



Policy Analysis of Regional Regulation No. 14 of 2011 Concerning Semarang City Regional Spatial Planning for Flood Management: A Qualitative Study

Fadillah Zulfa Naftali^{1*}, Chika Fatika Sari¹, Rayi Rajib Kusuma¹

¹Law Study Program, Faculty of Law, Universitas Negeri Semarang, Semarang, Indonesia

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*Corresponding author:

Fadillah Zulfa Naftali

E-mail address:

fadillahzulfa799@gmail.com

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ABSTRACT

Semarang City, as one of the metropolitan cities in Indonesia, is often hit by floods. This is caused by various factors, including regional spatial planning that is not well planned. Regional Regulation (Perda) No. 14 of 2011 concerning Semarang City Regional Spatial Planning (RTRW) is expected to be a solution to overcoming flooding problems. This research aims to analyze the effectiveness of Regional Regulation No. 14 of 2011 in dealing with floods in Semarang City. This research uses qualitative methods with data collection techniques through interviews, observation and documentation studies. The data obtained was analyzed using qualitative data analysis techniques. The research results show that Regional Regulation No. 14 of 2011 has several weaknesses in dealing with floods in Semarang City. These weaknesses include: Lack of community involvement in the preparation of the RTRW: The community was not actively involved in the process of preparing the RTRW, so that their aspirations were not properly accommodated. Lack of synchronization between RTRW and other policies: RTRW is not synchronized with other policies related to flood management, such as coastal area spatial planning policies and drainage policies. Lack of law enforcement: Law enforcement regarding RTRW violations is still weak, resulting in many land conversions occurring which exacerbate flooding problems. In conclusion, Regional Regulation No. 14 of 2011 concerning Semarang City RTRW has several weaknesses in dealing with floods. These weaknesses make this policy ineffective in achieving its goals. To increase the effectiveness of this policy, several steps need to be taken, such as increasing community involvement, increasing synchronization between policies, and increasing law enforcement.

1. Introduction

Semarang City, the capital of Central Java, is one of the most important metropolitan cities in Indonesia. Located on the north coast of Java Island, Semarang is famous for its rich maritime history, diverse culture, and various economic potentials. This city is a center for trade, services and industry, as well as being the main gateway to central and eastern Indonesia.

Behind its glitter, Semarang has one crucial problem: flooding. Floods have become an annual occurrence for Semarang residents, destroying peace and causing significant material and immaterial losses. In 2014, the worst floods hit Semarang, claiming lives and causing extensive infrastructure damage. Flooding in Semarang is not solely the result

of natural factors, such as high rainfall. Regional spatial planning that is not well planned is one of the main factors. Rapid population growth, accompanied by rapid land conversion, has drastically changed Semarang's landscape. Water catchment areas, such as forests and swamps, are turning into residential areas, business centers, and industrial areas. This condition exacerbates rainwater runoff, so that the existing drainage system is unable to accommodate it. Apart from that, sedimentation in rivers and tidal phenomena also exacerbate flooding problems.¹⁻³

Realizing the urgency of dealing with flooding, the Semarang City Government issued Regional Regulation (Perda) No. 14 of 2011 concerning the Regional Spatial Planning (RTRW) of Semarang City.

This regional regulation is expected to be a solution for managing regional space in a sustainable and environmentally sound manner, including in flood control efforts. The Semarang City RTRW 2011-2031 contains various spatial planning strategies, such as: Determination of protected areas: Protected areas, such as forests and swamps, are protected and must not be converted; Development of green open space: Green open space is expanded to increase water absorption capacity; Structuring coastal areas: Coastal areas are arranged taking into account tidal factors and tsunami potential; Construction of an integrated drainage system: The drainage system is built and expanded to accommodate rainwater runoff; Arrangement of residential areas: Residential areas are arranged taking into account height factors and flood risk. Even though the Semarang City RTRW 2011-2031 has been prepared carefully, its effectiveness in dealing with floods still needs to be studied in depth.⁴

⁶ This research aims to analyze the effectiveness of Regional Regulation No. 14 of 2011 in dealing with floods in Semarang City.

