



**DETERMINANTS OF SPATIAL PLANNING FOR URBAN  
RESILIENCE IN THE ISLAMIC SOCIETY SETTING:  
A CASE STUDY OF BANDA ACEH, INDONESIA**

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**Abstract**

The paper identifies the determinants influencing spatial planning for urban resilience within the context of an Islamic society. Semi-structured interviews were conducted with relevant stakeholders in spatial planning and disaster management in the city of Banda Aceh, Indonesia to assess their attitudes, opinions and experiences in implementing spatial planning for urban resilience. Qualitative thematic analysis revealed dominant factors specific to the Islamic society in the city of Banda Aceh, which were then elaborated on and categorised into five major groups: spatial pattern, spatial structure, spatial culture, spatial-related non-physical factors and religious factors. The interviews affirmed the importance of religious and cultural factors in spatial planning for urban resilience within Islamic societies. The findings will provide an essential understanding of the need to enhance urban resilience against disasters in the urban planning process and incorporate aspects of local wisdom derived from religious and cultural values, as well as societal necessities, as a planning approach. Given the context-specific nature of this research, future researchers may consider doing a comparative case study in another city with similar characteristics.

**Keywords:** Spatial planning, Urban Resilience, Islamic society, Thematic Analysis, Banda Aceh- Indonesia

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## **INTRODUCTION**

Since the previous century, there has been a notable increase of global disaster frequency, particularly in Asia, which is particularly susceptible to natural disasters. The UN Environment Program (UNEP) reports that Asia accounted for 40% of global natural disasters between the years of 2005 and 2015 (Lee, Kim, Maharani, Paripurno, & Sunarno, 2017). Tragic events like the 2004 tsunami and earthquakes in Indonesia and the Indian Ocean claimed the lives of hundreds of thousands (Folke et al., 2011), with profound repercussions on neighbouring countries such as Indonesia, Sri Lanka, India, and Thailand. The nearest big city, Banda Aceh in Aceh Province, Indonesia, bore a severe number of victims and witnessed the destruction of 27% of its 60.33km<sup>2</sup> area. The toll in terms of lives lost and injuries incurred amounted to approximately 27 thousand people from a population of 243,895 in the city (Government of The City Banda Aceh, 2018).

Given the escalating historical losses from disasters worldwide, resilience is increasingly recognised as a fundamental principle, as many acknowledge that massive losses result from a lack of urban resilience systems in effectively managing disasters (Achmad, Burhan, Zuraidi, & Ramli, 2020; UNDRR, 2015). Most professional disciplines, such as spatial planning and disaster risk management, began to realise the importance of playing a vital role in planning and establishing resilient urban systems (Hoa & Vinh, 2018). Notably, international policies underline the importance of integrating disaster risk reduction, resilience and climate risk considerations into urban planning to achieve sustainable development at various levels, including Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNDRR, 2015).

The literature affirms that the integration of these two fields presents a significant challenge. Wamsler (2014) notes that spatial planners may not prioritise risk reduction as a planning objective, and communication between experts from both fields is hindered by differences in their target groups, objectives, data sources and educational and professional backgrounds. Simultaneously, disaster studies tend to neglect spatial planning as an essential risk reduction measure (Sagar, 2017). Moreover, each authority operates within a different institutional framework with its unique operational methods and designated funding purposes (Greiving & Fleischhauer, 2006). Additionally, as highlighted by Zuraidi, Zainol, Ahmad, & Achmad (2022), most studies concerning spatial planning and urban resilience have been conducted in developed Western countries. Therefore, the general consideration of disaster risk reduction through enhancing urban resilience in spatial planning practices is questionable, especially in cities with specific characteristics such as those within Islamic societies.

A critical aspect lies in recognising that the experiences of spatial planning and urban resilience can markedly differ between developing Asian

countries and Western contexts. It is essential to understand how these concepts are interpreted and experienced. This nuanced understanding can be achieved through a robust qualitative methodology. Therefore, this research collects insights from stakeholders in spatial planning and disaster-related fields in Banda Aceh, Indonesia, exploring their perspectives and experiences in enhancing urban resilience. The qualitative exploratory research was subsequently subjected to thematic analysis, aiming to identify the determinants of spatial planning for urban resilience.

