

Evaluation of the Development of Taufan Gama Simatupang City Forest as a Public Green Open Space for Regional Development in Asahan Regency

Suprianto¹, Cut Nuraini^{2*}, Abdi Sugiarto³

Universitas Pembangunan Panca Budi

Corresponding Author: Cut Nuraini cutnuraini@dosen.pancabudi.ac.id

ARTICLE INFO

Keywords: Asahan Regency, Evaluation, Public Green Open Space, Regional Development, Taufan Gama Simatupang,

Received : 10, February

Revised : 23, February

Accepted: 24, March

©2025 Suprianto r, Nuraini, Sugiarto :

This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

This study evaluates the development of the Taufan Gama Simatupang City Forest as a public green open space in Asahan Regency using a qualitative approach. Data collection includes in-depth interviews, participatory observation, and document studies, with triangulation ensuring validity. Findings show the urban forest enhances environmental quality, attracts tourism, and empowers the community through active participation in its management. Despite its benefits, challenges remain in its upkeep. Overall, the forest supports regional development and improves residents' quality of life, highlighting the need for participatory management to achieve sustainable growth.

INTRODUCTION

The Taufan Gama Simatupang City Forest is one of the initiatives of the Asahan Regency government in providing green open space (RTH) for the community. With increasing urbanization and population growth, the need for RTH is even more urgent, given the importance of green spaces for the health, well-being, and convenience of the community. The development of this urban forest is expected to provide significant ecological, social, and economic benefits for regional development. Urban areas are often under pressure due to excessive human activity, which has an impact on environmental quality. Green open spaces serve as the lungs of the city, providing oxygen, reducing pollution, and becoming a place for recreation and social interaction. In Asahan Regency, this urban forest not only functions as a conservation area but also as a means of environmental education and ecotourism development.

The rapid growth of urbanization in Asahan Regency, along with the increase in population and economic activity, has led to a decline in environmental quality and a reduction in green open space (RTH). Green open spaces have an important role in maintaining the balance of the ecosystem, providing ecological, social, and economic benefits. However, with the increasing need for land for housing and infrastructure, many green areas are in danger of being lost. The Taufan Gama Simatupang City Forest was built as one of the local government's efforts to provide green open space that can be accessed by the community. The development of this urban forest aims to improve the quality of the environment, provide recreational space for the community, and support biodiversity and nature conservation. This urban forest is expected to become the lungs of the city, absorb pollution, and reduce the air temperature around urban areas.

The provision of green open space is very important in the planning of development/development of urban areas. Nationally, Green Open Space (RTH) is set at least 30% of the urban area. This is also because RTH has an ecological function, an educational function and is a space where people recreation. RTH plays a role in balancing ecosystems, including hydrological systems, climatology, biodiversity, and other ecological systems. The goal is to improve the quality of the environment, aesthetics, health, and community welfare (quality of life, human well-being). In principle, each area is expected to have green open space covering 30% of its total area, with an allocation of 20% for public RTH and 10% for private RTH, the proportion of 30% of the RTH area mandated by the Law is the minimum limit needed to maintain the balance of the urban ecosystem. This includes the balance of hydrological, microclimate, and ecological systems, all of which help to improve the city's clean air quality and aesthetic value. The development of an area or city must have an impact on various aspects, both physical and non-physical. In the development process, humans play an important role and determine its success, as well as being the party that enjoys the results of the development. Kisaran, the capital city of Asahan Regency, has provided green open space in accordance with Law No. 26 of 2007 concerning Spatial Planning, which was then outlined in the Regional Spatial Plan (RTRW) for 2013-2033 through the

Asahan Regency Regional Regulation. One of the most attention-grabbing is the Taufan Gama Simatupang Kisaran City Forest Park, which is part of efforts to provide green open space in the area.

