



Social Network Analysis of Environmental and Health Issues in the Development of The Nusantara Capital City (IKN) During 2022 to 2024

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Abstract. The relocation of the capital city from Jakarta to East Kalimantan has sparked a significant controversy. Environmental damage and threats to flora and fauna are among the major concerns receiving public attention. This study aims to identify how these related issues arise and to map the parties involved in the interactions. It employs a qualitative approach with a case study method. Data were collected using Google Trends over a three-year period from 2022 to 2024. The results indicate that the development of the new capital city has the potential to damage the environment, and that mining activities and infrastructure development could impact the health of surrounding communities. This research is expected to encourage policymakers to communicate environmental and health issues more transparently to the public and to implement substantial and targeted preventive measures to address the impacts arising from The Nusantara Capital City (IKN).

Keywords: The Nusantara Capital City (IKN), Social Network Analysis, Environmental Communication, Risk Management, Google Trends.

1 Introduction

The relocation of the National Capital from Jakarta to Penajam Paser Utara, East Kalimantan, is still under debate. The Ministry of National Development Planning/Bappenas stated that the relocation of the IKN is expected to promote decentralization and equitable development, particularly in areas outside Java, including Eastern Indonesia. However, challenges in the context of sustainable development have started to emerge, particularly regarding environmental and health concerns.

The Nusantara Capital City (IKN) is located in East Kalimantan Province, part of Kalimantan Island. The city's planning aims to ensure the sustainability of biodiversity conservation areas and protected forests, with at least 45 percent of Kalimantan Island, home to tropical rainforests, serving as the lungs of the world. Currently, 59.50 percent of the IKN area is forest, comprising conservation, protected, and production forests. Additionally, the IKN region includes the habitat of protected endemic species [1]. Ironically, based on BPS data, deforestation in East and North Kalimantan was recorded

at 13,758.8 hectares, the highest deforestation rate in the country from 2021 to 2022 [2]. During the Leadership Forum Live at Fisipol UGM, Dwiko Budi Permadi, a lecturer at the Faculty of Forestry UGM, expressed deep concern. Dwiko highlighted the deforestation threat posed by IKN development, especially in sectors that exploit, convert, or repurpose forest land. According to a Bappenas report, the forest condition in the IKN area is poor. Of the 256 thousand hectares of land, only 43 percent remains forested, indicating significant deforestation in 57 percent of the area. Dwiko also noted, based on KLHK records, that the capacity to rehabilitate 900 hectares of forest per year is limited, with a low success rate. It may take up to 99 years to restore the IKN forest fully [3].

Additionally, despite the legal framework supporting the capital's relocation, the construction of the IKN is costly, as materials need to be sourced from other islands such as Java and Sulawesi. BBC News Indonesia reported that sand, stone, and gravel mining activities in Palu, Central Sulawesi, for The Nusantara Capital City (IKN) project in East Kalimantan have led to respiratory diseases among residents, and fish catches in nearby waters have significantly declined [4]. Similarly, Tempo Magazine (July 14, 2024) reported that a memorandum of understanding between the Governors of Central Sulawesi and East Kalimantan in 2021 revealed that the IKN project requires 30 million tons of crushed stone for infrastructure development. Large-scale stone mining in areas such as Palu, Donggala, and Sili has led to a sharp increase in cases of acute respiratory infections (ARI) in Palu, rising from 800 cases annually to 3,000 cases over the past two years [5].

Criticisms continue to arise regarding President Jokowi's decision to move the capital city, announced during his state speech on August 23, 2019. Various groups have raised concerns about financing, land acquisition, environmental impacts, social issues, and health implications. Additionally, several economic experts questioned the government's decision to relocate the capital in the midst of the Covid-19 pandemic. This study addresses two key questions. First, what is the relationship between the various issues surrounding the relocation of IKN? Second, how can the parties involved in the emergence of problems during the IKN's construction be mapped? The study aims to critically examine these two questions.

2 Literature Review

2.1 Environmental Communication

Environmental communication focuses on the various media and processes used to convey messages related to environmental issues. These messages go beyond simply informing the public about problems like pollution or climate change; they also aim to shape people's understanding, attitudes, and behavior in response to these issues. Cox (2013) argues that environmental communication is not just about providing scientific information on environmental damage but also about fostering public participation in addressing these challenges. This involves efforts to increase public engagement with issues such as sustainability, natural resource conservation, and climate change mitigation [6].