## **LITERATURE REVIEW**

The notion of urban resilience has gained considerable attention in planning discourse over recent decades. Its origins trace back to in the study of ecological systems drawn from the work of C.S. Holling entitled “Resilience and stability of ecological systems” (Holling, 1973). Subsequently, in the early 2000s, scholars extended the concept of resilience into regional and urban planning practices, incorporating elements of disasters as essential elements in the planning process (Godschalk, 2003). Explicit references to spatial planning concepts and urban resilience began to emerge in the 2010s. Until now, the existing works of literature on spatial planning for urban resilience predominantly address topics related to urban physical structure and governance (Malalgoda, Amaratunga, & Haigh, 2013; Panagopoulos, Jankovska, & Bostenaru Dan, 2018). However, very little research in this area has explored spatial planning for urban resilience with a focus on the socio-religious perspective. The literature indicates that transitioning to a resilient urban community hinges on a multitude of factors, and cultural and site-specific parameters can pose challenges to broad-spectrum approaches.

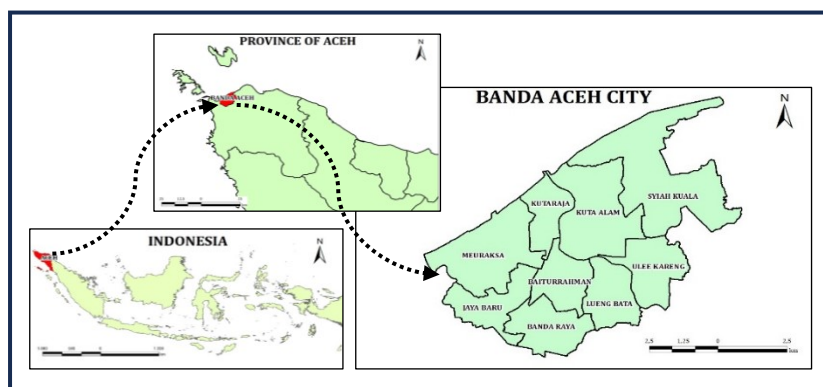
Spatial planning is primarily acknowledged as a function of the public sector aimed at influencing the future spatial distribution of activities (Yoshida, Yamagata, Chang, Jittrapirom, & Voulgaris, 2020). Its goal is to establish a more rational territorial arrangement of land use and their interconnections, striking a balance between developmental demands and environmental protection, while also achieving social and economic objectives (Wegener, 1998). Meanwhile, Meerow, Newell, & Stults (2016) defined urban resilience as “the ability of an urban system—and all its constituent socioecological and socio-technical networks across temporal and spatial scales—to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity” (p. 45). Rogatka, Starczewski, & Kowalski (2021) also emphasised that urban resilience is a superior concept that must be considered in future spatial planning endeavours, as it is integral to shaping appropriate urban development.

Previous studies have identified several determining factors in spatial planning for urban resilience. Lu, Zhai, Zhou, & Shi (2020) advocate for a focus on essential urban spatial elements to create urban resilience, including key spatial and morphological factors, which encompass factors like urban spatial scale, urban spatial form, urban spatial structure, urban spatial function and urban spatial network. Other studies focus on non-physical aspects such as policies, actors, socioeconomics, genius loci and information (Ewindy, Suganda, Asdak, & Sapari, 2021; Karabakan & Mert, 2021; Nur, 2020; Pokhrel, 2019; Pozoukidou, 2020; Rogatka et al., 2021; Mazlan, Zainol, Adilah, & Harumain, 2022).

Studies related to spatial planning for urban resilience within the socio-religious context is limited. Existing research predominantly emphasises the important role of religion in strengthening individual resilience in facing disasters. Resilience related to the concept of religion establishes a connection between people, practices, materials and spatial infrastructure with disaster events (Rüpke, 2020). This concept acknowledges the anticipation of disasters, the pre-event anxiety, strengthening individuals and communities against the event, and providing a prompt response after the event. It illustrates how faith is employed to overcome, recover and grow (Sulaiman, She, & Fernando, 2019). Gianisa & Le De (2018) also found that religious beliefs and practices unite local communities and contribute to the effectiveness of disaster management mechanisms. Moreover, religious communities can play a vital role in bridging gaps in response and recovery, especially in scenarios where external intervention is limited.