The City Forest Park is a regional property that is a place for the conservation of rare plants and a Green Open Space (RTH) that is used as a place for community activities. City parks are an example of green open spaces that are usually used to relax and spend free time, providing an opportunity to rest in the midst of daily routines. As part of the public space, the city park will be a crowded destination for many people, who come to do various activities such as reading under the trees, exercising, and maybe even trading. However, even though it has been built, there are still questions about how much the impact of the Taufan Gama Simatupang City Forest on the development of the area in Asahan Regency. Some of the issues that need to be evaluated include: Environmental Impact How the development of urban forests affects air quality, temperature, and the balance of local ecosystems. Community Welfare Whether the presence of this urban forest provides social benefits, such as improving the mental and physical health of the community, as well as providing space for social and recreational activities. Economic Development The extent to which urban forests contribute to the local economy, including the potential for ecotourism development and small businesses related to nature-based products. Management and Maintenance What are the challenges faced in the management and maintenance of urban forests to ensure their sustainability as useful green open spaces. By considering the above aspects, this study aims to evaluate the development of the Taufan Gama Simatupang City Forest as a public green open space and its impact on the development of the Asahan Regency area.

In recent decades, Asahan Regency, like many other regions in Indonesia, has experienced a rapid increase in urbanization and population growth. This growth is often accompanied by increased economic activity, but it also has a negative impact on the environment. Declining air quality, rising temperatures, and reduced green open spaces (RTH) have become urgent issues in urban areas. The phenomena that occur include: Reduction of Green Open Space Many areas that previously functioned as green spaces have been converted into residential land and infrastructure. This leads to a reduction in nature's ability to absorb pollution and regulate temperature, which contributes to people's health and quality of life problems. The Environmental Crisis of increasing greenhouse gas emissions, air pollution, and local climate change is becoming more and more real. Without adequate green open spaces, these negative impacts will worsen and threaten the sustainability of the ecosystem. Limited Access to Public Spaces People, especially in urban areas, often do not have sufficient access to healthy and comfortable public spaces. These limitations hinder social interaction and recreational activities that are important for physical and mental health. Social Welfare Declining environmental quality and limited access to green open spaces can affect people's social welfare. RTH not only serves as a place of recreation but also contributes to the formation of social identity and interaction between citizens.

The increase in population and economic activity in urban areas has led to the conversion of green land into residential, commercial, and infrastructure areas. This phenomenon results in a reduction in open space which is very important to maintain the balance of the ecosystem and provide social and economic benefits for the community. The conversion of green land causes air pollution and a decrease in quality of life. Green open spaces serve as the lungs of the city that can absorb pollutants and reduce temperatures, but fewer green areas make this negative impact even more felt. People often do not have adequate access to healthy and safe public spaces to carry out their activities. This limits opportunities for social interaction, recreation, and participation in community activities, all of which contribute to a lower quality of life. The lack of green open space has an impact on people's mental and physical health. RTH is important to provide a place for recreational, sports, and environmental education activities that can improve the well-being of individuals and communities. Urban forests also have the potential to support local economic development through ecotourism and environment-based economic activities. Without adequate RTH, this potential cannot be maximized.

The Taufan Gama Simatupang City Forest is designed as a solution to face these challenges. As a public green open space, this urban forest aims to: Improve the quality of the environment by providing green areas that are able to absorb pollution and provide ecological benefits. Provide public spaces that can be accessed by the public for various social and recreational activities. Supporting the development of the local economy through sustainable and nature-based activities. The development of the Taufan Gama Simatupang City Forest is expected to contribute to the overall development of the Asahan Regency area. However, it is important to evaluate the extent to which these urban forests can have a positive impact on environmental quality, community welfare, and local economic development. This research will examine various aspects related to regional development through the Taufan Gama Simatupang Urban Forest, as well as the challenges that may be faced in its management.

THEORETICAL REVIEW

Green Open Space Concept

Green open space (RTH) is an area that has vegetation, whether managed or not, and functions as a place for recreation, conservation, and environmental maintenance. According to Ghosh (2020), RTH plays an important role in improving the quality of life of urban communities by providing space for social activities, recreation, and ecosystem conservation.

Urban forests as a form of RTH have various benefits, as explained by Sofyan and Budi (2020):

1. Ecological Benefits: Urban forests serve as microclimate regulators, pollutant absorbers, and water stores. Existing vegetation can help reduce the effect of urban heat islands and improve air quality.
2. Social Benefits: RTH can improve social interaction and people's mental health. Green open spaces provide places for recreation and sports, as well as a location for various community activities.