Environmental communication can be understood as a social process in which different parties, including governments, environmental organizations, and the broader community, engage in dialogue about the actions needed to solve shared environmental problems [7]. When delivering messages, it is essential to recognize that audience characteristics play a significant role. Different community groups have varying backgrounds, values, and levels of understanding of environmental issues, so messages must be tailored to their needs and perceptions. This customization is crucial to ensure that the message is effectively received, understood, and capable of prompting real action from the audience [6].

Additionally, framing in environmental communication is a key concept discussed by Nisbet & Newman (2015). Framing refers to how environmental issues are presented to the public, whether as urgent crises or opportunities for innovation and improvement. Nisbet & Newman observed that crisis framing is often used to evoke urgency and concern, while solution-based framing tends to inspire optimism and engagement. For example, climate change can be framed as a global threat demanding immediate action or, alternatively, as an opportunity to transition to clean energy and green technology. Framing is vital in environmental communication because it influences how the audience responds to the information. Overemphasizing crisis or disaster framing can lead to feelings of anxiety or helplessness, whereas solution-based framing can offer hope and motivation to act. Nisbet & Newman (2015) highlight the importance of selecting a framing strategy that aligns with the social and cultural context of the audience, as well as the specific environmental issue at hand [8].

2.2 Civil Society

Civil society, including non-governmental organizations (NGOs), community groups, and other non-state actors, plays a crucial role in achieving common goals, particularly in the context of environmental sustainability. According to Bernauer and Gampfer (2013), civil society organizations (CSOs) act as key drivers in environmental policy-making. They argue that CSO involvement in decision-making processes enhances transparency and public participation, thereby strengthening the legitimacy of global governance. CSOs not only create platforms for citizens to engage in policy discussions but also advocate for environmental justice through partnerships with governments and international organizations [9].

Bailey's (2012) study shows that citizen-led initiatives often emerge to address gaps in public services, demonstrating the proactivity of civil society. These initiatives, both formal and informal, reflect community responses to unmet needs, such as access to healthcare and education services. Through these efforts, civil society directly contributes to meeting local needs and developing practical solutions, ultimately improving community well-being [10].

The impact of civil society extends beyond advocacy; they also facilitate public participation, ensure government accountability, and drive policy change on key issues such as environmental sustainability and social welfare. Acting as watchdogs and policy initiators, CSOs help bridge the gap between governments and citizens. Overall,

civil society plays a significant role in environmental governance, and further exploration of the literature is essential to understanding its influence in both global and local contexts.

2.3 Risk and Crisis Communication Mapping

Risk communication involves various types of messages and processes. The essence of risk communication is not just the scientific assessment of potential harms but also how organizations convey their confidence and capacity to achieve appropriate levels of safety [11]. In other words, risk communication is defined as the social management of risk by relevant agencies, with objectives such as informing, educating, and aiding decision-making [12]. Information predicting potential risks can be useful in analyzing possible losses. During the message-processing phase, all messages must be tailored to the needs and characteristics of the audience. Thus, the application of messages and processes in communicating each crisis cannot be standardized [13].

According to Fearn-Banks (2016), crisis communication is a dialogue between an institution or organization and the public, occurring before, during, and after a crisis or event. Crisis communication involves gathering, processing, and disseminating information needed to manage a crisis. The key differences between risk communication and crisis communication lie in the focus, nature, and timing of the message delivery. Risk communication is generally persuasive, while crisis communication is more informative [14]. Risk communication is conducted more routinely, while crisis communication is usually irregular or sudden. Risk communication focuses on the sender and recipient of the message, whereas crisis communication centers on the public and the evolving situation [15]. In this study, the researchers mapped strategic issues or problems that fall into risky situations, as well as those that can be categorized as crisis situations.

2.4 Measuring IKN Good Governance

On the ikn.go.id page, it is stated that IKN is being developed as a smart city by utilizing information and communication technology to create effective, transparent, and accessible governance that involves public participation [16]. In this context, IKN governance must adhere to the principles of good governance. According to Government Regulation Number 101 of 2000, the principles of good governance include:

1. Professionalism: The ability to enhance government administrative capabilities and morale to provide fast, accurate, easy, and affordable services.
2. Accountability: Increasing the accountability of decision-makers, particularly in matters of public interest.
3. Transparency: Building trust between the government and the public through open and accessible information.
4. Excellent Service: Providing public services with clear procedures, friendly and disciplined interactions, supported by adequate facilities and infrastructure.
5. Democracy: Involving the public in decision-making processes, accepting and considering public opinions, and ensuring freedom of expression.