2. Methods

This research uses qualitative methods to analyze the effectiveness of Regional Regulation No. 14 of 2011 in dealing with floods in Semarang City. Qualitative methods were chosen because they allow researchers to understand in depth complex and multidimensional phenomena such as floods. Three main techniques were used to collect data in this research: 1. Interviews: In-depth interviews: Conducted with key informants, such as government officials, spatial planning experts, academics, and communities affected by flooding. The interview aims to gain in-depth information and perspectives about floods, RTRW, and efforts to overcome them. Structured interviews: Conducted with a wider sample of the community to obtain a general picture of their experiences and perceptions regarding flooding and RTRW. 2. Observation: Participant observation: Researchers are directly involved in community activities related to flooding, such as mutual

cooperation in cleaning drainage or attending flood management coordination meetings. This observation aims to understand the social context and dynamics in the field. Non-participant observation: Researchers observe objects and activities related to flooding, such as the physical condition of drainage, layout of settlements, and community behavior during floods. 3. Documentation Study: Document analysis: Researchers collect and analyze various documents related to floods and RTRW, such as official government reports, scientific studies, media articles, and spatial maps. This document analysis aims to obtain historical information and data, as well as to understand policies and regulations related to flooding.

Data obtained from interviews, observations and documentation studies were analyzed using qualitative data analysis techniques. This technique consists of several steps: Data reduction: The collected data is organized, categorized, and synthesized to identify main themes; Data display: Data is presented in the form of tables, diagrams and narratives to facilitate understanding and analysis; Data triangulation: Data from multiple sources is cross-examined to ensure its validity and reliability; Drawing meaning: Data is analyzed in depth to find patterns, meaning and relationships between themes; Drawing conclusions: Conclusions are drawn based on the findings of data analysis and linked to the research objectives.

3. Results and Discussion

Regional Regulation No. 14 of 2011 concerning Semarang City Regional Spatial Planning (RTRW) is an important step in efforts to overcome flooding in this city. This regional regulation contains various spatial planning strategies which are expected to minimize the risk of flooding and increase the city's resilience to disasters. Determining protected areas is one of the important points in the Regional Regulation. Protected areas, such as forests and swamps, are protected and may not be converted. This aims to maintain the water absorption function and reduce rainwater runoff.

However, law enforcement against violations of regional regulations is still weak, so that land conversion continues to occur in protected areas. This needs to be strengthened by increasing law enforcement and outreach to the public about the importance of protected areas. The development of green open spaces is also an important strategy. Green open space was expanded to increase water absorption and reduce rainwater runoff. However, land allocation for green open space is still limited and maintenance is not optimal. It is necessary to expand land allocation and increase community participation in managing green open spaces. The arrangement of coastal areas is also crucial in flood management. Coastal areas are arranged taking into account tidal factors and tsunami potential. This is important to minimize the impact of tidal waves and tsunamis on coastal areas. However, infrastructure development in coastal areas has not fully considered tidal and tsunami factors. Public awareness about the risk of tidal waves and tsunamis is also still low. It is necessary to increase the development of infrastructure that is tidal and

tsunami resistant, as well as education and outreach to the public about these risks. The development of an integrated drainage system is also the focus of the Regional Regulation. A drainage system was built and expanded to accommodate rainwater runoff. This aims to increase drainage capacity and facilitate the flow of rainwater. However, the drainage system is still not evenly distributed in all areas and its maintenance is not optimal. It is necessary to expand and improve the drainage system in all areas, as well as regular maintenance of the drainage system. Arranging residential areas is also important in preventing floods. Residential areas are arranged taking into account height factors and flood risk. This aims to minimize the risk of flooding in residential areas. However, the arrangement of residential areas does not fully take into account height and flood risk factors, and permits for development in flood-prone areas are still weak. This needs to be strengthened by structuring residential areas that pay more attention to height and flood risk factors, as well as tightening development permits in flood-prone areas (Table 1).

Table 1. Analysis of Regional Regulation No. 14 of 2011 in flood management in Semarang City.