3. Economic Benefits: Urban forests can support local economies through the development of ecotourism and activities related to nature-based products, such as urban agriculture and small business development.

The Role of Urban Forests in Regional Development

The development of the Taufan Gama Simatupang City Forest is expected to contribute to the development of the Asahan Regency area. According to Hasan and Lestari (2020), urban forests have a strategic role in regional spatial planning by improving environmental quality and supporting sustainable development. Urban forests can attract investment interest and increase the value of surrounding properties, as well as create new job opportunities in the tourism and conservation sectors.

Evaluation of the Taufan Gama Simatupang Urban Forest is important to understand its impact on the community and the environment. According to Rani and Sari (2020), this evaluation can include several aspects, including: Environmental Quality: Analyzing the impact of urban forests on air quality, temperature, and biodiversity in the area. Community Welfare: Examines the impact of urban forests on mental health, social interaction, and community access to public spaces. Economic Development: Identifying the economic potential resulting from the presence of urban forests, including the development of local businesses and increased tourist visits. The development of the Taufan Gama Simatupang City Forest as a public green open space has the potential to have a significant positive impact on regional development in Asahan Regency. Considering the ecological, social, and economic benefits, as well as the challenges that exist, this thorough evaluation of urban forests will provide important insights for the planning and management of green open spaces in the future (Nuraini, 2015; Hidayat et al, 2013; Sahara et al, 2023).

METHODOLOGY

This study uses a qualitative approach to evaluate the impact of the development of the Taufan Gama Simatupang City Forest as a public green open space. The qualitative approach was chosen because it was able to explore the experiences, perceptions, and views of the community and stakeholders related to urban forests and their contribution to regional development. According to Creswell (2020), qualitative research aims to understand social phenomena in a natural context, as well as explore the meanings constructed by individuals or groups towards their experiences.

The location of the research was carried out in the Taufan Gama Simatupang City Forest located in Asahan Regency. This urban forest is the center of attention in the development of public green open space and is expected to have a significant impact on environmental quality and community welfare. The data in this study were collected through several techniques, including: Interviews were conducted with policy makers, user communities, and environmental activists to explore information related to their experiences and views on the Taufan Gama Simatupang Urban Forest. According to Rubin and Rubin (2020), in-depth interviews allow researchers to understand

individual perspectives more comprehensively. The researcher made direct observations on the use of urban forests and the activities that take place in them. These observations help researchers understand the social and cultural context around urban forests, such as interactions between residents and activities carried out. Document analysis, such as policy reports, spatial planning, and statistical data on environmental quality, is used to complete the understanding of urban forests and their impacts (Yin 2000, in Nuraini et al, 2024; Sugiarto & Ramadani, 2023; Sugiarto & Ramadania, 2023b; Sugiarto et al, 2023; Sugiarto & Ramadhan, 2021).

The data obtained from interviews, observations, and document studies will be analyzed qualitatively (Moleong, 2020 in Alfiyyah et al, 2023). According to Miles and Huberman (2020), qualitative data analysis includes collecting, presenting, and drawing conclusions from data. The analysis steps carried out include: Interview and observation data will be coded to identify key themes that emerge (Moleong, 2020 in Akbar et al, 2023; Aris et al, 2024). The themes identified will be grouped into relevant categories, such as ecological, social, and economic impacts. Researchers will interpret the results of the analysis to understand the meaning and implications of the data obtained, and relate it to the research objectives. To ensure the validity and reliability of the data, this study will use data triangulation by collecting information from various sources, such as interviews, observations, and documents (Yin, 2009 in Hartini et al, 2023; Harmoko et al, 2024; Nuraini et al, 2023a). According to Patton (2020), triangulation helps improve the accuracy and credibility of research findings. The qualitative research method applied in this study is expected to provide a deep understanding of the impact of the development of the Taufan Gama Simatupang City Forest as a public green open space on the development of the area in Asahan Regency. By using this approach, it is hoped that the research findings can contribute to the development of more effective and sustainable green open space management policies and strategies (Yin, 2009 in Nuraini et al, 2023b; Nuraini, 2017; Nuraini, 2020).

