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The Role of Geography Research in Supporting Sustainable Development in Ambon City, Indonesia: A Review

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ABSTRACT: This study discusses the significant role of geographic research in supporting sustainable development efforts in Ambon City, Indonesia. Through the analysis of urban growth patterns, natural resource management, spatial planning, and identification of environmental and social impacts, geographic research provides insights that guide urban planners and decision-makers. This research. This research uses a descriptive qualitative approach. 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 related to how the utilization of geography research in the fields of disaster, regional and urban planning, health, tourism, agriculture and forestry and climate change is applied to realize an environmentally sound and sustainable Ambon City. The results show that Geography research plays an important role in supporting sustainable development in Ambon City, Indonesia, revealing that geography research is not just an analytical tool, but also a valuable guide for policy makers, urban planners, and communities in designing and implementing sustainable development. Through collaboration and application of research findings, Ambon City can grow into a city that not only develops economically, but also preserves the environment and the welfare of its people.

Keywords: Ambon City, Geography Research, Sustainable Development

INTRODUCTION

Sustainable development has become a major agenda around the world, given the need to maintain a balance between economic progress, environmental protection, and social well-being for current and future generations (Walshe, 2017; Rahma et al., 2019). According to Liu, (2020), sustainable development has become a major focus in efforts to address global challenges that include environmental degradation, population growth, rapid urbanization, and social inequality. As urban transformation takes place around the world, the role of geography research is becoming increasingly important in supporting sustainable development in various regions, including Indonesian cities (Guo et al., 2018). One of the cities in Indonesia that faces the complex dynamics of sustainable development is Ambon City.

Ambon City, as the center of economic, social, and cultural activities in Maluku Province, is experiencing significant changes due to population growth, urbanization, and industrial development (Rakuasa et al., 2023). However, these changes also bring negative impacts such as uncontrolled land use change, increased population, environmental damage, decreased environmental quality and impacts on climate change and triggers future natural disasters (Salakory & Rakuasa, 2022). Therefore, it is important for Ambon City to adopt a sustainable development approach that not only promotes economic growth, but also protects and cares for the environment and improves people's welfare.

In this context, geography research has a strategic role in supporting sustainable development in Ambon City. Geography studies are able to analyze the complex interactions between humans and the environment and the impacts of these changes (Fu, 2020). Geographic research can provide in-depth insights into urbanization patterns, land use dynamics, population distribution, mobility, consumption patterns, and socio-economic interactions that occur in cities (Sprenger & Nienaber, 2018). Through spatial analysis and geographic conceptual frameworks, sustainable development issues can be identified and appropriate solutions proposed (Gress & Tschapka, 2017).

Some fundamental questions that can be answered by geography research in supporting sustainable development in Ambon City are: How is the utilization of geography research in the fields of disaster, regional and urban planning, health, tourism, agriculture and forestry and climate change applied to create an environmentally sound and sustainable Ambon City?

Through an in-depth understanding of urban dynamics and the interaction between environmental and human components, geography research can provide valuable input for sustainable development planning in Ambon City. By formulating strategies for sustainable natural resource management, handling the impacts of climate change, improving the quality of the urban environment, and improving the quality of life of the community, geography research becomes an important foundation in presenting a sustainable future for Ambon City in the future. Based on the description above, this research aims to determine the role of geography research in supporting sustainable development in Ambon City, Indonesia.

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 how the utilization of geography research in the fields of disaster, regional and urban planning, health, tourism, agriculture and forestry and climate change is applied to create an environmentally sound and sustainable Ambon City.

RESULT AND DISCUSSION

The Role of Geography Research in Supporting Sustainable Development in Ambon City, namely in the fields of disaster, regional planning, tourism, climate change, health, and agriculture and forestry.

1. Geography Research in the Field of Disaster

Geography research in the field of disaster in Ambon City that has been done is the analysis of areas prone to landslides, floods, earthquakes, tsunamis and erosion and their mitigation efforts. Geographic research in the field of disaster, namely landslides, has been conducted by Rakuasa & Rifai, (2021), with the title of mapping landslide disaster vulnerability based on geographic information systems in Ambon City. This research has an important role in supporting sustainable development in Ambon City. With the landslide vulnerability mapping conducted in this research, the government and stakeholders can have a better understanding of the areas vulnerable to landslides. This will help in spatial planning and development in Ambon City, thereby reducing the risk of landslides and protecting communities and critical assets. This research also provides a solid basis for landslide mitigation efforts in Ambon City, such as the development of early warning systems, infrastructure improvements, and better land management. Thus, this research contributes to achieving sustainable development in Ambon City.