## **RESEARCH METHODOLOGY**

This research was conducted in the city of Banda Aceh, Indonesia (Figure 1). Banda Aceh is a medium-sized city characterised by its vulnerability to natural disasters, and its population is predominantly Muslim. In 2004, the city experienced a catastrophic earthquake, swiftly followed by a devastating tsunami. This twin disaster resulted in the destruction of 27% of city's 60.33km<sup>2</sup> area, rendering it devoid of buildings. Casualties and fatalities numbered approximately 27,000 out of the 243,895 residents of Banda Aceh City (Aceh Province Disaster Management Agency, 2018).



**Figure 1:** Study Area: the city of Banda Aceh, Indonesia

*Source: Author, 2023*

Semi-structured interviews were conducted with ten relevant stakeholders to assess their perspectives, insights and experiences in the process and implementation of spatial planning for urban resilience within the context of an Islamic society. These participants were selected from individuals representing government and non-government institutions, possessing substantial knowledge and experience in spatial planning and disaster management in Banda Aceh. Prior to starting the research, all documents and procedures concerning human subjects were approved by the University of Malaya Research Ethics Committee (UMREC), with ethics approval number: UM TNC2/UMREC\_1876. Researchers extended invitations to stakeholders via telephone or WhatsApp, ensuring their willingness to participate. Prospective participants received an information sheet outlining the purpose of the research. All participants met the criteria of being cognitively functional and above 18 years of age. The interview guide focused on eliciting stakeholders' perceptions regarding the determining factors in spatial planning conducive to urban resilience. The interviews spanned a duration of 30 to 45 minutes and were transcribed verbatim from audio recordings, maintaining an exact account of the discussions.

The data was then analysed using a thematic analysis (TA) methodology in accordance with the approach advocated by Clarke & Braun (2017). TA is a method for identifying, analysing and reporting patterns (themes) within data, where a theme is defined as "something important about the data in relation to the research question and represents some level of patterned response or meaning from the data set" (p. 80). This study followed a six-phase thematic data analysis process developed by (Clarke & Braun, 2017). The first phase involved 'Familiarizing yourself with your data', where the interview transcripts were read and re-read, allowing the researcher to note initial ideas. Interview transcripts were then imported into the data management software NVivo. The

second phase,” Generating initial codes”, encompassed a descriptive coding process that involved the deconstruction of the data from its initial chronological structure. This inductive process resulted in the identification of 407 hierarchical codes from the interview data. In the third phase, “Searching for themes”, open coding was reviewed, and initial codes were merged, renamed, distilled and collapsed into broader categories. This allowed the data to be constructed in a manner aligned with the research objectives. The fourth phase, “Reviewing themes”, involved a process of ‘drilling down’, including recoding the text in the initial codes, reorganising them into a coding framework and breaking down the themes into sub-codes to gain a better understanding of the embedded meanings. In the fifth phase, “Defining and naming themes”, the data was abstracted into a broader thematic framework. Through an inductive process, data was coded in relation to the research objective, which is to identify determinant factors of spatial planning for urban resilience. The final phase, “Producing the report”, involved the writing of analytical memos to accurately summarise the content of each theme and propose empirical findings.

## **RESULTS AND DISCUSSION**

All participants in this are university graduates with a minimum of ten years of experience in their respective fields. Their ages range from 35 to 55 years. Of the ten stakeholders interviewed, six were male (60%) and four were female (40%). The sample is well-balanced in terms of representation from different stakeholder types, where four (40%) are experts in spatial planning, four (40%) specialise in disaster, and two (20%) focus on community culture. The range of professional experience among the participants is diverse. Participants with over 25 years of experience make up 20% of the sample, while those with 10-15 years and 20-25 years of experience constitute 20%. The group with 15-20 years of experience accounts for 40% of the sample size. In terms of employment sectors, six participants (60%) work in the public sector, while the remaining four (40%) are employed in the private sector.

Through inquiries into determinants of spatial planning for urban resilience, the study identified dominant factors specific to the Islamic community in Banda Aceh. These factors were subsequently detailed and grouped into five main themes derived from the thematic analysis: (1) spatial pattern, (2) spatial structure, (3) spatial culture, (4) non-physical factors related to space and (5) religious factors. Table 1 provides a summary of the themes and sub-themes generated from the initial coding process and excerpts from the interview transcripts.