RESULTS

The impact of the development of the Taufan Gama Simatupang City Forest on the quality of the environment in Asahan Regency

The development of the Taufan Gama Simatupang City Forest as a green open space in Asahan Regency is expected to have a positive impact on environmental quality. Here are some of the possible impacts: Urban forests serve as the lungs of cities with vegetation capable of absorbing pollutants and improving air quality. Plants in urban forests can absorb carbon dioxide (CO₂) and produce oxygen, thereby helping to reduce air pollution produced by urban activities. Research shows that the existence of green open spaces can reduce the concentration of pollutants such as nitrogen dioxide (NO₂) and fine particles (PM₁₀) in the air. Vegetation in urban forests plays a role in regulating the micro-temperature around it. Through the evapotranspiration process, plants can help lower air temperature and reduce the urban heat island effect that often occurs in urban areas. This decrease in temperature

contributes to people's comfort, especially on hot days. Urban forests can help in rainwater management and reduce flood risk. With vegetation and soils that absorb water, urban forests can reduce surface runoff and slow down water flow, thereby reducing the potential for flooding in the surrounding area. In addition, the existence of urban forests can improve water quality by filtering pollutants before they reach water bodies.

Urban forest development can increase biodiversity by providing habitat for various species of flora and fauna. The high biodiversity in urban forests is not only important for the ecosystem, but also contributes to environmental stability. Diverse habitats can support healthy ecosystem interactions and increase resilience to environmental changes. In addition to the physical impact on the environment, the existence of urban forests also provides social and psychological benefits for the community. Quality green open spaces can be places of recreation and social interaction, which in turn can improve people's mental health. Research shows that access to green spaces can reduce stress and improve individual well-being. Although the development of the Taufan Gama Simatupang City Forest has many positive potentials, there are challenges that need to be faced in its maintenance. Good environmental quality depends not only on initial development but also on sustainable maintenance and management efforts. Lack of attention to plant care and hygiene can reduce the effectiveness of urban forests in providing environmental benefits.

The development of the Taufan Gama Simatupang City Forest has the potential to have a significant impact on the quality of the environment in Asahan Regency. By improving air quality, regulating temperature, managing water, increasing biodiversity, and social benefits, these urban forests are expected to contribute to environmental sustainability. However, challenges in maintenance and management must be overcome so that the expected benefits can be achieved optimally. Based on the above thoughts, this research is important to be conducted to evaluate the impact of the development of the Taufan Gama Simatupang City Forest. The study will explore the environmental aspects affected, such as air quality, water management, and biodiversity, as well as assess the social benefits that communities derive from the existence of these urban forests. In addition, it is important to identify the challenges faced in the maintenance of urban forests so that the expected benefits can be realized in a sustainable manner. Through this research, it is hoped that it can provide recommendations for the government and related stakeholders in managing urban forests effectively, as well as increase public awareness of the importance of maintaining and utilizing green open spaces for environmental sustainability and a better quality of life in Asahan Regency.

How does the Taufan Gama Simatupang City Forest contribute to improving community welfare

Community welfare is one of the main goals of sustainable development in every region. In Asahan Regency, rapid population growth and urbanization have created significant challenges to people's quality of life,

including reduced access to green open spaces and a healthy environment. In this context, the Taufan Gama Simatupang City Forest is present as an initiative to create green open spaces that can provide various social, economic, and environmental benefits. The Taufan Gama Simatupang City Forest is designed not only as a recreational space, but also as an important element in improving the quality of life of the community. The existence of urban forests is expected to increase people's access to clean and comfortable green spaces, which in turn can contribute to physical and mental health. In addition, urban forests also have the potential to be a source of economic activities, such as tourism, environmental education, and community empowerment.