6. Efficiency and Effectiveness: Ensuring that public services are delivered by optimizing existing resources responsibly and effectively.
7. Rule of Law and Public Acceptance: Enforcing laws fairly for all members of society, regardless of status, and protecting human rights.

According to the World Bank (1992), good governance refers to institutions that manage development in a strong and responsible manner, aligning with the Indonesian government's system of democracy, efficient markets, budgetary discipline, and creating a legal and political framework to foster business growth [17]. Therefore, the government must manage all challenges and potential impacts from the development of IKN while supporting public openness. Public openness, in essence, is a form of transparency, which is crucial for the government's ability to achieve good governance. Transparency or openness promotes checks and balances [18].

3 Methods

This study employs a qualitative approach using a case study method. To gather relevant information on a specific case, data collection is conducted through web scraping, an automated process of retrieving data from certain web sources and converting it into a format suitable for further analysis [19]. Web scraping is particularly useful for obtaining large quantities of data, which are then stored in spreadsheets and analyzed according to the research objectives.

There are two methods of web scraping: manual and automatic. In this study, the researchers used web scraping to extract data from Google Trends. The time frame for the study spans three years, from 2022 to 2024. Google Trends tracks interactions in the digital world and identifies how certain issues become trends [20]. It offers several advantages, including easy access, historical data, and global coverage, which support trend analysis over time [21]. However, Google Trends has limitations, as it only captures data from Google users and presents relative scores, which may lead to inaccurate interpretations and incomplete data representation [22].

In addition to using Google Trends for data collection, this study also applies network analysis to examine the data. Network analysis aids in understanding the relationships and interactions between various entities in the digital environment, such as users, content, or popular issues [23]. Through this method, researchers can identify patterns of relationships, influences, and information flows within social networks or digital communication. In the context of this study, data extracted from Google Trends is processed to create a network that illustrates the relationships between frequently searched topics or keywords, showing how trends evolve and influence each other over time. This network analysis enables the visualization of the interconnectedness between trends, reveals the most influential topics or actors, and provides deeper insights into the dynamics of trends in digital media [24].

4 Result

Based on data from the Ministry of Environment and Forestry (KLH), monitoring results in 2022 show that Indonesia’s forested land covers 96.0 million hectares, or 51.2% of the total land area, of which 92.0% (or 88.3 million hectares) is designated as forest areas [25]. Additionally, according to the book “25 Years of Dynamics of Forest Cover in the Kalimantan Ecoregion,” Kalimantan has approximately 36.9 million hectares of forest area with defined primary functions. This division is based on a ministerial decree from the Ministry of Environment and Forestry, indicating that around 42% of Indonesia’s forest area is concentrated on the island of Kalimantan [26].

However, Kalimantan has experienced a steady decline in forest cover, losing about 1.12% (or approximately 0.36 million hectares) of forest annually between 1990 and 2014. Without a strategic policy to improve forest cover management, Kalimantan is projected to reach a critical threshold in 33 years (by 2047) and could lose its forest cover completely within 77 years from 2014. Article 6 of the Presidential Regulation of the Republic of Indonesia Number 3 of 2012 states that Kalimantan’s spatial planning should aim to maintain at least 45% of the island’s area with tropical rainforest vegetation, to support global biodiversity and act as the world’s lungs. Ironically, the trend over the past 25 years shows a continuous decline in forest cover.

Researchers made an interesting discovery while exploring Google Trends topics from 2022 to 2024. Google Trends provides an index of internet searches, reflecting public interest and motivation in seeking information on specific topics or news [27] [28]. In this study, researchers examined search trends related to the keyword “IKN” (the new capital city) and its associated issues, such as the impact of IKN, environmental damage, health, and deforestation. As shown in Figure 1, health-related issues were the most frequently searched by the public from 2022 to 2024. This is understandable, as the world, including Indonesia, was still grappling with the trauma of the Covid-19 pandemic during this period. The policies and relocation of IKN naturally captured the attention of many Indonesians.