The ‘spatial pattern’ theme was generated from 73 coding from 10 participants. The ‘spatial structure’ was generated from 6 participants and 32 coding. The ‘spatial culture’ was generated from 7 participants and 23 coding. The ‘spatial related non-physical factors’ theme resulted from 10 participants and

407 comments, and the "religious factors" theme was derived from 10 participants and 76 comments. Spatial pattern factors were identified from the sub-themes of spatial scale and spatial use. Spatial scales, such as the size of urban spaces and the growth of urban development, are determining factors in urban spatial planning and its resilience to disasters. This aligns with the findings of previous research by Lu et al. (2020), which states that urban spatial scale yields both positive and negative effects on resilience. On the positive side, larger cities often possess more efficient and resource-independent infrastructure, rendering them more resilient to economic crises and adept at swift recovery (Capello, Caragliu, & Fratesi, 2015). However, when urban development exceeds its ecological carrying capacity, the large urban spatial scale can exert a negative impact on resilience. Functional complexity and specialization grow with increasing city scale, potentially reducing overall resilience.

Table 1. Themes generated on spatial planning for urban resilience determinants.

Themes	Sub-Themes	NOC	NOP	Initial codes	Verbatim Data Extract Samples	PI
Spatial pattern	Spatial use	69	10	Physical Infrastructure, Land Use, Workplace, Nature-Based Solution	"In the aspect of resilience referred to earlier, there should be a determination of land use management directed at tsunami mitigation if we talk about the tsunami context."	SH 03
Spatial structure	Spatial scale	4	2	City Size, Urban Growth, Urban Function	"Banda Aceh is small enough to be controlled... We can make it more compact for a system of activities that makes it more concentrated and robust."	SH 09
	Spatial structure	21	4	Service Center System, Node System, Activity Center System, Ring Road	"We have activity and service centers tiered directly from the sub-center, to the neighbourhood center. Now, this neighbourhood center can function as a center that provides all kinds of things. So, we have the potential to create a more resilient urban system"	SH 09
Spatial culture	Spatial network	5	4	Transportation System, Urban Network System	"In spatial planning, we also have to regulate how urban network systems, both transportation and service centers, pay attention to disaster aspects"	SH 03
	Spatial form	5	3	Geographical Aspect, Urban Morphology	"So now it is more like partial. We need to look at the morphology of the city, the water cycle so that it fits the aesthetic."	SH 08
	Spatial culture	23	7	Inheritance, Silo Mentality, Local Wisdom, Gated Community, Place Connectedness, Disaster Amnesia	"Our people have built a perception since ancient times that if any disaster occurs, including war, the place of refuge is the mosque (place of worship). If we want to build an escape building, we unite it with the concept of local wisdom of the community; if there is a disaster, the community remains run to the mosque, we make the mosque an escape building, the default is an escape building"	SH 06
Spatial-related non-physical factors	Actors	10	6	University's Role, Ulama Involvement, Interaction Between Parties, City's Leader	"This is not only the government's responsibility; all parties must work together to build resilience, including NGOs, academics, researchers, the business world, and the media. All play a role in building resilience together because this is a continuous task and must be awakened."	SH 04
	Economic	22	8	Budgeting, Financial Issues, Economic Interest, Livelihood, Compensation	"Well, most people choose a place to live for reasons, firstly, because it is close to their work location and source of income. Second, because land prices are low there, the rent is cheap. Then it is also close to family. So those factors make them finally (living there). So, no wonder the tsunami areas are now getting crowded."	SH 04