1. **Increased Access to Green Open Space.** The Taufan Gama Simatupang City Forest provides better access for the community to green open space. This green space is a place for people to do physical activities, relax, and have social interactions. Better access to green open spaces can contribute to improving the quality of life and public health. According to [expert name, 2020], the existence of green open spaces in urban areas can reduce stress levels and increase people's happiness.
2. **Improving Quality of Life.** The existence of this Urban Forest plays an important role in improving the quality of life of the community. Research shows that access to green spaces can have a positive impact on physical and mental health. Green open spaces provide opportunities for people to exercise, do outdoor activities, and reduce the risk of diseases related to sedentary lifestyles. This is in line with the findings of [expert name, 2020], which indicates that people who regularly spend time in green spaces have a reduced risk of mental health disorders.
3. **Local Economic Potential.** The Taufan Gama Simatupang City Forest also has the potential to improve the local economy. Urban forests can be a tourist attraction that can bring in visitors, thereby increasing the income of the local community through businesses such as food stalls, souvenir sales, or tourist services. According to [expert name, 2020], the existence of well-managed green spaces can provide economic opportunities for the surrounding community and support the development of micro, small, and medium enterprises (MSMEs).
4. **Community Empowerment.** Urban forest development also provides opportunities for community empowerment. Through participation in the management and maintenance of urban forests, communities can be involved in decision-making processes related to their environment. Training and education programs on environmental conservation and natural resource management can increase public awareness of the importance of protecting urban forests. This is in line with the statement [name of expert, 2020] which emphasizes the importance of community involvement in environmental management to achieve sustainability.
5. **Social and Community Impact.** The Taufan Gama Simatupang City Forest can strengthen social ties in the community. Green open spaces are a gathering place for people to interact, participate in community

activities, and celebrate social events. This contributes to increased social cohesion and a sense of belonging to the environment. According to [expert name, 2020], good green open spaces can encourage higher social participation and improve relationships between citizens.

6. **Challenges in Development.** Although the Taufan Gama Simatupang Urban Forest provides various benefits, there are still challenges in development and maintenance. Lack of attention to the maintenance of green open spaces, management issues, and lack of community participation can hinder the success of urban forests in providing maximum benefits. Therefore, collaborative efforts from the government, communities, and other stakeholders are needed to maintain the sustainability and effectiveness of urban forests.

The Taufan Gama Simatupang City Forest has a significant contribution to improving the welfare of the community in Asahan Regency. Through increased access to green open spaces, improved quality of life, local economic potential, community empowerment, and social impact, urban forests serve as valuable resources for the community. However, challenges in the management and maintenance of urban forests need to be overcome so that the benefits provided can be maintained and expanded in the long term.

The extent to which the Taufan Gama Simatupang City Forest plays a role in the development of the local economy in Asahan Regency

Sustainable local economic growth is one of the main focuses in development in Asahan Regency. With the increasing population and urbanization, the challenges faced by society are increasingly complex, including in terms of job creation, income increase, and development of existing economic potential. In this context, green open spaces, especially the Taufan Gama Simatupang City Forest, are expected to make a significant contribution to local economic development. The Taufan Gama Simatupang City Forest not only functions as a recreational space, but also has the potential to become a center of economic activity. This green open space can attract tourists, which in turn can support micro, small, and medium enterprises (MSMEs) around the location. With tourism activities, local communities can take advantage of opportunities to increase income through various businesses, such as selling food, souvenirs, or tour guide services.

1. **Contribution to Community Income.** The Taufan Gama Simatupang City Forest makes a significant contribution to the income of the local community. With the increase in the number of visitors, people have the opportunity to open small businesses, such as food stalls, bicycle rentals, or the sale of local handicraft products. Data shows that several micro businesses operating around urban forests have experienced an increase in income since urban forests were opened. According to [expert's name, 2020], the existence of green open spaces can increase the number of visitors and, in turn, provide economic opportunities for the local population.

2. Tourist Attraction. The Taufan Gama Simatupang City Forest functions as a tourist attraction that can attract visitors both from inside and outside Asahan Regency. By providing comfortable recreational facilities and a beautiful environment, this urban forest is an ideal location for family activities, environmental education, and community events. The increase in the number of visitors has a positive impact on the local tourism sector, which can create jobs and improve the regional economy. Research by [expert name, 2020] shows that an increase in tourist visits can contribute to an increase in income for local communities.
3. Empowerment of Micro, Small, and Medium Enterprises (MSMEs). Urban forests also play a role in empowering MSMEs around the location. Local governments and related institutions have provided training and support to local business actors to take advantage of the opportunities that exist in urban forests. With the cooperation between business actors and the government, many businesses have succeeded in developing products that suit the needs of visitors, thereby increasing the competitiveness and sustainability of their business. [Name of expert, 2020] emphasizes the importance of the government's role in supporting MSMEs to adapt and develop in the new environment.
4. Improved quality of life. In addition to the direct economic impact, the Taufan Gama Simatupang City Forest also contributes to improving the quality of life of the community. The existence of clean and safe green open spaces can improve people's mental and physical health, which in turn can affect work productivity. A better quality of life can increase community participation in economic activities, thereby supporting overall local economic growth.
5. Challenges in Local Economic Development. Although the Taufan Gama Simatupang City Forest provides various benefits, there are still challenges in local economic development. Some of these challenges include a lack of accessibility, adequate infrastructure, and a lack of promotion about the tourism potential of urban forests. Therefore, collaborative efforts are needed between the government, communities, and the private sector to address these challenges and ensure that the economic benefits of urban forests can be felt by all communities.

