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Risk communication in risk-based planning: a practice in coastal area of Subang regency, Indonesia

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Abstract

Purpose – This paper aims to explore the extent to which risk communication has been implemented into spatial planning practice in Indonesia by using the coastal area of Subang Regency as a case study. Risk communication in risk-based planning (RBP) is the process of exchanging information about risk and hazards between all actors which emphasizes determining the level of risk acceptance of communities to support appropriate decision making in spatial planning. It has been proven effective in developed countries, but it remains unclear in Indonesia.

Design/methodology/approach – The study uses qualitative methods by analyzing documents and interviews with local stakeholders to explain how risk communication is implemented in RBP at the regency level.

Findings – This study reveals that risk communication is not explicitly incorporated into RBP regulations and impacts its practices. The absence of a clear definition and guidelines in regulations is leading to limited understanding at all government levels. The emphasis on community risk acceptance levels as the core of risk communication in RBP has not been conducted, where the existing focus is still majorly on disaster events. This has led to improper spatial planning decisions.

Practical implications – Incorporating risk communication in RBP is important in spatial planning practice in Indonesia. Without effective community engagement, clear definition and guidelines on community's acceptable risk levels, spatial planning efforts may not align with local needs, leading to social conflicts and hindering appropriate spatial planning. For instance, land use policy for community that is willing to tolerate the risk should be permitted with specified consideration instead of offering relocation options that potentially lead to social unrest by conflicting with their social, economic and cultural. Integrating risk communication into RBP can result in a more adaptive and appropriate spatial planning decisions.

Originality/value – This study offers a novel exploration of risk communication which is important to be integrated into the RBP in a locality in Indonesia, focusing on both regulatory factors and practices to support appropriate decision making in spatial planning. This paper is important because study on risk communication in RBP in Indonesia is still scarce.

Keywords Disaster, Hazards, Indonesia, Risk communication, Risk-based planning, Spatial planning

Paper type Research paper

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1. Introduction

The literature has indicated that effective risk communication is a fundamental aspect of risk-based planning (RBP) (Burby *et al.*, 2000; Saunders and Kilvington, 2016). Risk communication in RBP is defined as the process of exchanging information between interested parties about the potential, consequences and probability of risks and hazards which emphasizes to determine the level of risk acceptance of communities and categorizes as acceptable, tolerable or intolerable as a basis for making appropriate spatial planning decisions (Saunders *et al.*, 2013). Acceptable risk is when people are willing to accept risks in their daily lives without actively seeking to reduce them, then land use is allowed with controls. In tolerable risk, people accept risk and take action to reduce it, where land use is permitted with conditions. Intolerable risk is considered unacceptable due to its high level, where land use is prohibited in that area (Saunders and Kilvington, 2016; Sim *et al.*, 2022). This is the heart of RBP which distinguishes it from other fields (Kilvington and Saunders, 2019). Meanwhile, this definition is different from risk communication in disaster events which emphasizes more on process of exchanging information among interested parties about the nature, magnitude, significance or control of risk in pre-disaster, emergency response and post disaster procedures as the part of disaster risk management (Covello, 1992; UNDRR, 2022).

Conceptual and empirical studies have shown that effective risk communication can build proper decision making of RBP in developed countries, reducing casualties and material losses from natural hazards (Burby *et al.*, 2000; Saunders *et al.*, 2007). This is evident in the existence and implementation of official regulations regarding the role of risk communication in RBP, such as in Canada and New Zealand (Saunders *et al.*, 2013; Struik *et al.*, 2015). Developed countries also emphasize the importance of improving stakeholder understanding of risk communication in spatial planning (Banba, 2017). Risk communication in RBP plays a crucial role in involving communities and collecting relevant information such as spatial planning in Canada which has incorporated into the Canadian Standards Association (CSA) risk management standard (CSA, 2009). It emphasizes the integration of risk management into all aspects of spatial planning (Journeay *et al.*, 2015). Furthermore, clear government regulations help all stakeholders and affected communities understand the risk communication process (Saunders *et al.*, 2007).

