JSW JURNAL SOSIOLOGI WALISONGO

JSW (Jurnal Sosiologi Walisongo) – Vol 9, No 1 (2025), 81-94
ISSN 2503-3166 (print); ISSN 2503-3182 (online)
DOI: 10.21580/jsw.2025.9.1.20336

Climate Change and Gender-responsive Policies: A Case Study in Semarang, Central Java, Indonesia *

Rusmadi Rusmadi,[1] **Sudharto P. Hadi,[2]** **Hartuti Purnaweni[3]**

[1]Department of Environmental Engineering, Faculty of Science and Technology, Universitas Islam Negeri Walisongo Semarang, Semarang – Indonesia; [2]Department of Business Administration, Faculty of Social and Political Sciences, Universitas Diponegoro, Semarang – Indonesia; [3]Department of Public Administration, Faculty of Social and Political Sciences, Universitas Diponegoro, Semarang – Indonesia

Abstract

Semarang City is a coastal city facing serious problems related to climate change impacts, both in its physical environment and social vulnerability. Climate change does not occur in a vacuum, but manifests within a complex of social spaces, including gender relations. Referring to such a socio-ecological perspective, this study attempts to analyze the operational mechanism of climate change by reviewing gender relations as their spatial-social dimension. Simultaneously, this study examines the extent to which climate resilience policies in Semarang City have integrated considerations of the social space. Data collection was conducted through observation, interviews, FGD, and review of Semarang City's climate resilience policy documents. Descriptive analysis was used to describe how exposure to climate change impacts men and women, while content analysis was used to examine Semarang City's climate resilience policies. The findings indicate that socio-ecological vulnerability is more prevalent among women's groups than men's. It is evident that as women experience more exposure to climate change impacts, and at the same time, the issues of women's vulnerability are not prioritized in climate resilience policies. This research recommends more just, socio-ecological governance in building climate resilience.

Kota Semarang sebagai kota pesisir, menghadapi permasalahan serius terkait perubahan iklim, baik dari sisi lingkungan fisik maupun sosial. Perubahan iklim tidak hadir pada ruang kosong, melainkan hadir pada ruang sosial yang kompleks, termasuk relasi gender. Menggunakan perspektif sosio-ekologis, penelitian ini bertujuan mengungkap dampak perubahan iklim dalam konteks relasi gender sebagai ruang sosialnya. Sekaligus melihat bagaimana kebijakan ketahanan iklim di Kota Semarang, apakah telah merespons dinamika ruang sosial tersebut atau belum. Pengumpulan data dilakukan melalui observasi, wawancara, FGD, dan telaah dokumen kebijakan ketahanan iklim Kota Semarang. Analisis deskriptif digunakan untuk melihat bentuk-bentuk dampak perubahan iklim antara laki-laki dan perempuan, sedangkan analisis isi untuk melihat kebijakan ketahanan iklim di Kota Semarang. Hasilnya menunjukkan bahwa kelompok perempuan lebih banyak mengalami kerentanan sosial-ekologis dibanding laki-laki. Pada saat yang sama isu-isu kerentanan perempuan tersebut belum menjadi pertimbangan yang kuat dalam kebijakan ketahanan iklim. Penelitian ini merekomendasikan perlunya pengaturan baru yang lebih adil secara sosial dan ekologis terkait ketahanan iklim.

Keywords: climate change; resilience policy; *rob*; Semarang; socio-ecological perspectives

---

*The original draft of this article has been presented at the 23rd Annual International Conference on Islamic Studies (AICIS), February 1-4, 2024, at Universitas Islam Negeri Walisongo Semarang, Indonesia.

Corresponding Author: Rusmadi Rusmadi (rusmadi@walisongo.ac.id), Faculty of Science and Technology, Universitas Islam Negeri Walisongo Semarang, Kampus 3. Jl. Prof. DR. HAMKA Ngaliyan Semarang 50185, Indonesia.

Copyright © 2025 JSW (Jurnal Sosiologi Walisongo)
Submitted: 10 Feb 2024; Received in revised form: 1 Aug 2024; Accepted: 18 Feb 2025; Published: 30 Apr 2025

Introduction

One of the important issues facing communities in urban coastal areas is climate change, especially those with high population density. The Urban Development Report of the World Bank (2010) states that more than 360 million people live in coastal areas, which makes them highly vulnerable to flooding, high waves, and typhoons. Girard (2019), using the CoastalDEM method, estimated that 237 million people in Asian countries today, including in Indonesia, could face annual coastal flooding threats by 2050. Girard's analysis also showed that rising sea levels will exacerbate this risk, potentially leading to regular flooding or permanent inundation in some coastal areas within 30 years (Girard 2019). Many coastal cities around the world will be vulnerable to the impacts of climate change, including coastal cities in Indonesia such as Jakarta and Semarang, as well as surrounding cities such as Pekalongan and Demak. Semarang City also faces complexity in dealing with the climate change impacts because the population is concentrated in lowland areas on the northern coast.

The Central Bureau of Statistics (BPS) of Semarang City reported that in 2012, 2013, and 2014, the northern part of Semarang City had a higher population density than the southern region (BPS Kota Semarang 2013, 2015a, 2015b). In such a condition, exposure to the impacts of climate change is increasingly complex, especially in relation to the impact of tidal inundation.

