization and inadequate land-use planning have resulted from the failure of local government policies and laws to effectively regulate land-use change. The issue has been made worse by the improper enforcement of rules and regulations, which has led to unauthorized changes in land use. Land-use changes in the municipality have also been greatly impacted by the development environment. Infrastructures like power, water supplies, and roads have made it simpler for developers to turn agricultural land into urban areas. Land-use shifts have also been exacerbated by the migration of people from rural regions to urban areas due to the availability of jobs.

Impact of Urban Rapidity

Tanahun District's Shuklagandaki Municipality is a fast growing urban region that is having both beneficial and bad repercussions from its expansion. Public services, such as schools, hospitals, and public transportation, have grown in number along with the population. The citizens' well-being depends on these changes. For

example, the expansion of healthcare facilities has improved access to medical treatment, which has reduced mortality and improved quality of life. Comparably, more educational establishments have raised the literacy rate, which has raised the general public's level of education and expanded their access to the economy. Additionally, as a result of the boom, new sectors and enterprises have emerged, generating employment possibilities and promoting economic development. Residents' levels of self-sufficiency and poverty have decreased as a result of this growth in economic activity.

However, rapid urbanization in Shuklagandaki Municipality has also caused environmental degradation. Observations reveal that increased population has led to higher waste generation, air and water pollution, and deforestation. The growing waste has strained garbage collection and disposal systems, contributing to environmental pollution. Industrial activities, traffic congestion, and untreated sewage have exacerbated air and water pollution. Deforestation is another major concern, driven by urban expansion.

Moreover, traffic congestion has intensified as the number of private vehicles has grown, leading to longer commutes, increased air pollution, and a decline in quality of life. This congestion can also negatively impact the economy by raising transportation costs and reducing productivity. Additionally, the rapid urban growth has resulted in a shortage of affordable housing, causing issues such as homelessness and overcrowding. This lack of affordable housing exacerbates social inequality, with wealthier residents accessing better housing while lower-income individuals face substandard living conditions.

Conclusion

Due to an increase in the number of people leaving rural regions, economic growth, and better employment prospects in metropolitan areas, Nepal has lately seen a fast urbanization. Urbanization has brought about issues such as inadequate housing, pollution, and poor infrastructure, despite the fact that it has also improved access to modern amenities, healthcare, and education. With the help of initiatives like the National Urban Policy 2016 and the Urban Development Strategy 2017, the Nepalese government is tackling these problems.

Shuklagandaki Municipality has had substantial urban expansion over the previous few decades, according to data. From 33,317 in 1991 to 48,456 in 2001, the population climbed, stayed at 48,456 in 2011, and then increased again to 55,620 in 2021 (CBS, 2021). There has been unequal growth in the community; Ward No. 5 has had the largest gain in population, followed by Wards No. 2 and 10, while Wards No. 11 and 12 have witnessed a fall (CBS, 2021). According to land use statistics, non-built-up areas declined while built-up areas increased, rising from 1.85 km2 in 2000 to 18.31 km2 in 2020 (Table 3). This suggests a considerable rise in built-up areas and people as well as urbanization and growth.

But the increase is uneven, and the spread of populated regions might also be influenced by other variables. The reasons for the municipality's urban expansion

may become clearer with more investigation. In order to guarantee a sustainable and habitable future, the municipality had to adopt a proactive stance towards urban development, emphasizing sustainability, community involvement, and readiness for disasters.

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