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Analysis of Land Use Change on Environmental Degradation: A Literature Review in Urban Areas

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Abstract

This research presents a literature review on the analysis of land use change in urban areas and its impact on environmental degradation. Rapid and uncontrolled land use change in urban areas has resulted in the conversion of green land into residential, commercial, and industrial zones, with impacts such as urban heat island, air and water pollution, and loss of natural habitats. This research used a descriptive qualitative approach. The type of research used was a literature study. The results of this study show that it is important to have an in-depth understanding of land use change trends, their impacts on the environment, and their implications for urban sustainability. The results highlight the need for wise regional planning, sustainable natural resource management, and policies that consider environmental aspects to address the challenges of environmental degradation in urban areas..

Keywords: *Environmental Degradation, Land Use, Urbanization*

Abstrak

Penelitian ini menyajikan tinjauan literatur tentang analisis perubahan penggunaan lahan di daerah perkotaan dan dampaknya terhadap degradasi lingkungan. Perubahan penggunaan lahan yang cepat dan tidak terkendali di perkotaan telah menghasilkan konversi lahan hijau menjadi zona perumahan, komersial, dan industri, dengan dampak seperti urban heat island, polusi udara dan air, serta hilangnya habitat alami. Penelitian ini menggunakan pendekatan kualitatif deskriptif. Jenis penelitian yang digunakan adalah studi literatur. Hasil penelitian ini menunjukan bahwa pentingnya pemahaman mendalam tentang tren perubahan penggunaan lahan, dampaknya terhadap lingkungan, dan implikasinya bagi keberlanjutan perkotaan. Hasil penelitian ini menyoroti perlunya perencanaan wilayah yang bijaksana, pengelolaan sumber daya alam yang berkelanjutan, dan kebijakan yang mempertimbangkan aspek lingkungan untuk mengatasi tantangan degradasi lingkungan di daerah perkotaan.

Kata kunci: Degradasi Lingkungan, Penggunaan Lahan, Perkotaan

Introduction

Urban areas are centers of human socioeconomic activities that have grown rapidly in recent decades (Wahdah & Maryono, 2018; Rakuasa & Latue, 2023). Population growth, urbanization, and industrialization have been the main drivers of land use change in urban areas (Asfari et al., 2017; Pertuack et al., 2023; Sihasale et al., 2023). Along with this growth, significant land use change has occurred, dramatically altering the urban landscape (Manakane et al., 2023). While these changes have brought various benefits, such as increased economic and employment opportunities, it is important to note that these land use changes have also brought serious environmental impacts. One of the major impacts of land use change in urban areas is environmental degradation (Salakory & Rakuasa, 2022: Septory et al., 2023). These changes often involve the conversion of agricultural, forest, or open land into urban zones such as settlements, shopping centers, and industries (Latue & Rakuasa, 2023; Rakuasa & Latue 2023). The first noticeable impact is the loss of green space and decrease in vegetation cover, resulting in increased temperatures in urban areas (Latue et al., 2023; Latue & Rakuasa, 2023). This phenomenon is known as the urban heat island effect, which can impact air quality and population health (Hehanussa et al., 2023).

In addition, land use change can also lead to increased air and water pollution (Latue et al., 2023). Urban industrial and transportation zones are often the source of greenhouse gas emissions and other pollutants that are detrimental to the environment (Rakuasa, 2022a). Surface water and groundwater can also be contaminated by industrial and domestic effluents, causing damage to aquatic ecosystems and threats to public health. In addition to physical impacts, land use change in urban areas can also alter the social and economic lifestyle of residents (Philia & Rakuasa, 2023; Rakuasa et al., 2023). New settlements, infrastructure and shopping centers can change the way residents move, such as mobility, access to public facilities and quality of life. However, there are often negative consequences, such as traffic congestion, increased living costs, and accessibility issues for the less well-off.