Rakuasa et al., (2022), again conducted research on spatial analysis of potential landslide-prone areas in Ambon City using the SMORPH method. This research has an important role in supporting sustainable development in Ambon City. By identifying and mapping potential landslide areas, this research can provide valuable information for the government and stakeholders in development planning and regional management. By knowing the areas prone to landslides, mitigation and adaptation measures can be taken to reduce disaster risk and protect communities and infrastructure.

In the field of flood disasters Rakuasa et al., (2022), conducted research on mapping flood prone areas in Ambon City using geographic information systems. This research has an important role in supporting sustainable development in Ambon City. By identifying flood-prone areas and the factors that influence them, this research provides information that can be used in flood disaster planning and management in Ambon City. It also provides a better understanding of flood vulnerability and risk in residential areas, which can assist in decision-making regarding the development of disaster-resilient infrastructure. In addition, this research also provides information on rainfall patterns and their influence on flooding, which can be used in water management planning and flood mitigation in Ambon City. Thus, this research can serve as a strong basis for developing sustainable development strategies that focus on flood disaster mitigation in Ambon City.

Muin & Rakuasa (2023), conducted research on utilizing geographic artificial intelligence (Geo-AI) to identify flood-prone areas in Ambon City. This research has an important role in supporting sustainable development in Ambon City. By accurately identifying flood-prone areas and developing an effective early warning system, this research can help reduce the risk of flood disasters. It can also provide a basis for more sustainable spatial planning in Ambon City, by directing development and land use to reduce flood impacts and protect vulnerable areas. This research can also save costs and resources required for traditional flood-prone area identification

analysis, by using more efficient and automated Geo-AI technology. In addition, this research can increase public knowledge and awareness of flood risks in Ambon City, by socializing information about flood-prone areas and early warning systems to the public. Furthermore, this research can serve as a basis for further research and development of Geo-AI technology in flood risk mitigation in various regions. The findings and experiences from this research can be used as a reference for similar research in other cities facing flood risks. Thus, this research has a significant role in supporting sustainable development in Ambon City, through disaster risk reduction, better spatial planning, cost and resource savings, increased public knowledge and awareness, and technology development.

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In the field of tsunami disasters Latue & Rakuasa, (2022), conducted research on the spatial dynamics of tsunami-prone areas in Nusaniwe District, Ambon City, Maluku Province. This research has an important role in supporting sustainable development in Ambon City. In this study, the spatial dynamics of tsunami-prone areas in Nusaniwe Sub-district, Ambon City, were analyzed using the cellular automata - markov chain (CA-MC) method and weighted overlay. The results of this study provide information on the development of built-up land and the level of tsunami hazard in the area. With this information, the Ambon City government can use the results of this research as input in future tsunami disaster mitigation-based spatial planning efforts. In the context of sustainable development, this research also integrates consideration of disaster threats with the concept of Sustainable Development Goals (SDGs). Thus, this research contributes to the development of sustainable development strategies in Ambon City, taking into account disaster risk factors and the protection of coastal environments that are vulnerable to tsunamis and sea level rise.

Sugandhi et al., (2023), conducted research on, Spatial modeling of tsunami hazards and their exposure to settlements in Ambon City. This research has an important role in supporting sustainable development in Ambon City. By conducting spatial modeling of tsunami hazards and their exposure to settlements in Ambon City, this research provides relevant information for the Ambon City government in coastal spatial planning based on disaster mitigation. The research also

provides a better understanding of the disaster risks faced by settlements in coastal areas, which can help in making better decisions regarding the development of sustainable and disaster-safe settlements.

In the field of earthquake disasters Rakuasa et al., (2022), conducted research on the Spatial Dynamics Model of Earthquake Prone Area in Ambon City. This research has an important role in supporting sustainable development in Ambo City. The results showed that the area of built-up land affected in earthquake-prone areas has a relationship that is directly proportional to the year of land development built. Therefore, as the years increase, the area of built-up land in earthquake-prone areas increases. This research is expected to be used as a reference in the management of sustainable residential area development and for spatial planning efforts based on disaster mitigation in order to minimize losses and casualties due to earthquake disasters that will occur in Ambon City in the future.