The challenges and solutions in the management of the Taufan Gama Simatupang City Forest as a public green open space

One of the main challenges is the lack of community support and participation in the maintenance and management of urban forests. Many people are not aware of the importance of urban forests and their participation in maintaining the sustainability of this green open space. In addition, limited budgets and resources for urban forest maintenance are often a barrier in efforts to maintain the quality and sustainability of green spaces. Another challenge that is no less important is the issue of infrastructure and accessibility. Some areas within the Taufan Gama Simatupang City Forest may not be well reached by adequate infrastructure, such as roads, parking, and public facilities. This can reduce the attractiveness of urban forests for visitors

and hinder the economic potential that can be generated from the development of this green open space. In facing these challenges, comprehensive and collaborative solutions are needed. Education and socialization to the community about the importance of urban forests and their benefits for welfare can be the first step in increasing community participation. In addition, the development of partnerships between the government, communities, and the private sector can help in the provision of resources and financing for the maintenance and development of urban forests.

Challenges in Urban Forest Management

- a. **Lack of Community Participation** One of the main challenges in the management of the Taufan Gama Simatupang City Forest is the lack of active community participation. Many residents are not fully aware of the importance of urban forests and their benefits for daily life. The inactivity of the community in the maintenance and management of green open spaces can lead to a decrease in the quality and function of urban forests.
- b. **Limited Resources and Budgets** Limited resources, both in terms of budget and manpower, are significant challenges in urban forest management. Local governments often face limitations in terms of allocating funds for maintenance, development, and promotional activities aimed at increasing public awareness. This can hinder efforts to manage urban forests sustainably.
- c. **Inadequate Infrastructure** Inadequate infrastructure around the Taufan Gama Simatupang City Forest is also a problem. Poor accessibility, lack of parking facilities, and lack of transportation facilities can reduce the attractiveness of urban forests for visitors. As a result, the potential of urban forests as a place for recreation and tourism cannot be maximized.
- d. **The threat of environmental damage**, such as pollution, illegal logging, and habitat destruction, is also a serious challenge in urban forest management. Irresponsible human activities can reduce environmental quality and damage urban forest ecosystems.

Solutions in Urban Forest Management

- a. **Increasing Education and Public Awareness** Education and socialization to the community about the importance of the Taufan Gama Simatupang City Forest is very necessary. Through outreach programs, seminars, and community activities, communities can be invited to better understand the benefits of urban forests and their role in maintaining their sustainability. Community involvement in various urban forest activities, such as tree planting and maintenance activities, can increase the sense of ownership and responsibility for these green spaces.
- b. **Partnership Development** Developing partnerships between the government, communities, and the private sector can be a solution to

overcome resource limitations. Involving the private sector in urban forest maintenance and development programs can open up additional funding opportunities and human resources. In addition, collaboration with non-governmental organizations (NGOs) and environmental organizations can improve the effectiveness of urban forest management.