Other countries, such as New Zealand, have successfully implemented risk communication into RBP by providing clear guidelines and definition that already incorporated it into the Resource Management Act, 1991, which prioritizes the sustainable management of natural and physical resources (RMA, 1991). These guidelines provide detailed explanations of the spatial risk management framework, ensuring a consistent approach from the national to the community level and reducing the knowledge gap (Saunders *et al.*, 2013). Risk communication is an essential component at every stage of the framework, forming a crucial foundation for spatial planning decisions. Furthermore, the community is actively involving in determining level of risk acceptance, and assigning clear authority to stakeholders for implementing risk communication (Beban and Gxunnell, 2019). This ensures that stakeholders and affected communities have a comprehensive understanding of the entire process, resulting in a robust risk communication in spatial planning (Saunders and Kilvington, 2016).

While risk communication has been proven effective in developed countries, the practice in spatial planning in Indonesia remains unclear. Therefore, we conducted this study to explore this gap by providing the empirical evidence. We argue that there is still a lack of research which have not specifically addressed risk communication in RBP. While previous studies have focused on integrating disaster risk reduction (DRR) into spatial planning through improved hazard mapping and national DRR guidelines (Sagala *et al.*, 2021). Another study examines the discussion of risk communication in case studies in Indonesia, which was more focused in disasters occurrence during the pre-disaster, emergency response and post-disaster phases (Fakhriati *et al.*, 2023; Selamet, 2019).

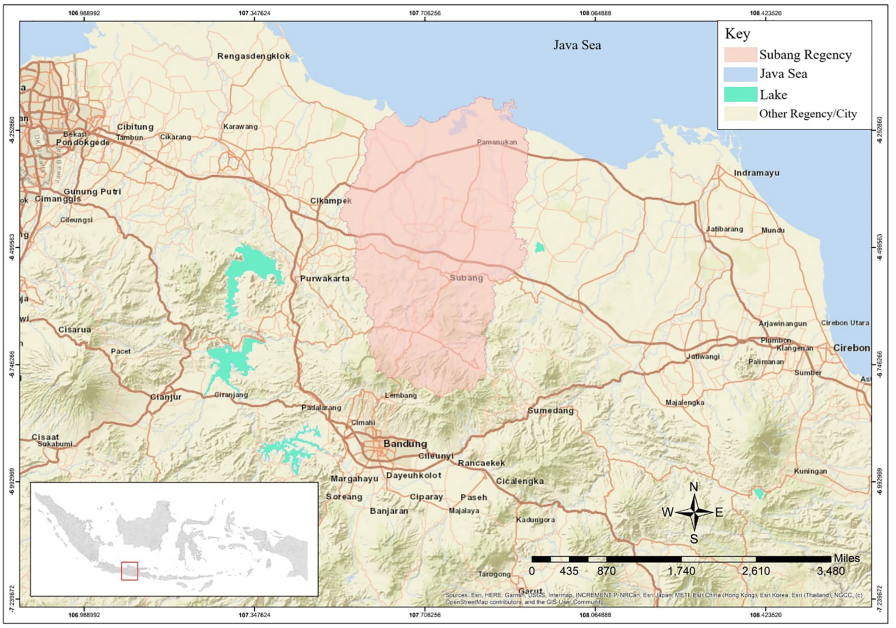
This paper aims to explore the extent to which risk communication is implemented into spatial planning practice in a locality in Indonesia. Being an archipelago country, Indonesia is located in an area prone to multiple hazards. However, its capacity to manage these hazards remains constrained (Zorn, 2018). We present a case study in the coastal area in Subang Regency, West Java Province which represents the Indonesian coastal region with multiple hazards including slow onset hazards from climate change impact, abrasion and coastal inundation (Abi Suroso and Firman, 2018; Solihuddin *et al.*, 2021). The main issue in this area is the risk of the region sinking in the coming decades due to the hazards. However, the existing spatial planning lacks sufficient coordination and control from relevant actors (Dewi *et al.*, 2022). It gave impression that the actors are not taking any action regarding spatial planning to address potential risk and hazards.

From study case in Subang Regency, our study unfolded in two stages. First, we explore the extent risk communication integrated in regulation that have mainstreamed RBP as a normative regulatory perspective. Then, we analyze its practical implementation through in-depth interview with key informant from spatial planning actors. This approach gains valuable insight from the practice and experience explored in Subang Regency thus contributing to enriches our understanding of the implementation of risk communication in RBP practice.

This paper is structured as follows: introduction to explain background, gap, purpose of the study, followed by an explanation of the methods. The next section presents the results of qualitative analysis, including the discussion. This paper also concludes the findings of the authors.