To address these changes, a deeper understanding of the relationship between land use change and environmental degradation in urban areas is essential. Previous studies have tried to answer this question, but there are still many variables and complexities that are not fully understood. Therefore, this study aims to determine the relationship between land use change and environmental degradation: a review of the literature in urban areas. By better understanding the relationship between land use change and environmental degradation, we can design more effective policies and strategies to maintain a balance between urban development and sustainable environmental preservation.

Research Method

This research uses a descriptive qualitative approach. Qualitative research is a research procedure with descriptive data results in the form of written or spoken words (Hamilton & Finley, 2019). Qualitative research aims to analyze the quality of a study. The type of research used is a literature study which is research that has been done before by collecting books, journals, magazines, and scientific papers that are interrelated with the research problems and objectives. Literature study is a data collection technique carried out by conducting a study of books or literature related to the problem being solved (Roller, 2019). The literature review

database used is by searching on Google Scholar, Scopus, and Google Book. The search was conducted using keywords related to this research.

Results and Discussion

Land Use in Urban Areas

Land use in urban areas is a key element in the rapid transformation of urbanization around the world. It refers to the way in which urban lands are used for various purposes, such as residential, commercial, industrial, transportation, green space, agriculture, and conservation. These land uses reflect complex urban dynamics, which can have significant impacts on various aspects of urban life (Latue et al., 2023). One of the main aspects of urban land use is housing. Housing development is a response to the growing urban population. This often results in the conversion of agricultural or open land into residential zones (Shao et al., 2021). While this is important to provide shelter for urban residents, uncontrolled housing growth can result in problems such as congestion, increased overcrowding, and pressure on city infrastructure (Shafia et al., 2018).

Commercial land use is also an important element in the urban fabric. It includes businesses, shopping centers, restaurants, and other commercial facilities. These land uses create centers of economic activity, provide employment and support urban economic growth. However, the conversion of land into commercial zones can also lead to problems such as loss of green space, pollution, and traffic congestion. In addition, industrial land uses are an important part of modern cities. Factories, warehouses and other production facilities are located in industrial zones. This creates employment opportunities, but can also result in air and water pollution if not managed properly. Therefore, industrial development in urban areas requires strict supervision and regulation to protect the environment and public health (Rakuasa et al., 2023).

Transportation is also an important aspect of urban land use. Roads, transportation terminals, and other transportation infrastructure are used to support the mobility of residents and businesses (Ergashev, 2020). The development of efficient and sustainable transportation is important to address traffic congestion issues and facilitate good accessibility for city residents. Green spaces also play an important role in cities (Kim, 2021). Urban parks, urban forests, and other open lands provide open spaces for recreation, relaxation, and maintain air and water quality. They also help reduce the urban heat island effect by providing shading and heat absorption (Philia & Rakuasa, 2023). Land use in urban areas also includes urban agriculture, which is increasingly important in the modern era. This can include gardens, small-scale farming, and livestock farming within the city (Latue & Rakuasa, 2023). It supports local food supply and maintains environmental sustainability by maintaining vegetation cover (Latue et al., 2023). Overall, land use in urban areas is a vital aspect in shaping the structure, character and quality of life in cities. To plan for sustainable urban development, it is important to carefully consider how these lands are used to meet the needs of current residents without compromising environmental sustainability and quality of life in the future (Sugandhi et al., 2022).

Environmental Degradation in Urban Areas

Environmental degradation in urban areas is a serious problem that has emerged as a consequence of rapid urban growth (Coluzzi et al., 2022). This phenomenon refers to the degradation of the natural and built environment in urban environments due to various human activities (Olanipekun et al., 2019). This environmental degradation can have detrimental effects on human health, ecosystems, and overall urban sustainability. One of the main impacts of environmental degradation in cities is uncontrolled urbanization (Rakuasa et al., 2022). Rapid population growth and aggressive land conversion for housing, industry, and transportation infrastructure often lead to loss of green open space and vegetation cover. This results in the urban heat island effect, where temperatures in urban areas become much higher compared to the surrounding areas. This effect can result in extreme temperature increases and contribute to local climate change (Mansourmoghaddam et al., 2023).