Themes	Sub-Themes	NOC	NOP	Initial codes	Verbatim Data Extract Samples	PI
	Evacuation systems	26	7	Community Centre, Evacuation Building, Meeting Point, Artificial Hill, Relocation	"If resilience increases, we must also appreciate it. On the one hand, Banda Aceh City already has evacuation routes, evacuation signs, the determination of gathering points, and the designation of high, medium, and low-risk areas, although this does not reflect spatial planning or spatial planning practices. So, at least, that is what we saw." "So, there is a transfer of information between generations with the formal and informal education system; that is the best that can be done." "Institutionally, we have Disaster Risk Management Forum (FPRB), a disaster resilient youth. However, I think we have to empower it and provide more capacity building: how do we get these forums to provide input, and do their functions run well? Not bad for our institutions; maybe that is potential. Institutional potential up to the village level, we have a disaster-resilient village. At least there is risk knowledge, and we have the institution that must be activated, whether running or not."	SH 03
	Information	47	9	Socialization, Information, Knowledge, Literacy		SH 03
	Institutions	77	9	Community Forum, Institutional Strengthening, Empowering, Government's Vision		SH 09
	Land related matters	28	6	Land Acquisition, Land Consolidation, Land Ownership, Land Use Change, The Land Value Planning Policy, Regulatory Compliance, Zoning Regulation, Risk-Oriented Policy, Policy Strategy	"There is a determination of land use management directed at tsunami mitigation if we talk about the tsunami context. There has been a change in land use converted into a buffer zone. In my opinion, it needs to be reviewed, and it needs to be considered to arrive at the resilient city definition." "If we talk about policies, compared to other regions, it is quite advanced. Some regulations have been issued related to disaster risk reduction, and specifically, regarding the tsunami, both at the level of governor regulations, gamuns, and up to mayoral regulations. However, the focus is enforcement, and now enforcement is sometimes a weak side that we cannot see in practice so that this interaction will form the resilience profile together."	SH 03
	Policies	110	10			SH 03

Themes	Sub-Themes	NOC	NOP	Initial codes	Verbatim Data Extract Samples	PI
	Social	80	10	Social Capital, Resistance, Public Involvement, Community Distrust, Community Education	"The definite potential is social. Socially, our society is quite resilient. From the old war to the economic crisis in the 2000s, we were quite resilient. After that, after the tsunami, we already had risk knowledge. It was in people Aceh exists. "	SH 09
Religious factors	Religious belief	5	4	Belief in Allah, Surrender to Allah, Worship to God, Faith	"JICA (Japan) and Banda Aceh learn from each other. They have the technology; we have some social values. For example, the ability to rise; they think we are better than them. We are stronger because there is a factor of religious belief. That is potential."	SH 10
	Religious practice	37	9	Friday Sermon, Spatial Policy Setting with the Shat'la, Evacuation to Masjid, Syariah Awareness, the Role of Ulama (Cleric), Religious Behaviour	"We have a spiritual based mitigation strategy. Disaster mitigation is not only what we need physically; we also build non-physically. If we strengthen spirituality and calm a few people's minds to think, they must pray, they will recite; this is Allah's test. We will build an escape building on a spiritual basis, namely Masjid. We use local wisdom, combining wisdom with faith and technology; our culture is Islamic. Then, Friday pulpit, a straightforward public space, that the verses of the Quran talk more about disasters"	SH 02
	Religious knowledge	27	7	Religious Teaching, Islamic Concept, Rationality, Inclusiveness	"Actually, in the Quran, it says we must stay away from danger, but at that time, residents did not know, they thought it was the end of the world, so they went to the mosque, and it was fatal."	SH 10

Note: NOC= Numbers of Comments, NOP= Numbers of Participants, PI= Participant Identifier

Source: Author (2023)

Furthermore, within the spatial pattern, the sub-theme of spatial use also emerges as a determining factor. The study found that the allocation of space for physical infrastructure, the availability of supporting facilities, and the utilisation of land for settlements and workplaces significantly contribute to enhancing urban resilience. Karabakan & Mert (2021) emphasise the pivotal role of implementing green infrastructure systems in providing a certain degree of resilience. Furthermore, as stated by earlier scholars, land use is critical in determining urban efficiency, potential sustainability and resilience (Burby, Deyle, Godschalk, & Olshansky, 2000; Lu et al., 2020). These findings further strengthen the statement by Ewindy *et al.* (2021) regarding the implementation of strict land use as a means of disaster mitigation.

The thematic analysis reveals that spatial structure of a city, such as the presence of multiple service centre systems in Banda Aceh, had a positive influence on reinforcing the service system in the event of a disaster. This finding aligns with the assertion made by Feliciotti (2018) that polycentric city model may promote urban resilience by enhancing the modularity of infrastructure, functions and institutions of different sizes. This organisational framework effectively spreads risk across sub-centers and diversifies traffic flow, mitigating significant losses in areas with a high concentration of resources during a catastrophe.