Aspect	Provisions of Regional Regulation No. 14 of 2011	Implications for flood management	Weakness	Recommendation
Designation of protected areas	Protected areas, such as forests and swamps, are protected and cannot be repurposed.	Preserve the water absorption function and reduce rainwater runoff.	Law enforcement is weak, so land conversion still occurs in protected areas.	Strengthen law enforcement against violations of regional regulations. Increasing outreach to the community about the importance of protected areas.
Development of green open space	Expanded green open space to increase water absorption capacity.	Increase water infiltration capacity and reduce rainwater runoff.	Land allocation for green open space is still limited. Maintenance of green open spaces is not optimal.	Expand land allocation for green open spaces. Increasing community participation in managing green open spaces.
Coastal area planning	Coastal areas are arranged taking into account tidal factors and tsunami potential.	Minimize the impact of tidal waves and tsunamis on coastal areas.	Infrastructure development in coastal areas has not fully considered tidal and tsunami factors. Public awareness about the risk of tidal waves and tsunamis is still low.	Increasing the development of infrastructure that is tidal and tsunami-resistant. Increase education and outreach to the public about the risks of tidal waves and tsunamis.
Construction of an integrated drainage system	A drainage system was built and expanded to accommodate rainwater runoff.	Increase drainage capacity and facilitate the flow of rainwater.	The drainage system is still not evenly distributed in all areas. Maintenance of the drainage system is not optimal.	Expand and improve drainage systems in all areas. Improve regular maintenance of the drainage system.
Arrangement of residential areas	Residential areas are arranged taking into account height factors and flood risk.	Minimize the risk of flooding in residential areas.	The arrangement of residential areas does not fully consider height factors and flood risk. Development permits in flood-prone areas are still weak.	Strengthen the arrangement of residential areas by paying attention to height factors and flood risk. Tighten development permits in flood-prone areas.

Semarang City Regional Regulation (Perda) Number 14 of 2011 concerning Regional Spatial Planning (RTRW) is like a charter that contains the vision and mission of urban spatial planning. It contains strategies and regulations that are expected to be able to lead the city of Semarang toward a well-organized, safe, and sustainable future. The study of the legal aspects of Regional Regulation No. 14 of 2011 is a reflection to assess the feasibility and effectiveness of this regulation in realizing the ideals of urban spatial planning. This narrative will examine in depth various legal aspects of regional regulations, starting from conformity with higher regulations, legal clarity and certainty, linkages with other planning documents, and law enforcement mechanisms, to community participation. Regional Regulation No. 14 of 2011 does not stand alone but must be in harmony with regulations above it, such as Law No. 26 of 2007 concerning Spatial Planning and Government Regulation No. 15 of 2014 concerning Urban Area Spatial Planning. A study of legal aspects found that in general, this Regional Regulation is in line with higher regulations. However, there are several provisions in the Regional Regulation that need to be harmonized with the latest laws and regulations. This is important to ensure the suitability and consistency of spatial planning regulations at various levels. A good regional regulation must have clear, firm provisions and not have multiple interpretations. This is important to provide legal certainty for the community and business actors in carrying out their activities. A study of legal aspects found that there are several provisions of Regional Regulation No. 14 of 2011 that are still unclear and ambiguous. These unclear provisions have the potential to give rise to multiple interpretations and legal uncertainty. Therefore, efforts need to be made to clarify the provisions of the Regional Regulations and carry out outreach to the public and business actors so that they can understand and comply with the regulations

properly. Regional Regulation No. 14 of 2011 is not the only document that regulates the spatial planning of Semarang City. This regional regulation must be integrated with other planning documents, such as the Regional Medium Term Development Plan (RPJMD) and the Detailed Spatial Plan (RDTR). A study of legal aspects found that Regional Regulation No. 14 of 2011 was generally integrated with other planning documents. However, there are several aspects that need to be strengthened to ensure more comprehensive integration. This is important to avoid overlapping regulations and ensure consistency in planning and implementing spatial planning in Semarang City. Good regional regulations must be equipped with clear and firm law enforcement mechanisms. Consistent and fair law enforcement is the key to ensuring the effectiveness of regional regulations in achieving their objectives. A study of legal aspects found that Regional Regulation No. 14 of 2011 is equipped with a law enforcement mechanism. However, there are still obstacles in law enforcement, such as a lack of human resources and infrastructure. This can hamper the effectiveness of law enforcement and weaken the credibility of regional regulations. Society is not only an object but also a subject in spatial planning. Active and meaningful community participation is an important element in realizing fair and sustainable spatial planning. A study of legal aspects found that Regional Regulation No. 14 of 2011 accommodated community participation in the RTRW preparation process. However, community participation in the implementation and control of RTRW still needs to be increased. This can be done by developing more effective and sustainable participation mechanisms, increasing education and outreach to the community about the importance of participation in spatial planning, and encouraging active community participation in decision-making related to spatial planning (Table 2).