2. Methods

We employed a single case study by using qualitative approach to provide in-depth understanding and insights into complex issues (Stake, 1995). Our study investigates



Source(s): Authors

Figure 1. Map of Subang regency

integration of risk communication in RBP regulation and provides evidence of risk communication practices carried out by local actors in the process of spatial planning preparation. The coastal area of Subang Regency which is located in the north of part West Java Province Indonesia (Figure 1), is an area vulnerable to the risk of sinking within a few decades due to slow onset risks such as sea level rise, sediment deficit, coastal abrasion and inundation (Abi Suroso and Firman, 2018; Handiani *et al.*, 2022). However, there is insufficient coordination in spatial planning in this region, leading to a worsening impact of the risks faced each year (Dewi *et al.*, 2022). This indicates that there is something unclear in the ongoing risk communication in RBP practice. The selection of this area as a case study offers a relevant illustration of how risk communication is incorporated into spatial planning regulations and how the principles of this concept are put into practice in the spatial planning prepared by actors.

In order to capture the complexity of the case and gain a comprehensive understanding, a multiple source of data is required which can be gathered from documents and in-depth interview (Stake, 1995). This study spans a period from August 2023 to November 2023. We conducted a content analysis of 16 spatial planning and disaster-management regulations documents which have mainstreamed RBP (Table 1). These documents provide a normative regulatory perspective that has implications for practical risk communication in the spatial planning in national, provincial and regency levels. Content analysis is used to analyze and measure specific words, themes or concepts within texts to identify communication patterns (Krippendorff, 2004).

In order to concentrate the analysis on the key aspects related to the research objectives, first we identified unit of analysis from specific terms: "communication," "risk communication," and "risk communication guidelines". Secondly, we tallied the occurrences of these chosen terms in each document and examined the utilization within the regulations. Thirdly, we established categories that indicate the extent and specificity of

Table 1. Selected regulation document

No	Document	Level
Spatial planning document		
1	Law No. 26 of 2007 on spatial planning	National
2	Law No. 1 of 2014 on the management of coastal areas and small islands	
3	Law No. 11 of 2020 on Job Creation	
4	Government Regulation No. 13 of 2017 National Spatial Plan	
5	Regulation of Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency (ATR/BPN) No. 11 of 2021 on procedures for spatial planning and detailed spatial plans	
6	West Java Regional Regulation No. 22 of 2010 on regional spatial planning	Provincial
7	West Java Regional Regulation No. 5 of 2019 on zoning plans for coastal areas and small islands	
8	Subang Regency Regulation No. 3 of 2014 on regional spatial planning	Regency
Disaster management document		
1	Law No. 24 of 2007 on disaster management	National
2	Government Regulation No. 64 of 2010 on disaster mitigation in coastal and small islands	
3	Government Regulation No. 21 of 2008 on implementation of disaster management	
4	Regulation of Head of BNPB No. 2 of 2012 on general guidelines for disaster risk assessment	
5	National Disaster Management Plan	
6	Master Plan of Disaster Management	
7	Regulation of West Java Governor No. 68 of 2014 on implementation of disaster management	Provincial
8	Regulation of Subang Regency Regent No. 11 of 2021 on disaster mitigation	Regency

Source(s): Data collection, 2023

these terms (merely mentioned, provided basic information or outlined clear guidelines). Finally, we explore the depth of these terms in all regulations beyond mere counting (Krippendorff, 2004).

Furthermore, we also conducted in-depth interviews with the related heads of division from six government departments in Subang Regency who play strategic roles and have the responsibility of preparing a spatial planning plan (Table 2). In-depth interviews were selected because they allow for a thorough exploration of information, and key informants prefer direct and personal approaches. The key informants are between 50–57 years old, with the head of division from settlement areas department being female and the other five being male. The questions revolved around their understanding of risk communication in RBP, the implementation of risk communication in the preparation of spatial planning plans and their responsibilities in carrying out risk communication in spatial planning. Data analysis was conducted using the thematic analysis method (Braun and Clarke, 2006). We transcribe the data and identify patterns within the data, search for initial codes in the form of words or phrases, categorize the codes into appropriate themes, name the themes by capturing the main ideas and details discussed within each theme. Then, we analyze the data based on these themes.

In this method, content analysis provides structured understanding of how risk communication appears in the related regulations officially, while thematic analysis offers insights into how it is understood and practiced by related actors. This mutually reinforcing analysis gives more robust and deep conclusions.