This study reveals the prominence of spatial culture within the Islamic society of Banda Aceh, particularly in how people use space to accommodate their daily activities, such as the use and attachment to places of worship like mosques. This cultural expression significantly influences urban space and its resilience in the face of disasters. Consequently, the spaces shaped by the cultural practices of the Islamic community, reflecting local characteristics emerge as determining factors in spatial planning for urban resilience. This finding supports the results of previous studies (Jamalinezhad, Talakesh, & Soltani, 2012; Tabibian & Rezapour, 2016; Zuraidi, Caisarina, & Fuady, 2020) which consider that many cultural and site-specific parameters can hinder broad spectrum prescriptions. The findings also align with the conclusion of Karabakan & Mert (2021), stating that urban policies and spatial strategies should be tailored according to local characteristics and values, recognising the absence of a universal solution in this regard. Moreover, this finding resonates with the genius loci theory presented by Norberg-Schulz (2016), positing that the essence of place and the application that human life is included in local wisdom is called genius loci. This concept is also associated with a spiritual sense of place to contextually sustain and preserve the quality of life and local characteristics. The concept of genius loci has a significant role in enhancing urban resilience (Nur, 2020).

The study observes that non-physical factors related to space, including policies, actors/institutions, social, economic, evacuation systems and

information, determine urban resilience. This observation also confirms previous research conducted by Amri & Giyarsih (2021), who emphasised the importance of strategies such as prohibiting occupancy in disaster-prone areas and establishing protected areas to mitigate risks. These strategies, when combined with policies related to building regulations, incentive mechanisms, determining evacuation routes, and other structural or non-structural measures, are crucial for enhancing resilience. Failure to formulate and implement appropriate policies can lead to undesirable consequences in the future.

Furthermore, this study finds that religious factors hold significant sway in spatial planning for enhancing urban resilience within Islamic societies. The thematic analysis identifies the influence of religious beliefs, practices and knowledge on spatial use in Banda Aceh City. This finding aligns with the theory put forward by Rüpke (2020), which posits that individuals use their faith as a resource for coping, recovering and growing. The findings also align with Gianisa and Le De's (2018) conclusions that religious beliefs and practices foster community cohesion and contribute to effective coping mechanisms during disasters. However, a lack of proper understanding of Islamic religious knowledge, especially among stakeholders in Banda Aceh, is considered as detrimental to the conditions of spatial planning, ultimately reducing urban resilience in this city. The importance of religious knowledge is also in line with Greed's perspective that there is a need to educate planners to reduce illiteracy and spiritual ignorance about the patterns, characteristics and values of religious group worship, all of which need to be integrated into the urban spatial planning process (Greed, 2016).

## **CONCLUSION**

This paper aims to identify the determinants influencing spatial planning for urban resilience in an Islamic societal setting. It examines the literature gap by soliciting the perspectives of stakeholders in spatial planning and disaster management in Banda Aceh City, Indonesia. The results discovered determining factors specific to the Islamic society in Banda Aceh namely spatial pattern, spatial structure, spatial culture, spatial-related non-physical factors and religious factors. These results contribute to the advancement of knowledge in the field of urban planning related to spatial planning that accommodates the local socio-religious context, enhancing urban resilience to disasters based on Islamic values. Identifying the determining factors of spatial planning for urban resilience in the Islamic society context will provide essential insights into the need to increase urban resilience disaster-prone areas through informed urban planning, incorporating aspects of local wisdom and culture or societal needs. Given the context-specific nature of this research, future studies might explore comparative case studies in both developed or developing regions. A similar study conducted in a different city with shared characteristics, including susceptibility to multi-

hazards and a predominantly Islamic population, would yield valuable comparative insights.