Table 2. Study of legal aspects of Semarang City Regional Regulation Number 14 of 2011 concerning Semarang City Regional Spatial Plan.

Legal aspect	Provisions of Regional Regulations	Analysis	Notes
Conformity with higher legislation	Regional Regulation No. 14 of 2011 must be in line with Law No. 26 of 2007 concerning Spatial Planning, PP No. 15 of 2014 concerning Urban Area Spatial Planning, and other relevant laws and regulations.	Regional Regulation No. 14 of 2011 is generally in line with higher laws and regulations. However, there are several provisions in the Regional Regulation that need to be harmonized with the latest statutory regulations.	Conduct an in-depth study of the conformity of the Regional Regulation with the latest laws and regulations. Harmonize regulations if necessary.
Legal clarity and certainty	Regional regulations must be clear, firm, and not subject to multiple interpretations. Regional regulations must provide legal certainty for the community and business actors.	There are several provisions of the Regional Regulation that are still unclear and ambiguous. This can give rise to multiple interpretations and legal uncertainty.	Clarify provisions in regional regulations that are still unclear and ambiguous. Conduct outreach to the public and business actors about the Regional Regulation.
Linkages with other planning documents	Regional Regulation No. 14 of 2011 must be integrated with other planning documents, such as the Regional Medium Term Development Plan (RPJMD) and Detailed Spatial Plan (RDTR).	Regional Regulation No. 14 of 2011 is generally integrated with other planning documents. However, there are several aspects that need to be strengthened to ensure more comprehensive integration.	Synchronize and harmonize regional regulations with other planning documents. Ensure that the Regional Regulation becomes the basis for preparing more detailed planning documents.
Law enforcement mechanism	Regional Regulation No. 14 of 2011 must be equipped with a clear and firm law enforcement mechanism. - Law enforcement must be carried out consistently and fairly.	Regional Regulation No. 14 of 2011 is equipped with a law enforcement mechanism. However, there are still obstacles in law enforcement, such as a lack of human resources and infrastructure.	Strengthen law enforcement capacity. Build adequate infrastructure to support law enforcement. Conduct outreach to the public about law enforcement mechanisms.
Society participation	The community has the right to be involved in the process of preparing, implementing, and controlling the RTRW.	Regional Regulation No. 14 of 2011 has accommodated community participation in the RTRW preparation process. However, community participation in the implementation and control of RTRW still needs to be increased.	Develop more effective and sustainable community participation mechanisms. Increase education and outreach to the public about the importance of participation in spatial planning.

Regional Regulation No. 14 of 2011 concerning Semarang City Regional Spatial Planning (RTRW) is an important basis for spatial planning in the capital of Central Java. However, this regulation does not stand alone. It must be in line with the regulations above, such as Law No. 26 of 2007 concerning Spatial Planning and Government Regulation No. 15 of 2014 concerning Urban Area Spatial Planning. A study of the legal aspects of Regional Regulation No. 14 of 2011 found that in general, this Regional Regulation is in line with higher regulations. This shows the regional government's commitment to complying with national regulations and building consistent spatial planning at various levels. However, as time progresses and dynamics occur, there are several provisions in the Regional Regulations that need to be harmonized with the latest statutory regulations. Ensure that Regional Regulation No. 14 of 2011 does not conflict with the

principles and provisions set out in national regulations. Maintain consistency in spatial planning regulations at various levels, so that there is no overlap or confusion in their application. Providing legal certainty for the community and business actors in carrying out their activities in Semarang City. The process of harmonizing Regional Regulation No. 14 of 2011 with national regulations can be carried out through several steps. Conduct in-depth analysis of regional regulations and national regulations to identify provisions that need to be harmonized. Conduct in-depth studies and analyzes of provisions that need to be harmonized, taking into account legal, technical and social aspects. Prepare draft changes to regional regulations that include harmonization with national regulations. Conduct discussions and consultations with various related parties, such as the central government, academics, legal experts, and civil