3. Result and analysis

This section presents result and analysis which explain overview of risk communication in RBP regulation and practice as a result from content analysis and thematic analysis.

3.1 Overview of risk communication in RBP regulation

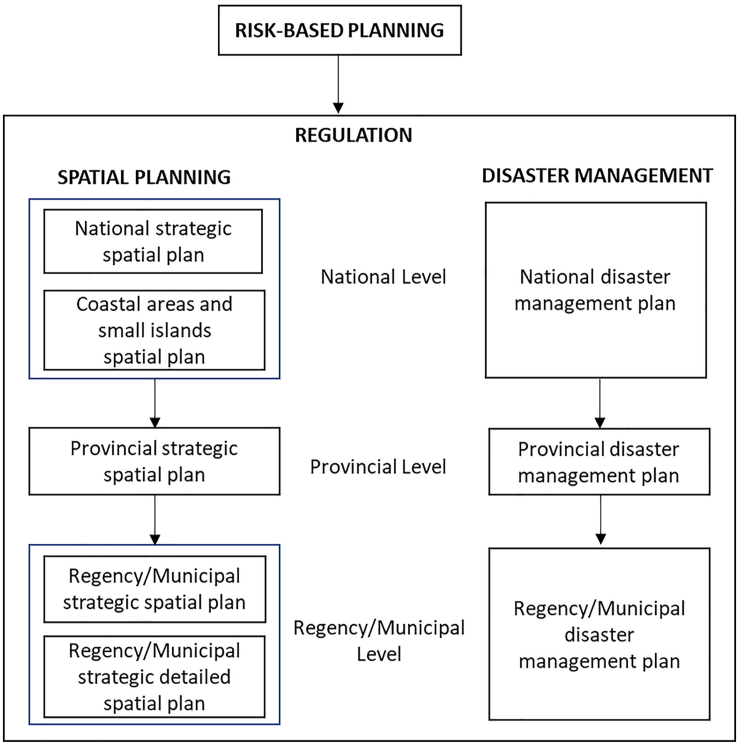
We conducted a content analysis of 16 regulatory documents on spatial planning and disaster management in Indonesia which has mainstreamed RBP from the national to the regency/municipal level. The link between these key policy documents can be seen in Figure 2.

From the content analysis result, the term "communication" is already considered in both types of regulations (Table 3) but not all of these terms are related to risk, for example in the

Table 2. Overview of responsibility from each informant

Code	Key informant	Organization	Responsibility
K1	Head of infrastructure and spatial planning	Regional Development Planning, Research and Development Agency (BP4D)	Macro development planning
K2	Head of spatial planning	Department of Public Works and Spatial Planning (Distaru)	Detail Spatial Plan (RDTR) 2023–2043 and Regional Spatial Plan (RTRW) 2011–2031
K3	Head of settlement areas	Department of Housing, Settlement and Land Areas (Disrumkim)	Settlement feasibility
K4	Head of environmental management	Department of Environment (DLH)	Strategic Environmental Assessment (KLHS) 2023–2043
K5	Head of capture fisheries	Department of Fisheries (DKP)	Challenge and opportunities of fisheries sector, characteristic of fisherman and aquaculture farmer
K6	Head of BPBD	Regional Disaster Management Agency (BPBD)	Standard operational procedure of disaster management

Source(s): Data collection, 2023



Source(s): Analysis result, (2023)

Figure 2. Links between the key policy documents that mainstream risk-based planning in Indonesia

Table 3. Number of selected terms in regulation documents

No	List of term	National Spatial planning	Disaster management	Province Spatial planning	Disaster management	Regency Spatial planning	Disaster management
1	Communication	39	172	11	22	11	3
2	Risk communication	25	70	3	12	3	0
3	Risk communication guideline	0	0	0	0	0	0

Source(s): Analysis result, 2023

field of telecommunications equipment and communication system. “Risk communication” is present in regulations at all levels of government but appears more frequently in disaster management regulations. It appears 70 times at the national and 12 times at the provincial level. In spatial planning regulation, it appears 25 times at the national, three times at the provincial, and at the Subang Regency. In the disaster management regulations, such as the master plan of disaster management 2015–2045, risk communication in the disaster events is not only mentioned but also detailed in the disasters risk communication strategy in a separate

chapter. This strategy outlines the actors, channels and media used to distribute disaster risk information to communities in Indonesia before, during and after disasters. The regulation specifies various forms of risk communication, such as dissemination, education, training, counseling, drills and simulations, to enhance community awareness capability and readiness in addressing disasters. It is evident that risk communication within the disaster event is a crucial aspect and integral component of disaster management regulation.