Rakuasa & Latue, (2023), conducted research on the utilization of remote sensing data and geographic information systems for the identification of built-up land development in earthquake-prone areas in Ambon City. This research has an important role in supporting sustainable development in Ambon City. With a better understanding of built-up land development patterns, the government and stakeholders can develop effective mitigation strategies, including spatial planning that considers earthquake vulnerability, building regulations, and the development of earthquake-resistant infrastructure. The results of this study are expected to serve as a basis for the development of mitigation policies and strategies aimed at the sustainability of the Ambon City region amid the existing earthquake threat.

In the field of erosion disasters, Intopiana (2020), conducted research on mapping erosion-prone areas in the Wae Batu Merah watershed in Ambon City. This research has an important role in supporting sustainable development in Ambon City. This research provides a better understanding of the sustainability of water resources management on Ambon Island. In addition, this research also provides an analysis of the sustainability management of the Wae Batu Gajah river flow in Ambon City. The results of this research can be used as a basis for developing a sustainable water management model in the city. In addition, this research also provides directions for conservation actions that can be taken to prevent erosion and maintain soil and water quality in the Batu Merah watershed. The research suggests several conservation measures such as reforestation with transgenic durian and sengon tree species, and the creation of parks in residential areas. The implementation of these conservation measures can help maintain the sustainability of the Batu Merah watershed ecosystem and prevent erosion. Thus, this research makes a significant contribution in supporting sustainable development in Ambon City by providing an understanding of sustainable water resources management, stream sustainability management, and conservation measures to prevent erosion and maintain soil and water quality.

2. Geography Research in Urban Planning

Geographic research in the field of Urban Planning in Ambon City that has been done, including prediction of land cover change and carrying capacity of settlement land, monitoring the development of built-up land in Ambon City. Salakory & Rakuasa, (2022), conducted research on cellular automata markov chain modeling to predict the carrying capacity of Ambon City. This research has an important role in supporting sustainable development in Ambon City. It provides

insights and analysis on land cover change, support capacity, and land use planning. The aim of this research is to improve the utilization and efficiency of urban land cover based on rational land cover planning for sustainable development. By predicting the land cover in 2031 and analyzing the land support capacity of settlements, this research provides valuable information for the government in the process of spatial planning and decision-making. This research is an appropriate and innovative solution to facilitate sustainable development and land use management in Ambon City.

Rakuasa & Latue (2023), conducted research on Monitoring Urban Sprawl in Ambon City Using Google Earth Engine. The research Monitoring Urban Sprawl in Ambon City Using Google Earth Engine has an important role in supporting sustainable development in Ambon City. By utilizing high-resolution satellite image data and advanced analysis algorithms, this research provides evidence-based information on urban change, enabling stakeholders, including local governments, to make more informed decisions in urban development planning. The research helps identify patterns and trends in urban development, which can assist in formulating sustainable urban development strategies and policies. In addition, this research enables local governments to identify areas that are prone to urban sprawl, so that more effective development planning and control measures can be taken to prevent the negative impacts of urban sprawl. In addition, this research also serves as a valuable database for further research on urban development, environmental quality, and the socio-economic impacts of urban sprawl in Ambon City. This research contributes to the understanding of changes in urban areas and addresses the issue of urban sprawl, which is important to achieve a balance between urban development and environmental preservation. With a data-driven approach and advanced technology, this research aims to promote sustainable and harmonious urban growth that considers environmental sustainability and the quality of life of the people of Ambon City. Overall, this research supports sustainable development in Ambon City by providing valuable information for decision-making, urban development planning, and urban planning.

Rakuasa et al., (2023), conducted research on prediction of land cover model for central Ambon City in 2041 using the cellular automata markov chains method. This research has an important role in supporting sustainable development in Ambon City. Through analyzing and predicting land cover change using the Cellular Automata Markov Chains model, this research provides a better understanding of the dynamics of land cover in Ambon City. The results of this research can be used as a reference in managing the development of sustainable residential areas and as an effort to regulate land use in the central area of Ambon City based on ecological aspects. Thus, this research contributes to proper land use planning and environmental conservation to support sustainable development in Ambon City.

Muin & Rakuasa,(2023), conducted research on evaluation of Ambon city spatial plan based on aspects of flood vulnerability. This research has an important role in supporting sustainable development in Ambon City. By evaluating Ambon City's Regional Spatial Plan (RTRW) based on flood vulnerability, this research can provide relevant and accurate information on flood-prone areas. This will help the government and community to take more effective measures to prevent and manage flooding. In addition, this research can also help maintain environmental quality in Ambon City. By evaluating the RTRW based on flood vulnerability, this research can encourage

the development of areas that are environmentally friendly and consider aspects of sustainability. In addition, this research can also involve community participation in the planning and development process. By involving communities in the evaluation of spatial plans based on flood vulnerability, community needs and aspirations can be accommodated in development planning. This will ensure that regional development is more accountable, transparent and supported by the community.