In addition, environmental degradation in urban areas also includes air and water pollution issues. Industrial, transportation and development activities in urban areas often produce exhaust emissions and pollutants that pollute the air. Air pollution can cause various health problems such as respiratory problems, cardiovascular diseases and increased risk of cancer. Meanwhile, water pollution can threaten the quality of water sources and aquatic ecosystems, which can damage the food chain and disrupt the supply of clean water. In the context of environmental degradation, uncontrolled urbanization can also disrupt natural ecosystems (Rakuasa et al., 2022). Shrinking open land and natural habitats often result in declining wildlife populations and damage to local flora. This threatens biodiversity and can result in long-term impacts on urban ecosystems.

It is also important to note that environmental degradation in urban areas has significant social impacts (Widodo et al., 2015). People living in degraded environments face higher health risks, including diseases from air and water pollution. In addition, a degraded urban environment can create inequalities in access to resources such as clean water, clean air and green land, which can negatively affect underprivileged groups in society. In order to address environmental degradation in urban areas, there is a need for planning and policies that focus on sustainability. This includes developing greener cities by increasing open land, improving sustainable transportation, and better waste management. In addition, public awareness of the environmental impacts of urban activities is also crucial in mitigating environmental degradation and promoting sustainable urban development.

Land Use Change Analysis

Land use change analysis is an important method in understanding how land in an area has changed from one use to another over a period of time (Manakane et al., 2023). It is an important tool in understanding urban, agricultural and environmental dynamics, and can provide valuable insights for planning and decision-making (Achmadi et al., 2023). This analysis is often done through spatial and temporal data processing using various GIS (Geographic Information System) techniques and statistical analysis (Sugandhi et al., 2023). First, land use change analysis provides a picture of the evolution of an area over time (Somae et al., 2023). It can help in tracking important trends, such as rapid urban growth or changes in

agricultural patterns. Through this analysis, we can identify crucial points of change and their impacts on the environment and economy.

Land use change analysis can help in monitoring environmental vulnerability. By looking at how land changes from green or open zones to urban or industrial zones, we can identify areas that may experience greater environmental stress. This could include risks such as uncontrolled urbanization, ecosystem damage, or degradation of water and air quality. Third, land use change analysis plays an important role in sustainable regional planning (Latue & Rakuasa, 2023). By understanding how land has been used and changed over time, urban planners and local governments can design wiser policies to direct urban growth, protect valuable green spaces, and maintain ecological balance.

Analysis of land use change can help in identifying socioeconomic issues. Changes in land use often have economic and social impacts, such as the displacement of people from agricultural land or changes in employment patterns (Rakuasa, 2022). By looking at these changes, we can identify issues such as unemployment, land conflicts, or changes in social structure within an area. Land use change analysis can be used in future forecasting. By understanding the trends in land use change that have occurred, we can develop models and scenarios to forecast how land will be used in the future (Rakuasa, 2022). This is very useful in long-term planning and strategic decision-making.

Land use change analysis can also help in environmental conservation. By identifying areas that are undergoing drastic changes in land use and may be at risk of environmental degradation, we can take preventive measures to protect and maintain the natural ecosystems in the region (Rakuasa et al., 2022). Overall, land use change analysis is an important tool in understanding regional dynamics, environmental impacts, and socio-economic changes in a region (Khan et al., 2022). It can be used in a variety of contexts, from urban planning to environmental conservation, and helps in better decision-making for a sustainable future.

Impacts of Land Use Change on the Environment

Land use change has significant impacts on the environment, and understanding these impacts is critical in the context of environmental conservation and sustainability (Aquilué et al., 2017). First of all, one of the main impacts is the loss of green land and natural vegetation cover. When agricultural or open land is converted into residential, industrial or commercial zones, it reduces the area of land that serves as a carbon sink, air conditioner and habitat for various species. This can result in increased temperatures in cities, known as the urban heat island effect, which in turn can compromise air quality and public health (Rakuasa & Pakniany, 2022).