Meanwhile, in spatial planning regulation such as in the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency (ATR/BPN) Regulation Number 11 of 2021 in the preparation procedure of Regional Spatial Plan (RTRW) and Detail Spatial Plan (RDTR) in provincial to regency level, risk communication in RBP is only mentioned as part of two-way communication methods during the formulation of spatial planning. While the discussion also often focuses on disaster mitigation and adaptation. However, the regulation lacks a specific section that clearly defines and outlines the steps for exploring the community's level of risk acceptance, as the heart of risk communication in RBP at all government levels. This creates a lack of knowledge for the government at lower levels.

The lack of knowledge at the provincial and regency/municipal levels is shown in Regional Regulation No. 22 of 2010 concerning Regional Spatial Planning in West Java Province. In this regulation, the provincial government conducts public consultations as the form of risk communication during the spatial planning process. The regulation gives greater attention to disaster management which emphasize more on locations for disaster mitigation and evacuation routes rather than exploring the community's level of risk acceptance to be aligned with long-term spatial planning. Lack of knowledge is also shown in the regency level government which is illustrated in Subang Regency Regional Regulation Number 3 of 2014 concerning Regional Spatial Planning in Subang Regency which explains that understanding risk communication is emphasized on disaster outreach including the implementation of disaster mitigation and evacuation drills. These findings explain that the majority of risk communication concept in spatial planning regulation are still understood in the disasters rather than in RBP.

Furthermore, terms of "risk communication guideline" have not been included in all regulations at all levels. However, in the disaster management regulation, although the term is not explicitly mentioned, the steps for implementing risk communication are outlined in the disaster management risk communication strategy. In contrast, the guideline for risk communication within the RBP is not addressed at all in its regulations.

Our content analysis shows that the lack of risk communication in RBP could hinder the implementation of spatial planning regulations. For the illustration, Subang Regency Regional Regulation Number 3 of 2014 explain prohibition of building settlements and public facilities in coastal areas prone to inundation. However, implementing this rule may be challenging due to settlements and public facilities have existed in these areas for decades. Effective risk communication within the RBP could allow for a more flexible land use approach, with exceptions considered based on community needs. This can help reduce social conflicts and align with the characteristics of coastal communities dependent on natural resources and strong social ties.

Risk communication in RBP has not been a priority in spatial planning regulations in Indonesia at the national, provincial and regency/municipal levels. The distinction between risk communication in spatial planning and disaster management has not been clearly understood, leading to a stronger emphasis on disaster management. Consequently, decision-making in spatial planning is often misguided and has the potential to create additional problems, due to the lack of attention to community expectations for long-term land use in their area.

3.2 Overview of risk communication in RBP practice

We interviewed key informants extensively to gain insights into their understanding and implementation of risk communication in RBP. We then analyzed the interview data

thematically to identify key findings. Our thematic analysis revealed three main themes: understanding of the concept, current practices and actors' interest. Here, we provide an overview of these themes.

3.2.1 Theme 1: understanding of the concept. We asked key informants about their understanding of risk communication in RBP. Stakeholder's understanding of risk communication involves their knowledge of disaster, potential consequences and the probability. However, their understanding often only focuses on the steps that can be taken in each phase of a disaster (Table 4). They lack the understanding and knowledge regarding the importance of exploring the community's risk acceptance level, as the core in RBP to support appropriate spatial planning decision-making.

> Our risk communication efforts aim to raise awareness about disaster risks. We introduce early warning system and conduct evacuation drills. – K6

> We carry out risk communication with Regional Disaster Management Agency (BPBD) which has the authority over disasters. We waited for reports on damaged infrastructure due to tidal flood in north Subang coast and then repaired it. – K2

Risk communication of spatial planning in Subang Regency is conducted in the form of public consultation during the drafting stage of the RDTR, involving related stakeholders (government, private and representative of community). This approach also extends to the Strategic Environmental Assessment (KLHS) document as a supporting document for RDTR. These documents also emphasize discussion of disasters. This includes early warning systems, evacuation routes and mitigation efforts.