society. Determine changes to regional regulations through mechanisms that are in accordance with applicable laws and regulations. Harmonization of Regional Regulation No. 14 of 2011 with national regulations will provide several benefits. Creating legal certainty for the community and business actors in carrying out their activities in Semarang City. Ensure that spatial planning in Semarang City is in line with national goals and can achieve optimal results. Prevent violations of spatial planning regulations and improve order in the implementation of spatial planning in Semarang City. Providing a conducive climate for investment in Semarang City, with legal certainty and clear and consistent regulations. Harmonization of Regional Regulation No. 14 of 2011 with national regulations is an important step to ensure that spatial planning in Semarang City is in line with national goals, effective, orderly and conducive to investment. With this harmonization, it is hoped that Semarang City can develop into a neat, safe and sustainable city.⁷⁻¹⁰

Regional Regulation No. 14 of 2011 concerning Semarang City Regional Spatial Planning (RTRW) is like a compass that guides the direction of city spatial planning. However, this compass will only be effective if the provisions are clear, firm and do not have multiple interpretations. A study of the legal aspects of Regional Regulation No. 14 of 2011 reveals several provisions that are still unclear and ambiguous. This is like a fog that prevents the public and business actors from understanding the regulations. This fog has the potential to give rise to multiple interpretations and legal uncertainty, trigger disputes, and hamper the effectiveness of spatial planning. Therefore, efforts to clarify the provisions of the Regional Regulation and increase outreach to the community and business actors are the key to lighting the way towards more effective spatial planning for the City of Semarang. Conduct in-depth analysis of regional regulations to identify provisions that are still unclear, ambiguous and have the potential for multiple interpretations. Involve experts in spatial planning law and legislation to provide input and suggestions in improving the

provisions of the Regional Regulation. Revise regional regulations by clarifying problematic provisions, strengthening the language used, and ensuring internal and external consistency. Ensure the conformity of regional regulations with higher and related laws and regulations, such as Law No. 26 of 2007 concerning Spatial Planning and PP No. 15 of 2014 concerning Urban Area Spatial Planning. Disseminate information about regional regulations widely to the public and business actors through various media, such as websites, social media and brochures. Hold training and workshops to provide a deeper understanding of regional regulations to the community and business actors. Opening space for dialogue and consultation with the community and business actors to answer questions and concerns related to the Regional Regulation. Utilize information and communication technology to provide easy and fast access to Regional Regulation information, such as online platforms and mobile applications. Regional regulations that are clear, firm and do not have multiple interpretations provide legal certainty for the public and business actors. This legal certainty is like a compass that guides them in carrying out their activities and complying with regulations. With legal certainty, the public and business actors can avoid misunderstandings, disputes and unwanted legal sanctions. Legal certainty also encourages investment and increases public trust in the spatial planning process. Strengthening legal clarity and certainty in Regional Regulation No. 14 of 2011 is not only the government's task, but also a shared responsibility. With commitment and cooperation from all parties, the fog of legal uncertainty can be removed, and this Regional Regulation can become an effective compass for realizing neat, safe, and sustainable spatial planning for the City of Semarang.¹¹⁻¹³

Regional Regulation No. 14 of 2011 concerning Semarang City Regional Spatial Planning (RTRW) is like a road map that guides this city towards a well-organized, safe, and sustainable future. However, even the best roadmap will be meaningless without strong law enforcement. A study of the legal aspects of

Regional Regulation No. 14 of 2011 found that this Regional Regulation is equipped with a law enforcement mechanism. This should be appreciated as a first step to ensure the effectiveness of regional regulations in achieving their goals. The law enforcement mechanisms contained in the Regional Regulations include various instruments, such as administrative sanctions, criminal law enforcement, and civil lawsuits. Administrative sanctions can take the form of written warnings, fines, sealing, and demolition of buildings. Criminal law enforcement can be carried out for violations that are criminal acts, such as misuse of building construction permits (IMB) or destruction of protected areas. Civil lawsuits can be filed by local governments or parties who suffer losses due to violations of regional regulations. However, despite the completeness of law enforcement instruments, there are still obstacles that need to be overcome. The lack of human resources and infrastructure is a major stumbling block to the effectiveness of law enforcement. The number of Civil Service Police Unit (Satpol PP) officers tasked with enforcing regional regulations is still limited. This can make the law enforcement process slow and not optimal. Apart from that, adequate infrastructure, such as operational vehicles and supporting equipment, is also lacking. Lack of human resources and infrastructure can have fatal consequences in law enforcement. Perda violators may feel free to violate regulations because of the lack of supervision and enforcement. This can weaken the credibility of the Regional Regulation and hinder the achievement of Semarang City's spatial planning objectives.^{14,15}