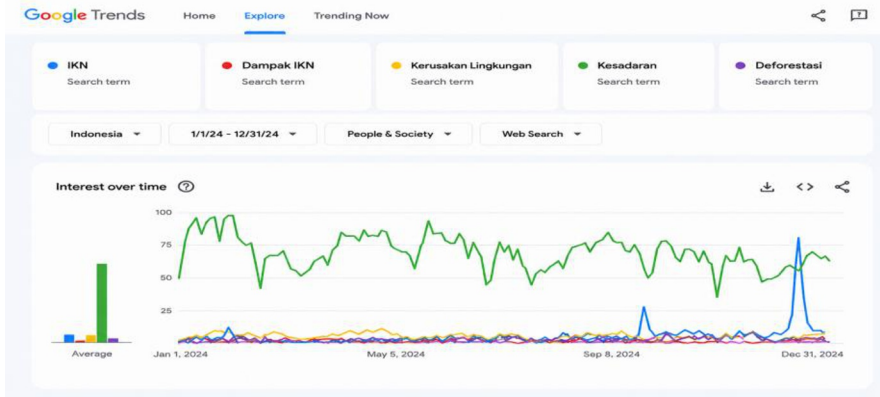


Fig. 1. Google Trends analysis of public interest in IKN-related issues (health, environment, deforestation, and impact) from 2022–2024.

Meanwhile, Figure 2 shows that the search for information related to IKN is not limited to the people of East Kalimantan Province. The topic is also of interest to residents in other Kalimantan regions, such as Central Kalimantan, North Kalimantan, and South Kalimantan. Notably, the DKI Jakarta region is among the top five in terms of trending IKN searches. These findings, as illustrated in Figure 2, directly contribute to the analysis of social networks. The interest in these topics indicates that the relocation and development of IKN have sparked a broader discourse in cyberspace. Through technological devices, civil society frequently seeks information to satisfy their needs and curiosity. This connectivity serves as both a source of strength and a means to monitor social change.

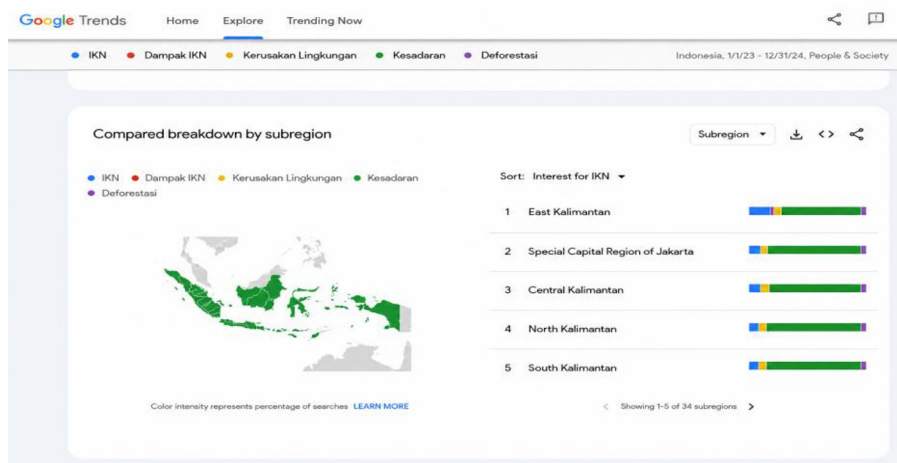


Fig. 2. Geographic distribution of Google Trends searches related to IKN across Indonesian provinces

In the civil society review, it is explained that civil society is a driving force in policy formation. The involvement of civil society can also increase transparency and public participation in the decision-making process. The inclusion of the Jakarta area in the top five trending topics related to IKN indicates that IKN is closely connected to Jakarta, both as Indonesia's former capital and in light of the planned relocation of the state civil apparatus (ASN) from Jakarta to East Kalimantan. Therefore, the government needs to uphold accountability, transparency, and democracy, involving the public to realize the principles of good governance.

The researchers then linked IKN to its impacts. Two trending topics that emerged from this keyword were the development of IKN and its positive impacts (see Figure 3). These two topics were further explored to form an information network explaining the development of IKN infrastructure. This search pertains to the IKN's development, which is expected to be completed and inaugurated by President Joko Widodo in October 2024. The progress of infrastructure development is predicted to reach 93% for the first phase [29].

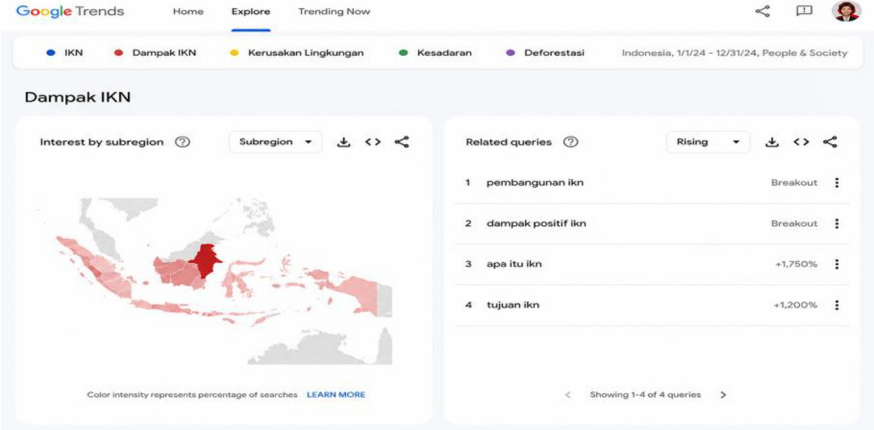


Fig. 3. Network visualization of Google Trends topics related to IKN development and its perceived positive impacts.