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## REFERENCES

- Aceh Province Disaster Management Agency. *Aceh Disaster Management Strategic Plan (2018-2022)*. , (2018).
- Achmad, A., Burhan, I. M., Zuraidi, E., & Ramli, I. (2020). Determination of recharge areas to optimize the function of urban protected areas on a small island. *IOP Conference Series: Earth and Environmental Science*, 452(1). <https://doi.org/10.1088/1755-1315/452/1/012104>
- Burby, R. J., Deyle, R. E., Godschalk, D. R., & Olshansky, R. B. (2000). Creating Hazard Resilient Communities through Land-use Planning. *Natural Hazards Review*, 1(2), 99–106.
- Capello, R., Caragliu, A., & Fratesi, U. (2015). Spatial heterogeneity in the costs of the economic crisis in Europe. *Journal of Economic Geography*, 15(5), 951–972.
- Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology*, 9760, 1–2. <https://doi.org/10.1080/17439760.2016.1262613>
- Ewindy, J., Suganda, B. R., Asdak, C., & Sapari, M. (2021). Palu earthquake hazard risk assessment (EHRA) based on urban land use planning. *Acta Geologica Slovaca*, 13(1), 79–84.
- Feliciotti, A. (2018). *Resilience and urban design: a systems approach to the study of resilience in urban form*. University of Strathclyde.
- Folke, C., Jansson, Å., Rockström, J., Olsson, P., Carpenter, S. R., Stuart Chapin, F., ... Westley, F. (2011). Reconnecting to the biosphere. *Ambio*, 40(7), 719–738. <https://doi.org/10.1007/s13280-011-0184-y>
- Gianisa, A., & Le De, L. (2018). The role of religious beliefs and practices in disaster The case study of 2009 earthquake in Padang city, Indonesia. *Disaster Prevention and Management: An International Journal*, 27(1), 74–86. <https://doi.org/10.1108/DPM-10-2017-0238>
- Godschalk, D. R. (2003). Urban Hazard Mitigation: Creating Resilient Cities. *Natural Hazards Review*, 4(3), 136–143. [https://doi.org/10.1061/\(asce\)1527-6988\(2003\)4:3\(136\)](https://doi.org/10.1061/(asce)1527-6988(2003)4:3(136))
- Government of The City Banda Aceh. *Banda Aceh City Qanun Number 2 of 2018 concerning Amendments to Banda Aceh City Qanun Number 4 of 2009 concerning Banda Aceh City Spatial Planning 2009-2029*. , (2018).
- Greiving, S., & Fleischhauer, M. (2006). Spatial Planning Response towards Natural and Technological Hazards. *Geological Survey of Finland, Special Pa*(42), 109–123.
- Hoa, N. T., & Vinh, N. Q. (2018). The notions of resilience in spatial planning for drought - flood coexistence (DFC) at regional scale. In Q. B. Bui, R. Cajka, M. T. Tran, T. A. Trinh, A. U. H. Yasar, G. Wets, & M. Woloszyn (Eds.), *2nd International Conference on Sustainable Development in Civil, Urban and Transportation*