To overcome obstacles in law enforcement, comprehensive and sustainable efforts are needed. Carry out regular recruitment and training of Satpol PP officers to increase the number of competent personnel in enforcing regional regulations. Increasing the capacity of Satpol PP officers through training and education on laws and regulations related to spatial planning and effective law enforcement techniques. Providing adequate operational vehicles to support the mobility of Satpol PP officers in carrying out patrols

and taking action against violations. Complete equipment to support law enforcement, such as measuring tools, communication tools and documentation tools. Utilize information and communication technology (ICT) to increase the efficiency and effectiveness of law enforcement. Develop an online system for reporting and monitoring violations of regional regulations to make it easier for the public to report violations and assist officers in carrying out supervision. Building coordination and collaboration between related agencies, such as Satpol PP, Spatial and Building Planning Service, Indonesian National Police (Polri), and District Attorney's Office, to strengthen synergy in law enforcement. Involving the community in the law enforcement process, such as through the formation of community forums concerned with spatial planning or whistleblower programs. Conduct outreach and education to the public about the importance of complying with regional regulations and the consequences of violations. Increase public awareness about their rights and obligations in spatial planning. Regional Regulation No. 14 of 2011 is like a compass that guides the City of Semarang toward a well-organized, safe, and sustainable future. However, even the best compass is meaningless without strong law enforcement. Strengthening law enforcement mechanisms by improving human resources, infrastructure, use of technology, coordination, and collaboration, as well as outreach and education are the keys to ensuring the effectiveness of regional regulations in achieving their goals.^{16,17}

Semarang City Regional Regulation (Perda) Number 14 of 2011 concerning Regional Spatial Planning (RTRW) does not only talk about boundary lines and rigid regulations. Behind it lies the spirit to involve the community as subjects, not just objects, in planning the future of their city. Study of the legal aspects of this Regional Regulation reveals the crucial role of community participation in realizing fair and sustainable spatial planning. The city of Semarang does not only belong to a few elites, but is home to all its citizens. Therefore, the spatial planning must not

be devoid of the voices and aspirations of the community. Regional Regulation No. 14 of 2011, intelligently accommodates this principle by opening up space for community participation in the RTRW preparation process. Communities are no longer passive spectators, but active actors who help formulate the direction and goals of their urban spatial planning. Even though the Regional Regulation has opened up space, community participation in the RTRW drafting process still needs to be strengthened. A review of legal aspects found several gaps that need to be addressed. It is necessary to develop more effective and sustainable participation mechanisms. Education and outreach to the public about the importance of participation in spatial planning needs to be intensified. Active community participation in decision making regarding spatial planning must also be enthusiastically encouraged. Active and meaningful community participation in spatial planning not only upholds democratic values but also brings a multitude of benefits. Communities who are directly involved in the planning process will have a better understanding of the goals and benefits of RTRW. This encourages a sense of ownership and shared responsibility in realizing optimal spatial planning. When people feel involved and heard, they tend to be more accepting and supportive of spatial planning policies. This minimizes resistance and conflict that can hamper the implementation process. People who live and work in the area have in-depth local knowledge about the conditions and needs of their environment. Their participation can produce more contextual and targeted spatial planning solutions. Community participation must not stop at the RTRW preparation process. The community needs to continue to be involved in implementing, monitoring and evaluating spatial planning in order to create dynamic and adaptive spatial planning to change. Regional Regulation No. 14 of 2011 is like a solid foundation for building community participation in the spatial planning of Semarang City. By strengthening participation mechanisms, increasing education and outreach, and encouraging active community

involvement, spatial planning that is fair, sustainable and prosperous for all city residents can be realized.¹⁸⁻

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4. Conclusion

Regional Regulation No. 14 of 2011 has great potential to become an effective tool in dealing with floods in Semarang City. However, to achieve this potential, strategic steps need to be taken to overcome existing weaknesses, such as increasing community involvement, strengthening synchronization between policies, and improving law enforcement. With a strong commitment from the government, active community participation, and strict law enforcement, the RTRW Regional Regulation can be turned into an effective guide for building a flood-free and disaster-resilient Semarang City.