In addition, land use change often impacts water quality and aquatic ecosystems. Urban and industrial development can generate waste that pollutes surface and groundwater sources (Akbar & Supriatna, 2019). This pollution can damage aquatic ecosystems, threaten aquatic species, and reduce the quality of water available for humans and other living things. These impacts can also involve increased surface runoff, which can lead to flooding and soil erosion. Land use change can also disrupt terrestrial ecosystems (Talukdar et al., 2020). The conversion of agricultural or forest land into industrial or urban zones often means the loss of natural habitats for flora and fauna. This can result in declining populations of local species, even to endangered levels. These impacts undermine biodiversity and can lead to ecosystem

imbalances. Furthermore, land use change can also have social impacts. The relocation of people from converted land, such as traditional settlements or farms, can result in social inequalities, conflicts and economic problems. In addition, land use change often affects the livelihoods and lives of local communities.

In addition to negative impacts, land use change can also have positive impacts in the form of economic development and improved access to public facilities such as education and healthcare. However, it is important to strike a good balance between economic development and environmental protection to ensure that economic benefits are not achieved by damaging ecosystems and environmental quality. In order to reduce the adverse environmental impacts of land use change, prudent planning, sustainable resource management, and policies that consider environmental aspects in urban and industrial development are required. Monitoring and mitigating the negative effects of land use change are also important to maintain environmental quality and ecosystem sustainability in the future (Yunita et al., 2022).

Sustainable Land Use Management Strategy

Land use change analysis is a very important approach in understanding the dynamics of land in an area over time. It involves the process of collecting, processing, and interpreting data that reflects changes in land use, such as the conversion of agricultural land into residential zones, forest land into industry, or green zones into urban infrastructure. This analysis can provide valuable insights in a variety of contexts, including regional planning, environmental policy, and natural resource management (Latue & Rakuasa, 2023). Land use change analysis helps in tracking the evolution of an area over time. It allows us to understand how the area has developed, identify long trends that might influence future development, and assess the impact of certain policies and actions on land use (Kapitza et al., 2022). This analysis is useful in measuring the environmental impact of land use change. For example, conversion of forest land into industrial zones can result in loss of wildlife habitat and increase greenhouse gas emissions (Wang et al., 2022). By analyzing land use change, we can identify areas at risk of environmental degradation and take appropriate preventive measures. Land use change analysis is a useful tool in sustainable regional planning. It assists urban planners and policy makers in designing strategies to manage urban growth, preserve valuable green land, and minimize negative impacts on the environment (Akbar & Supriatna, 2019).

This analysis can be used for monitoring infrastructure and transportation developments. For example, by examining land use change along a particular road, we can evaluate the need for roadway expansion or development of public transportation systems (Fahad et al., 2021). Land use change analysis can help in planning and managing natural resources. This means monitoring changes in vegetation cover, agricultural land, or other natural resources with regard to conservation and sustainable exploitation (Liaqat et al., 2021). Land use change analysis is often used in scientific and academic research to understand geospatial trends, social developments, and economic impacts of land use change. It plays a role in providing a deeper understanding of environmental change and its impact on society and ecosystems (Talukdar et al., 2020). Overall, land use change analysis is an important tool in exploring various aspects of regional dynamics, environmental impacts, and sustainable planning. It helps in making better decisions to maintain environmental quality, manage natural resources, and plan for sustainable regional development.

Conclusion

In analyzing land use change in urban areas, we can conclude that these changes have a significant impact on environmental degradation. The conversion of green land into urban, industrial, or commercial zones often results in loss of natural habitats, increased temperatures, air and water pollution, and pressure on natural resources. Therefore, the protection and wise management of urban land use is essential to maintain environmental quality, public health, and future urban sustainability. Land use change analysis can be a valuable tool in planning and decision-making to address these environmental degradation challenges.

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