3. Geography Research in Tourism

Geography research in the field of Tourism in Ambon City has been carried out, including the distribution of marine tourism and the use of Web GIS to promote marine tourism destinations in Ambon City. Mehdil et al., (2022), conducted research on Mapping the distribution of marine tourism objects on Ambon Island using geographic information systems. This research has an important role in supporting sustainable development in Ambon City. By using a geographic information system (GIS) to map the distribution of marine tourism objects on Ambon Island, this research provides important information for the development of the tourism sector in the area. Through this mapping, the government and relevant stakeholders can have a clearer picture of the potential of marine tourism in Ambon City, so that they can take strategic steps in the development and promotion of existing tourist destinations. Thus, this research can be the basis for better decision-making in an effort to increase economic growth through the tourism sector in Ambon City.

Marhelin et al., (2023), conducted research on geographic information system for the Distribution of marine tourism objects in Salahutu District, Ambon Island Web-Based using ArcGIS StoryMaps. This research has an important role in supporting sustainable development in Ambon City. By utilizing web-based Geographic Information Systems (GIS), especially through the ArcGIS StoryMaps platform, this research can assist in optimizing the potential of marine tourism in Salahutu District, Ambon Island. Through attractive and interactive visualizations, this research can increase the attractiveness of marine tourism objects, expand the range of promotions, and increase the participation of communities and policy makers in sustainable tourism management. Thus, this research provides in-depth insight into how the utilization of web-based GIS technology can support sustainable development in Ambon City.

4. Geography Research in the Field of Climate Change

Geography Research in the Field of Climate Change carried out includes monitoring changes in surface temperature in Ambon City spatially and temporally. Rakuasa, (2022), conducted research on spatial temporal analysis of land surface temperature of Ambon City based on cloud computing: google earth engine. This research has an important role in supporting sustainable development in Ambon City. By analyzing land cover change and urbanization growth, this research provides a better understanding of the impacts of urbanization on the urban environment and climate. The results of this research can be used as a basis for developing sustainable development policies and strategies, including more effective land management, vegetation preservation, and climate change mitigation. Thus, this research can assist the government and stakeholders in taking appropriate measures to maintain the balance between urban growth and environmental sustainability in Ambon City.

5. Geography Research in Health

Geography research in the field of Health in Ambon City that has been carried out is the spatial distribution of COVID 19 distribution in Ambon City. Rakuasa et al., (2021), conducted research on spatial distribution analysis of the incidence rate of Covid-19 cases with the kernel density method in Ambon City. This research has an important role in supporting sustainable development in Ambon City. By analyzing the spatial distribution of the incidence rate of COVID-19 cases using the Kernel Density method, this research can provide relevant information for policy makers in determining disease control and prevention strategies based on higher risk areas. In addition, this study also examines the relationship between population density and the number of positive COVID-19 cases in Ambon City, which can provide insight into the factors that influence the spread of the disease. With a better understanding of the distribution and factors affecting the spread of COVID-19 in Ambon City, this research can provide a solid basis for policy makers to plan effective and efficient response measures. This will contribute to the sustainable development of Ambon City by reducing the negative impacts of the spread of the disease and protecting overall public health.

6. Geography Research in Agriculture, Forestry

Geography research in the field of agriculture and forestry in Ambon City that has been carried out is the analysis of vegetation density, analysis of cover changes in watersheds. Latue et al., (2023), conducted research on vegetation density analysis of Ambon City using Sentinel-2 satellite image data with machine learning-based MSARVI method on google earth engine. This research has an important role in supporting sustainable development in Ambon City. The results of the vegetation density analysis can provide relevant information for decision makers in environmental management and sustainable urban development. By knowing the areas with high vegetation density, efforts can be made to preserve vegetation and replant plants in the city. This will help maintain air quality, environmental health, and the comfort of city residents. In addition, this research can also be used for monitoring environmental change, identifying areas with poor environmental quality, measuring the impact of climate change, and monitoring plant health. Thus, this research makes a significant contribution to maintaining environmental balance and sustainable development in Ambon City.