While the positive impact of IKN is expected to attract investment, create new jobs, and promote equitable development across Indonesia’s regions, this anticipated benefit does not directly align with societal perceptions and discourse in cyberspace. Figure 4 illustrates that equitable development is linked to the Indonesian government’s ability to identify solutions and consider factors that must be addressed to avoid social conflict, enhance welfare, and ensure decent living standards, as well as equality in economic distribution. In other words, the development of IKN has not yet met the community’s expectations.

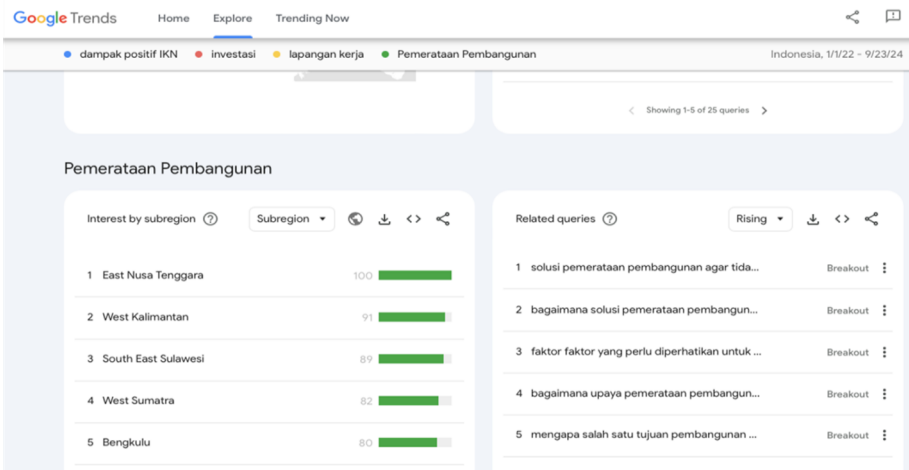


Fig. 4. Public discourse network on equitable development in relation to IKN development based on Google Trends data.

What about the issue of deforestation? This matter was particularly sensitive during the development of IKN. Figure 5 shows that deforestation can lead to socio-cultural

problems, and data on deforestation is widely sought by the public. In reviews of environmental communication, crisis framing is often used to create a sense of urgency and concern, while solution-based framing tends to promote optimism and engagement. Many environmental activists and media outlets have emphasized this issue. By criticizing deforestation, these activists and the media hope the government will present more than just ‘good’ data. The government must provide accurate data because institutions that adhere to the principles of good governance require solid and responsible development management.

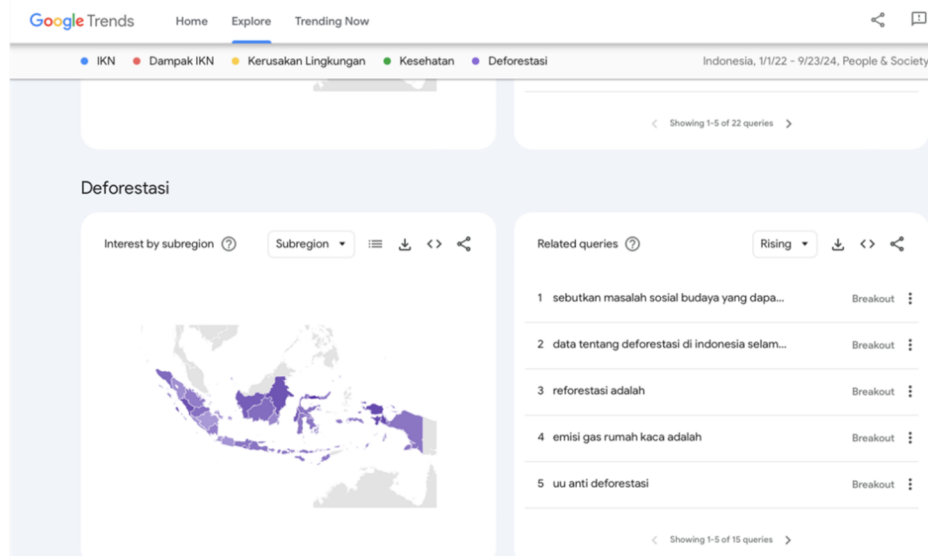


Fig. 5. Network of public concern regarding deforestation impacts associated with IKN development