Table 4. Three aspects of risk communication in RBP practice from thematic analysis

Code	Understanding the concept	Current practices	Actors interest
K1	Risk communication is focused on visible solutions (seawalls and greenbelts)	Public consultation to support macro development plan	Macro-scale planning, communicate risks related to natural hazards and planned solutions
K2	Risk communication is a report on damaged infrastructure and making repairs	Public consultation in the preparation of RDTR document	Risk communication is needed for the preparation of RTRW and RDTR
K3	Risk communication is a discussion of the annual impact of coastal disasters	Public consultations in the preparation of RDTR document	Risk communication is used to determine appropriate housing and settlement solutions
K4	Risk communication is the hazards of erosion and coastal inundation, and greenbelt is the proposed solution	Public consultation in the preparation of KLHS documents	Risk communication is an essential part of the KLHS preparation to support the RDTR
K5	Risk communication is providing information about disaster risks to coastal communities	Direct conversation with fishermen and aquaculture farmer affected by the disaster to offer support and assistance	Risk communication involves transmitting information related to disasters (weather forecasts and wave heights), from the BMKG to the public to increase awareness and preparedness
K6	Risk communication aim to raise awareness about disaster risks	The preparedness phase: disaster outreach at schools, hospitals, companies. The emergency response phase: Fast Report Delivery System (SIKILAT) application	Risk communication is conducted through disaster outreach activities, evacuation drills and emergency response

Source(s): Analysis result, 2023

> We gather all information in public consultation about abrasion and coastal inundation. We then attempted to find a solution. – K4.
>
> We require input from public consultation to support the process of preparing RDTR, KLHS, and RTRW in vulnerable coastal areas. Some proposed sea walls and embankments for protection. -K2.
>
> Risk communication with other stakeholder often discuss the risk in north coastal of Subang such as coastal inundation and abrasion. Our communication efforts have primarily focused on visible solutions (seawalls and greenbelts). – K1.

Our investigation found that key informants lack understanding of risk communication in this concept, with no awareness of its differences from communication in disaster. They also clarified that the central government has not provided guidance or information on this issue. The discussion on risk communication automatically focused on disasters communication including steps in pre-disasters, emergency response and post-disasters phase. They neglected the concepts level of acceptable, tolerable and intolerable risks in the community which is crucial for RBP. This leads to proposed solutions for spatial planning by the local government that may not align with societal expectations and characteristics, causing rejection and lead to social unrest as indicated by the results of the interviews.

> We, along with other stakeholders, communicate to discuss the annual impact of coastal disasters in northern Subang Regency. As a solution, we propose relocating residents. However, residents refuse to leave their area of origin and place of livelihood. – K3.

Coastal communities generally have specific sociocultural characteristics. They tend to have lower levels of income and education, limited expertise in fisheries and a heavy dependence on natural resources. Moreover, they hold valuable local cultural knowledge, a strong connection to their ancestral heritage and exhibit robust social bonds and unity. These unique characteristics make it challenging to relocate them without thorough discussion and preparation, as was evident in our exploration of potential alternative livelihood options for coastal communities.

> The fisherman prioritized immediate income from selling fish and lacked savings due to poor financial management. Their impatience hindered a transition to aquaculture, which requires a longer process. They heavily relied on large investors for loans without collateral, making them dependent on these investors. – K5

The results of our analysis on this theme show that the absence of clear definitions and guidelines which encompass the concept, framework and implementation steps, particularly at the national level, causes improper understanding from local government regarding this concept. As a result, it has not been a priority for planners at all levels of government.

3.2.2 Theme 2: current practices. We explored the existing practices in the study area by inquiring about their implementation while preparing spatial planning documents. Our first finding highlights the role of coastal communities in risk communication in RBP, which is primarily conducted through public consultations as the sole means of two-way communication between the local government and the community in the process. However, the current practice in public consultation only involves the village and district heads as representatives of the community. This means that the involvement of entire community is not fully realized.

> We gather information of disasters data from village and district head. This information will be considered for a macro scale planning. – K1
>
> We conduct risk communication with village and district leaders of the coastal areas in Subang Regency. These leaders shared information about disaster risks and discuss it in public consultations with other stakeholders. – K2.

In fact, coastal communities are the first to be impacted by natural hazards and feel the impact directly. They are a valuable source of information and should be the primary informants for

the successful implementation of public consultation. In reality, not all representatives are equally capable of accurately representing the needs of the community, and the information available to the community is often restricted by their limited capacity.