Rakuasa et al., (2022), conducted research on Land Cover Model in Ambon City Watersheds in 2031: Case Study of Wai Batu Gantung, Wai Batu Gajah, Wai Tomu, Wai Batu Merah and Wai Ruhu Watersheds. This research has an important role in supporting sustainable development in Ambon City. By analyzing land cover change and predicting future land cover, this research provides information that can be used in rational and conservative land use planning. The results of this analysis and prediction of land cover change can provide solutions in structuring the future sustainable land use of Ambon City based on ecological aspects and conservation efforts to support land use planning and appropriate land use allocation.

Based on the above, it can be concluded that geographic research has a central role in supporting sustainable development efforts in Ambon City. Through in-depth analysis of geographical and spatial aspects, this research provides a number of crucial benefits in designing and implementing

sustainable and environmentally sound development. The following are some of the important benefits of geography research in supporting sustainable development in Ambon City:

1) Understanding City Dynamics: Geographic research provides an in-depth understanding of urban development, including patterns of population growth, land use change, and infrastructure development. With this information, policymakers can identify areas that require special attention, anticipate the impacts of change, and design appropriate solutions (Secundo et al., 2020).
2) Sustainable Resource Management: Geography research assists in the sustainable management of natural resources, such as water, land and forests. By understanding the interactions between humans and the environment, this research helps design effective management strategies to prevent environmental degradation, maintain resource availability, and support sustainable economic growth (Hallinger & Chatpinyakoop, 2019).
3) Efficient Spatial Planning: Spatial analysis from geography research helps in efficient and sustainable spatial planning. This includes transportation planning, distribution of public facilities, and infrastructure development (Mio et al., 2020). This research helps reduce traffic congestion, improve connectivity, and create more functional cities.
4) Identification of Environmental and Social Impacts: Geography research helps identify the impacts of human activities on the environment and society. By understanding the impacts of land use change, pollution, and economic activity, it enables planning that minimizes negative impacts and improves the quality of the environment (Pizzi et al., 2020).
5) Disaster Risk Reduction: In the context of Ambon City, which is vulnerable to natural disasters, geographic research has an important role to play in reducing disaster risk. Analysis on vulnerability to earthquakes, floods, and climate change helps design appropriate mitigation and adaptation strategies to maintain community safety and infrastructure sustainability (Pizzi et al., 2020).
6) Sustainable Policy Development: Geography research provides a strong empirical basis for sustainable policy development. Data and findings from this research enable decision-makers to design policies that focus on sustainable development priorities, such as poverty alleviation, environmental conservation, and social inclusion (Walshe, 2017).
7) Community Participation: Geography research can also involve the active participation of communities in the development process. By understanding local preferences and needs, it helps design relevant solutions and gain community support in their implementation (Rakuasa & Mehdila, 2023).
8) Technology Development and Innovation: Geography research encourages technological development and innovation in mapping and spatial analysis. The use of advanced geospatial technologies helps improve the efficiency of planning and decision-making, and facilitates monitoring and evaluation of sustainable project implementation (Rakuasa et al., 2023).

Taken together, these benefits confirm the importance of geography research in supporting sustainable development efforts in Ambon City. By providing an in-depth understanding of urban dynamics, interactions between people and the environment, and the impacts of development policies, this research provides a valuable guide for policymakers, urban planners, and communities in creating a sustainable, inclusive, and environmentally sustainable Ambon City.

CONCLUSION

In the research on The Role of Geographic Research in Supporting Sustainable Development in Ambon City, Indonesia, the importance of geographic research in guiding and supporting sustainable development efforts in urban contexts is clearly seen. The research revealed that geographic research is not just a spatial analysis, but a tool that provides deep insights into the complex interactions between people and the environment in Ambon City. Through the analysis of urban growth patterns, natural resource management, spatial planning, identification of environmental and social impacts, and disaster risk reduction, geographic research helps design and implement development policies that are balanced between economic, environmental and social aspects. This research provides a strong empirical basis for policymakers' decisions, with relevant and reliable data and findings. In facing the challenges of sustainable development in Ambon City, geography research also encourages active community participation and technology development. Collaboration between researchers, government and communities is important to design solutions that are relevant and accepted by all parties. This research provides convincing evidence that geography research has an integral role in shaping the direction of sustainable development in Ambon City. By providing a deeper understanding of city characteristics, human-environment interactions, and policy impacts, geography research helps to create a sustainable, inclusive, and environmentally sustainable city.

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