- Engineering (CUTE 2018)* (Vol. 143). <https://doi.org/10.1088/1755-1315/143/1/012066>
- Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4, 1–23.
- Jamalinezhad, M., Talakesh, S. M., & Soltani, S. H. K. (2012). Islamic Principles and Culture Applied to Improve Life Quality in Islamic Cities. *Procedia - Social and Behavioral Sciences*, 35(December 2011), 330–334. <https://doi.org/10.1016/j.sbspro.2012.02.095>
- Karabakan, B., & Mert, Y. (2021). Measuring the Green Infrastructure Resilience in Turkey. *Chinese Journal of Urban and Environmental Studies*, 9(3). <https://doi.org/10.1142/S2345748121500147>
- Lee, S., Kim, J., Maharani, Y., Paripurno, E., & Sunarno. (2017). Analysis of the Risk of Windstorm (angin puting beliung) in Indonesia. *Journal of the Wind Engineering Institute of Korea, Volume 21*, 21–28.
- Lu, Y., Zhai, G., Zhou, S., & Shi, Y. (2020). Risk reduction through urban spatial resilience: A theoretical framework. *Human and Ecological Risk Assessment: An International Journal*, 27(4), 921–937. <https://doi.org/10.1080/10807039.2020.1788918>
- Malalgoda, C., Amaratunga, D., & Haigh, R. (2013). Creating a disaster resilient built environment in urban cities: The role of local governments in Sri Lanka. *International Journal of Disaster Resilience in the Built Environment*, 4(1), 72–94. <https://doi.org/10.1108/17595901311299017>
- Mazlan, N. A., Zainol, R., Adilah, Y., & Harumain, S. (2022). Resiliency of Urban Informal Economic Activities in Kuching City. *Planning Malaysia: Journal of the Malaysian Institute of Planners*, 20(5), 248–259.
- Meerow, S., Newell, J. P., & Stults, M. (2016). Defining urban resilience: A review. *Landscape and Urban Planning*, 147, 38–49. <https://doi.org/10.1016/j.landurbplan.2015.11.011>
- Nur, K. W. (2020). Alley activation: Genius loci to construct a resilient city. *Journal of Architecture and Urbanism*, 44(1), 63–68. <https://doi.org/10.3846/jau.2020.11015>
- Panagopoulos, T., Jankovska, I., & Bostenaru Dan, M. (2018). Urban green infrastructure: The role of urban agriculture in city resilience. *Urbanism. Architecture. Constructions*, 9(1), 55–70.
- Pickett, S. T. A., Cadenasso, M. L., & Grove, J. M. (2004). Resilient cities: Meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms. *Landscape and Urban Planning*, 69(4), 369–384. <https://doi.org/10.1016/j.landurbplan.2003.10.035>
- Pokhrel, S. (2019). Green space suitability evaluation for urban resilience: an analysis of Kathmandu Metropolitan city, Nepal. *Environmental Research Communications*, 1(10). <https://doi.org/10.1088/2515-7620/ab4565>
- Pozoukidou, G. (2020). Designing a green infrastructure network for metropolitan areas: a spatial planning approach. *Euro-Mediterranean Journal for Environmental Integration*, 5(2). <https://doi.org/10.1007/s41207-020-00178-8>
- Rogatka, K., Starczewski, T., & Kowalski, M. (2021). Urban resilience in spatial planning of polish cities - True or false? Transformational perspective. *Land Use Policy*, 101. <https://doi.org/10.1016/j.landusepol.2020.105172>

- Rüpke, J. (2020). 7. Urban resilience and religion: Attaching time to place. In *Urban Religion* (Vol. 67). <https://doi.org/10.1515/9783110634426-009>
- Sagar, K. (2017). Integrating disaster risk reduction and urban planning: Evidence from class III City-Rajgir, India. *International Journal Of Advance Research And Innovative Ideas In Education*, 3(1), 237–252.
- Sulaiman, N., She, T. W., & Fernando, T. (2019). Community resilience frameworks for building disaster resilient community in Malaysia. *Planning Malaysia: Journal of the Malaysian Institute of Planners*, 17(1), 94–103. <https://doi.org/https://doi.org/10.21837/pm.v17i9.589>
- Tabibian, M., & Rezapour, M. (2016). Assessment of urban resilience: a case study of Region 8 of Tehran city, Iran. *Scientia Iranica*, 23(4), 1699–1707. <https://doi.org/10.24200/sci.2016.2240>
- UNDRR. (2015). Sendai Framework for Disaster Risk Reduction 2015-2030. In *United Nations for Disaster Risk Reduction* (Vol. 144). Sendai.
- Wamsler, C. (2014). *Cities , Disaster Risk* (M. Miles, Ed.). London and New York: Routledge, Taylor and Francis.
- Wegener, M. (1998). GIS and spatial planning. *Environment and Planning B: Planning and Design*, (Anniversary Issue), 48–52.
- Yoshida, T., Yamagata, Y., Chang, S., Jittrapirom, P., & Voulgaris, G. (2020). Spatial modeling and design of smart communities. In *Urban Systems Design*. <https://doi.org/10.1016/B978-0-12-816055-8.00007-5>
- Zuraidi, E., Caisarina, I., & Fuady, Z. (2020). The Islamic public space concept in the Southeast Asia region as a friendly urban design and planning enlightening. *IOP Conference Series: Earth and Environmental Science*, 452(1). <https://doi.org/10.1088/1755-1315/452/1/012146>
- Zuraidi, E., Zainol, R. B., Ahmad, Y. Bin, & Achmad, A. (2022). Understanding the evolution and global trends of resilience and urban planning studies: A bibliometric analysis. *Planning Malaysia: Journal of the Malaysian Institute of Planners*, 20(5), 260–271. <https://doi.org/https://doi.org/10.21837/pm.v20i24.1203>

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