Secondly, public consultation in spatial planning should take place during the drafting stage of planning documents in order to accommodate input from community representatives. However, in practice, it often only occurs at the finalization stage, which limits input from them. Furthermore, we discovered that public consultations were not continuous, taking place only two to three times. This limited the opportunity for expressing aspirations, resulting in many community inputs not being accommodated by the local government in the spatial planning process. Ultimately, public consultations served merely to fulfill regulatory obligations without truly incorporating feedback from community representatives.

During the public consultation period, ongoing discussions with the community should be conducted to assess their willingness to accept the risks involved and to understand their expectations for future land use plans in relation to this acceptance level. This is a challenging task as it involves potential hazards that have not yet occurred. Ideally the implementation is carried out with a gradual process. Communities require time to receive, digest and react to this information that impacts their settlements and livelihoods. Without effective risk communication, the optimal functioning of spatial planning is compromised.

3.2.3 Theme 3: actors' interest. Our finding reveals that the responsibility for implementation of risk communication in RBP at the regency level is still unclear. It should be the responsibility of the Department of Public Works and Spatial Planning (Distaru), as the authorized agency for regulating spatial planning, including risk communication as a fundamental aspect of planning. In Subang Regency, there are several departments that have varying levels of interest in public consultations as a form of risk communication in preparing spatial planning documents (Table 4). The public consultations revealed a strong emphasis only on solution of disasters, particularly in infrastructure development for mitigation due to lack understanding of risk communication in spatial planning. It is still a fundamental principle understood by all Subang Regency Government (2014). There has been a lack of clear responsibility, particularly between the Distaru and BPBD regarding risk communication. The Distaru believes that risk communication is the responsibility of BPBD. Meanwhile, BPBD believes that the current risk communication efforts are appropriate in the disasters event such as evacuation drills and application of Fast Report Delivery System (SIKILAT). This indicates that there is a non-mutually reinforcing relationship between multiple sectors in Subang Regency in risk communication in RBP.

> There were suggestions to build a sea wall, but we also proposed a more cost-effective green belt. Relocation was considered, but limited land availability would require alternative livelihoods which may not easily accepted by communities. – K1

> In the context of risk communication, BPBD is leading sector for disaster management. – K2.

> The risk communication in Department of Environment (DLH) focuses on solutions for natural hazards, such as waste management and mangrove planting. These initiatives have been carried out in collaboration with corporate social responsibility (CSR). – K4.

> We provide limited risk communication, sharing weather forecasts from the Meteorology, Climatology and Geophysics Agency (BMKG), to help the coastal community stay informed and prepared for potential risks due to their livelihood on fishing and aquaculture. – K5.

> We proposed adaptation options for coastal communities that were reluctant to be relocated. We suggested tall houses on stilts. However, our proposal has not received much attention as most efforts are focused on structural mitigation. – K3

Due to the high risk of sinking in this area, spatial planning needs to be carefully coordinated with the community to address potential issues. Effective risk communication in RBP is

crucial for this issue. However, no interest from the Distaru in this concept due to lack of understanding may lead to problems in the future. It is important to consider maintaining the area as a settlement with specific conditions and measures to enhance community readiness, rather than immediately offering relocation as a solution. This approach should be based on an assessment of the community's willingness to accept risks.

4. Discussion

Clear and concise risk communication in RBP is essential for improving stakeholders' understanding of natural hazards and guiding informed spatial planning decisions by evaluating acceptable risk levels. Our research analyzed the implementation of risk communication in spatial planning practice in the coastal area of Subang Regency, and highlighted several findings. The analysis of RBP policy documents in Indonesia revealed that the definition and guidelines for risk communication in spatial planning are not clearly defined at the national level, which is crucial for lower-level governments. The lack of clarity in risk communication hinders effective decision-making in spatial planning, leading to knowledge gaps and differing interpretations among governments at different levels. The current understanding still focuses mainly on disasters, with no specific guidelines and lack attention for determining the level of risk acceptance of communities.