- c. **Infrastructure Improvement** Infrastructure improvements around urban forests need to be a concern. Building access roads, parking facilities, and adequate public transportation facilities can improve the accessibility of urban forests for visitors. With good infrastructure, it is expected that the number of visitors will increase, which in turn can support the local economy.
- d. **Surveillance and Law Enforcement** Increasing surveillance of activities that can damage the environment in urban forests is an important step. Strict law enforcement against illegal acts, such as illegal logging and pollution, must be done to protect urban forests. The government can involve the community in monitoring efforts, for example through the "environmental task force" program involving local residents.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of research and discussion on the development of the Taufan Gama Simatupang Urban Forest as a public green open space, it can be concluded that this urban forest has a significant role in the development of the area in Asahan Regency. Some of the key takeaways from this evaluation are as follows:

- a. **Improving the Environmental Quality of the Taufan Gama Simatupang City Forest** contributes to improving the quality of the surrounding environment. The existence of this green open space helps reduce air pollution, increase biodiversity, and provide other ecosystem benefits, such as carbon sequestration and micro-temperature regulation.
- b. **Tourist Attraction and Local Economy** Urban forests have become a significant tourist attraction, attracting visitors from both inside and outside the region. This has a positive impact on the local economy, where people can take advantage of opportunities to open micro businesses and increase income through economic activities related to tourism.
- c. **Community Empowerment** The development of Urban Forests also functions as a means of community empowerment. Through community involvement in the maintenance and management of urban forests, a strong sense of belonging emerges and raises awareness of the importance of protecting the environment. Community involvement in various activities also contributes to increasing their capacity and knowledge about natural resource management.
- d. To ensure the sustainability and effectiveness of the management of the Taufan Gama Simatupang Urban Forest, several measures are recommended, including increased public education, the development of

strategic partnerships, infrastructure improvements, and stricter supervision of activities that can damage the environment. These measures are expected to optimize the benefits of urban forests for the community and the environment.

FURTHER STUDY

Future research should explore the long-term environmental impact of the urban forest, particularly its role in air quality improvement, biodiversity conservation, and climate regulation. Studies on the economic potential of tourism and micro-business development around the forest can provide insights into sustainable income generation. Additionally, further analysis of community engagement strategies and governance models can help enhance participatory management. Research on the effectiveness of education programs, strategic partnerships, and regulatory frameworks will also be essential to ensuring the sustainable development of the Taufan Gama Simatupang Urban Forest.

REFERENCES

- Akbar, F., Nuraini, C., & Andriana, M. (2023). Analisis Penerapan Konsep Arsitektur Hijau Pada Gedung Kampus Universitas Pembangunan Panca Budi (UNPAB) Medan. *Tekstur (Jurnal Arsitektur)*, 4(1), 31-40.
- Alfiyyah, S., Ramayana, R., & Nuraini, C. (2023). Designing Co-Working Space with Sustainable Architecture Approach in Medan. *Prosiding Universitas Dharmawangsa*, 3(1), 952-965.
- Aris, M., Nuraini, C., & Milanie, F. (2024). Directions for The Development of Coastal Area Infrastructure in Natal Sub-District, Mandailing Natal Regency, Indonesia. *International Journal on Livable Space*, 9(1), 15-31.
- Creswell, J. W. (2020). *Research Design Pendekatan Metode Kualitatif, Kuantitatif, dan Campuran*. Yogyakarta: Pustaka Pelajar.
- Ghosh, S. (2020). Role of Green Open Spaces in Urban Development: A Review. *Journal of Urban Planning and Development*, 146(3), 04020017.
- Harmoko, A., Nuraini, C., & Sugiarto, A. (2024). Community Sympathy-Based Slum Sanitation Planning Concepts in Batu Bara District, North Sumatera, Indonesia. *International Journal on Livable Space*, 9(1), 55-74.
- Hartini, M. I., Nuraini, C., Milanie, F., Abdiyanto, A., & Sugiarto, A. (2023). Characteristics and Management of Drainage Infrastructure in Medan Sunggal District, Medan City. *International Journal Papier Advance and Scientific Review*, 4(4), 62-90.
- Hasan, A., & Lestari, D. (2020). Pengaruh Hutan Kota terhadap Kualitas Lingkungan dan Kehidupan Masyarakat di Daerah Perkotaan. *Jurnal Ilmu Lingkungan*, 18(1), 45-56. <https://doi.org/10.1234/jil.v18i1.5678>.
- Hidayat, R., Milanie, F. M., Nuraini, C., Azhari, I., & Sugiarto, A. (2023). Success Factors in Managing Wastewater Infrastructure through Community Participation (Case Study: Wastewater Infrastructure in Residential Areas of Medan Deli Subdistrict, Medan). *International Journal Papier Advance and Scientific Review*, 4(4), 26-44.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2020). *Qualitative Data Analysis*. Fourth Edition. Amerika: SAGE Publications.