As reported on the Mongabay website, David Gaveau, the founder of the tree map and an activist, has voiced concerns that the construction of the National Capital City (IKN) in East Kalimantan will worsen deforestation in the region. In an interview with Mongabay, Gaveau stated that the IKN project, although promoted as an environmentally friendly city, risks attracting investments that could ultimately accelerate deforestation in Kalimantan. One of the most worrying aspects is the construction of infrastructure, such as toll roads, which could damage protected forest areas and disrupt wildlife habitats, including those of sun bears in the Sungai Wain Protected Forest area in Balikpapan. In addition to David Gaveau, Mapaselle, the Executive Director of the Coastal Working Group, expressed similar concerns. He warned that the construction of toll roads, which would facilitate access to IKN, could further damage forests in Kalimantan. He noted that these roads are likely to be used for industrial purposes, potentially triggering forest fragmentation and increasing tensions between local communities and migrants. According to the Indostrategic survey, many people oppose the

implementation of IKN construction. Beyond disturbing flora and fauna, this mega development project raises fears about its impact on the health of surrounding communities, particularly due to intensive mining and infrastructure development activities.

Based on the findings from the data and analysis conducted, the researcher has several important observations. First, in the review of risk communication, risk management by policymakers such as informing the public, demonstrating empathy, showing respect, and providing education must be conducted continuously and substantially, tailored to the needs and characteristics of the community. For example, when health issues become a trending topic associated with IKN, the government must convey information transparently regarding all potential advantages and challenges during the construction of IKN. The government should engage with its citizens maturely by acknowledging and addressing all input and criticism. A credible government will find it easier to gain the trust of the community and the media. Conversely, statements that are overly positive but lack sensitivity to the current situation can trivialize significant issues that citizens may be directly experiencing.

The next observation concerns deforestation, which tends to evoke negative sentiment. When the IKN policy was established, the justification presented was economic equality and development in Indonesia. However, the development of IKN has seemed rushed, resulting in various issues that have sparked widespread concern in the community. Many residents have questioned the funding of IKN and whether the budget allocation is appropriate, especially given the financial struggles of many citizens. Additionally, have the environmental and health impacts been thoroughly assessed? What about forest rejuvenation, considering that many trees have been cut down for the IKN area? It is important to remember that replanting forests takes a significant amount of time. Moreover, what about the availability of water and community involvement in the IKN location? These questions cause anxiety within the community and lead to certain speculations or assumptions about the governance of the IKN development, contributing to a crisis of trust between the community and the government.

Currently, the government uses the ikn.go.id website to inform the public about various matters. However, when the situation is at a crisis level, strategic issue management should be conducted through multiple media channels. The government must not only communicate but also involve various segments of society regarding all possible impacts caused by the IKN development. This includes inviting and engaging community members, experts in relevant fields, environmental activists, and both mainstream and digital media to collaborate in finding solutions to the problems that arise.

Additionally, the government needs to avoid overly monumental narratives that promote luxury in the IKN development. Influencers unrelated to environmental and health issues should not be utilized in these communications. Ultimately, the primary goal of the IKN development is economic equality, including job creation. It is essential to communicate these messages meaningfully, rather than superficially. Dominant discourse can shape social networks and contribute to a broader conversation. Therefore, synergy and community participation are crucial. These two elements are integral to recognizing democratic rights and enforcing the rule of law in the good governance of the IKN development.

5 Conclusion

To achieve sustainable development of IKN, the government must prepare and conduct regular monitoring of the IKN's progress and its associated impacts. The development of IKN should not only focus on technological sophistication or modernization; it must also be utilized to enhance the prosperity of the people and be sustainable across generations. Additionally, the IKN development project must adhere to the principles of good governance. Although Kalimantan Island is one of the areas with minimal disaster risk, if the development of the IKN infrastructure does not prioritize environmental awareness and disaster mitigation, Kalimantan will become increasingly vulnerable to risks such as flooding, fires, disruption of flora and fauna, wildlife habitat loss, and imbalances in forest, coastal, and mangrove ecosystems in the coming years.

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