In contrast, developed countries have clear spatial risk management frameworks and specific steps for implementing risk communication to create appropriate spatial planning (Saunders and Kilvington, 2016). The lesson learned from previous literature studies in Canada is that risk communication in RBP is regulated from federal, provincial to local (municipal) levels, as outlined in the National Disaster Mitigation Strategy. This strategy serves as a guideline for all levels of government (Hwacha, 2005). At the local level, the emergency management agency is responsible for implementing risk communication in RBP, following the guidelines provided (Struik *et al.*, 2015). This also applies in New Zealand, where risk communication for spatial planning is implemented at the national, regional and local levels while the District Council is responsible in the local level (Saunders *et al.*, 2007). As the result, impact of natural hazard can be reduced and land use can be maintained continuously (Saunders *et al.*, 2013).

As an illustration, in the drafting of the RDTR document for the coastal area of Subang Regency for the period 2023–2043, the study area is located in a hazardous zone at risk of sinking due to slow-onset hazards. As per the zoning, this area is designated as off-limits for economic activities and residential development. By conducting risk communication within the RBP, the community's level of risk acceptance can be thoroughly examined, aiding the local government in devising optimal spatial planning strategies based on the findings. Considering the social, cultural and economic characteristics of the coastal community in Subang Regency, the majority exhibit a tolerance for risk and choose to remain in their current location, prepared to face potential future risks. However, the Distaru, responsible for spatial planning, has not conducted a comprehensive exploration of this issue, including understanding the community's aspirations and preferences regarding land use in the future. Notably, one of the proposed solutions in the RDTR includes the option of relocation. According to Saunders *et al.* (2013) the appropriate spatial planning decision for a tolerable risk level involves permitting settlement and economic activities with specific restrictions and conditions as a compromise. Conversely, relocation is considered when the community is largely intolerant of the risks they face. This highlights that spatial planning decisions are often inaccurate and could potentially lead to new problems if enforced without careful consideration. The community in the coastal area of Subang Regency has rejected the idea of relocation to a distant location, indicating the ineffectiveness of recent spatial planning implementation and a lack of proactive measures by the local government to enhance land use management in response to the risks faced by the community. This is different from Canada, where the exploration of the risk acceptance level is a key consideration in the spatial planning decisions made (Struik *et al.*, 2015).

Additionally, our research highlights that relying solely on village leaders for community representation is inadequate for capturing the important aspirations of their areas as input for spatial planning. This is contrast to the practices in developed country, where communities actively participate in planning and decision-making processes, effectively voicing their concerns and preferences for mitigation and adaptation strategies (Boholm and Lofstedt, 2013; Godschalk *et al.*, 2003). Furthermore, a limited number of public consultations results in the public's aspirations not being fully communicated to the local government. As a result, public consultations are being perceived as mere formalities and ceremonial rather than meaningful opportunities for community input in the preparation of the RDTR. Contrasts with practices in developed countries, where dialogue process and exchange of risk information are carried out gradually and continuously where community input are thoroughly explored and carefully considered to support spatial planning decision-making (Saunders *et al.*, 2013).

In the spatial planning practice, the responsibility for addressing risks is typically assigned to BPBD, which may not be the most appropriate department for leading risk communication in spatial planning. Despite Distaru being a more authoritative department at the regency level, there is a lack of knowledge and understanding, leading to a situation where Distaru does not take the lead in risk communication, instead deferring to BPBD. In the study area, stakeholders involved in spatial planning are unclear about their roles in risk communication within RBP, resulting in a shifting of responsibilities. This contrasts with the approach in New Zealand, where stakeholders collaborate effectively based on their specific roles to conduct risk communication throughout the spatial planning process (Saunders and Kilvington, 2016).

5. Conclusion

This research shows that risk communication in RBP has not been fully implemented in Indonesia. We have explored that risk communication remains more of an interest rather than a serious consideration in RBP which is indicated by the absence of a specific section and explanation in spatial planning regulation. There is a clear need for definitions and guidelines for risk communication in RBP in Indonesia as a reference for all level of government. These should be explicitly included and integrated into regulations that prioritize RBP. This is important for increasing understanding and minimizing knowledge gaps among stakeholders. We also found that not all regencies, including Subang, have implemented national-level regulations as a reference for lower governments, which was the focus of our research case study.

Risk communication in RBP should be based on the level of community risk acceptance of natural hazards, rather than just the disaster occurrence. This requires direct community involvement and not only represented by local leaders in the spatial planning process to support appropriate decision making. Achieving this will require collaborative efforts and coordination among all stakeholders. Future research should focus on a more comprehensive study of the proposed risk communication framework for application in Indonesia.

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