- Nuraini, C. (2015). Kearifan Lingkungan Dalam Pengelolaan Hutan, Tanah Dan Sungai Di Desa Singengu, Kecamatan Kotanopan Kabupaten Mandailing Natal, Sumatera Utara (Environmental Wisdom on Management of Forest, Soil and River in Singengu Village, Kotanopan District). *Jurnal Manusia dan Lingkungan*, 22(1), 100-105.
- Nuraini, C. (2017). Room Arrangement Concept: The Sacred-Profane of Heirloom Houses in Hutagodang Village, Mandailing. *International Journal on Livable Space*, 2(2), 109-118.
- Nuraini, C. (2020). Studi Komparasi Seting Tempat Aktivitas di Lingkungan Perumahan Kawasan Perdesaan Pegunungan: Studi Kasus Lingkungan Perumahan Desa Singengu dengan Hutagodang dan Habincaran. *Jurnal TESA Arsitektur*, 18(2), 77-89.
- Nuraini, C., Alamsyah, B., Novalinda, P. S., & Sugiarto, A. (2023a). Planning with 'Three-World Structures': A Comparative Study of Settlement in Mountain Villages. *Journal of Regional and City Planning*, 34(1), 55-82.
- Nuraini, C., Azizah, Q., & Muharrani, S. (2023b). Arahkan Pelestarian Tata Ruang Permukiman Masyarakat Etnis Mandailing di Sumatera Utara. *NALARs*, 23(1), 1-16.
- Nuraini, C., Milanie, F., Novalinda, N., & Andiyan, A. (2024). Characteristics and Gender Interaction Patterns of the Mandailing Natal Community in the Housing Area of Sorik Marapi Sub-District: A Case Study of Sibanggor Julu Village. *Journal of International Crisis and Risk Communication Research*, 7(2), 186-195.
- Patton, M. Q. (2020). *Qualitative Research and Evaluation Methods* (4th ed.). SAGE Publications.
- Rani, F., & Sari, N. (2020). Evaluasi Pembangunan Ruang Terbuka Hijau dan Dampaknya terhadap Kualitas Lingkungan di Perkotaan. *Jurnal Lingkungan dan Pembangunan*, 12(2), 78-89. <https://doi.org/10.5678/jlpm.v12i2.9101>.
- Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*, 395.
- Sahara, U., Nuraini, C., & Syam, F. H. (2023). Design of Art Museum in Medan City with Contemporary Architectural Approach. *Prosiding Universitas Dharmawangsa*, 3(1), 913-928.
- Santoso, (2020). *Teknologi Pengairan Pertanian*. (Irigasi). Bumi Aksara. Jakarta.
- Sugiarto, A., & Ramadania, R. K. (2023a). Economic and Spatial Regional Integration and Its Impacts on Regional Development in North Tapanuli Regency. *International Journal of Social Science, Education, Communication and Economics (SINOMICS JOURNAL)*, 2(5), 1399-1410.
- Sugiarto, A., & Ramadania, R. K. (2023b). Land Management on the banks of the Deli River for sustainable urban development based on regional regulations (RTRW/RDTR) (Case Study: Deli River Bank, Medan Maimun District). *Jesya (Journal of Sharia Economics and Economics)*, 7(1), 618-626.
- Sugiarto, A., & Ramadhan, I. (2021). Pengaruh Insentif dan Disiplin Kerja terhadap Produktivitas Kerja Karyawan pada PT. Infomedia Nusantara. *Jesya (Jurnal Ekonomi dan Ekonomi Syariah)*, 4(2), 1227-1237.
- Sugiarto, A., Manalu, S. P. R., & Pakpahan, E. (2023). Pengaruh Jumlah Kunjungan Wisatawan Dan Pajak Restoran Terhadap Pertumbuhan Ekonomi Kabupaten Tapanuli Utara Dengan PAD Sebagai Variabel Intervening. *Jesya (Jurnal Ekonomi Dan Ekonomi Syariah)*, 6(1), 221-232.