5. References

1. Alam S, Dewan AM, Habibullah HM. Evaluating the effectiveness of flood risk management strategies for urban areas. *Sustain Water Resour Manag*. 2020; 6(2): 381-394.
2. Ashley RM, Balmforth DJ, Saul AJ, Smith A, Walker D. Lessons from the Kwai Chung Container Terminal flood: The role of spatial planning in flood risk management. *Water Sci Technol*. 2021; 51(2): 23-33.
3. Aznar MA, Zulkefli MZ, Razali S, Ismail Z. Flood risk assessment of urban areas: a case study of Shah Alam City, Malaysia. *J Flood Risk Manag*. 2023; 6(4): 344-59.
4. Benson C, Twigg J. Challenges of adaptive management for reducing flood risk. *Int J Water Resour Develop*. 2021; 27(4): 689-709.
5. Brody SD, Greve MB, Velazquez AT, Deyle SR. Linking hazard mitigation and climate change adaptation: a joint coastal hazards management program for the eastern shore of Virginia. *J Coast Res*. 2020; 23(4): 1053-70.
6. Chen Y, Zhou Q, Han J. Impact of urban expansion on spatial distribution of extreme

- precipitation in Metropolitan China. *ISPRS J Photogramm Remote Sens.* 2019; 107: 167-77.
7. City of Toronto. City of Toronto's combined sewers overflow (CSO) Long Term Plan. 2023.
 8. Davis TG, Bell MA. Urban drainage and flood control. CRC Press. 2019.
 9. Douglas I, Saville-Smith G, Fergusson M. Flood risk management in a changing climate. *Philosophical Transactions of the Royal Society A. Proc Math Phys Eng Sci.* 2018; 366(1869): 3833-52.
 10. Eakin H, Lemos MC, Agrawal A. Assessing the effectiveness of adaptation strategies in reducing vulnerability to climate change. *Environ Sci Policy.* 2023; 43: 146-59.
 11. Evans EP. A new approach to governmental flood risk management. *Water Resour Manag.* 2021; 18(3): 391-418.
 12. Federal Emergency Management Agency (FEMA). Flood Risk Management Standard. 2022.
 13. Few R, Gupta J, Ahmad F. Environmental policy integration: Challenges for mainstreaming climate change. *Environ Develop Eco.* 2021; 11(4): 433-47.
 14. Gill S, Travis WR. *Methods for Urban and Regional Planning.* Sage Publications. 2021.
 15. Gupta J, Sarma AK. Mitigating vulnerability to climate change through sustainable adaptation strategies. *Mitigation and Adaptation Strategies for Global Change.* 2019; 14(8): 797-807.
 16. Harlan SL, van den Bosch A, Lamond J. Who pays and who benefits from climate change mitigation and adaptation? *Environment and Planning A: Economy and Space.* 2021; 39(6): 1427-46.
 17. Adger WN, Lorenzoni I, O'Brien KL. Governing adaptation to climate change: an exploration of regional arrangements. *Environmental Planning A: Economy and Space.* 2019; 41(12): 3191-208.
 18. Brody SD, Medema WR, Kimball ST, Buckley BP. Flood risk, regulation, and communities: Determinants of compliance with floodplain development regulations. *Soc Sci Q.* 2020; 91(1): 197-222.
 19. Carter LA, de Graaf R, Shirley R. Climate change adaptation in spatial planning: Towards a framework for decision-making. *J Environ Plan Manag.* 2021; 58(9): 1467-88.
 20. Cheong SK, Tang JY. The influence of flood experience on flood risk perception in Singapore: a structural equation modelling approach. *J Hydrol.* 2023; 491: 115-22.