Climate change has an impact on increasing the sea level, which creates vulnerability in urban coastal areas. A study conducted by the Asian Cities Climate Change Resilience Networks (2010) states that in the coastal area of Semarang City, from 1985 to 2008, there has been an increase in sea level. Between 1985-1998, there was an increase of up to 58.2 cm or an average of 4.47 cm/year, and between 2003-2008, there was an increase of 37.2 cm or an average of 7.43 cm/year. The ACCCRN then projects that sea level rise will continue to increase to 10 cm in 2025, 21 cm in 2050, and 48 - 60 cm in 2100. This projection shows that sea level rise has increased in an extreme manner over a period of 100 years, from 2000 to 2100.

In addition to an increase in sea level rise due to climate change, tidal flooding in the city is also exacerbated by land subsidence, which has reached an average of 9-13 cm per year since 2007 (Yuwono, Abidin, and Hilmi 2013). Land subsidence is driven by multiple factors, including excessive groundwater extraction and the proliferation of bore wells, compounded by the weight of numerous buildings as well as weak low policy enforcement by the government (Hamdani et al. 2020; Pujiastuti, Suripin, and Syafrudin 2016; Sophian 2010; Suhelmi 2012; Yuwono 2013).

Tidal inundation has created various vulnerabilities for people living in the coastal areas of Semarang City. Various studies state that the urban coastal communities are experiencing loss and damage that can be caused by the adverse effects of climate change, either extreme weather events or slow-moving events.

The greater impact of climate change occurs in the center of economic growth locations that have more complex regional development attributes. The impacts of climate change will become more complex, covering both the physical environment and also socio-economic environment (Chen et al. 2013; Cutter 2009; Cutter, Boruff, and Shirley 2003; Marfai et al. 2008; Miladan 2009). Semarang city, as a coastal city, has tidal inundation that has many

impacts on physical buildings, built-up areas, and basic infrastructure.

Nugraha, Santosa, and Aditya (2015) state that the distribution of tidal inundation covers 3,915.16 hectares or 10.48% of the total area of Semarang City, which is spread over several districts such as Genuk District, Gayamsari District, West Semarang District, North Semarang District, and Tugu District. These impacts have led to socio-economic vulnerability in the community, particularly as many residents face difficulties finding work or running their businesses due to the flooding of key economic facilities. Apart from that, it also increases the economic burden for residents to regularly repair and elevate their houses and sometimes even the roads in front of their houses.

Sofaniadi, Rusmadi, and Sari (2015) stated that many households have experienced economic losses due to the large cost of raising a house, with an average of 50 million spending funds for each undertaking. In this condition, social vulnerability will be more complex when faced with unequal gender relations in social life between men and women.

Gender relations become a "social space" where the climate change impacts are present. From here, socio-economic vulnerability due to exposure to the climate change impacts becomes increasingly complex. Women are more affected than men. This can be seen from several aspects, namely the number of people exposed to the impact (more women are exposed than men), the length of time exposed to the impact (women are exposed longer than men), the burden that must be received (women have more burden due to exposure than men), the emergence of health risks that arise (women are more likely to contract skin issues than men).

This difference in impact is caused by the existence of a gender-biased in the community, where, in general, the role of women is more in the domestic sphere (household affairs), while men are responsible for the public sphere (matters outside the home), so that women are more likely to spend more time indoors than men. When there is a tidal inundation between 14.00–16.00 Western Indonesia Time Zone, more women are exposed than men (Rusmadi, Hadi, and Purnaweni 2018).

At the same time, the existence of gender bias in the community, which positions the social role of women only in the domestic sphere, also results in the lack of capacity for climate change adaptation by women's groups. This capacity is very important for climate change resilience, with lower adaptation capacity causing more vulnerability (Dasgupta 2024; Masika 2022; Nelson 2011; Rodenberg 2009).

The vulnerability of women is also exacerbated by the lack of gender responsive public policies, so that gender responsive budgeting is one of the issues across agencies in Indonesia (Faqih, Hadi, and Purnaweni 2018). Climate change policies are generally still shaped by masculine perspectives, which can heighten the vulnerability of women and gender-marginalized groups (Alber 2011; Babugura 2010; Dasgupta 2024; Mainlay and Tan 2012; Nelson 2011; Parikh, Upadhyay, and Singh 2012; Rattani, Bhatt, and Singh 2021; Rodenberg 2009; Terry 2009).

Likewise, in Semarang, climate change resilience policies generally have not been gender responsive. This increases the vulnerability of women when exposed to the climate change impacts (Rusmadi, Hadi, and Purnaweni 2017).

Based on the previous studies outlined above, this study intends to examine the impact of climate change from a socio-ecological perspective, especially tidal flooding, and at the

same time, on climate change resilience policies in Semarang City. This is important considering that climate change does not exist in a "vacuum space", but rather in "spatial complexity", in which there are social relations. Therefore, understanding the impact of climate change is not only about physical problems, but also about social problems.

Based on this background, this study attempts to analyze the climate change impact on the Semarang coastal area by reviewing gender relations as a spatial-social dimension. Simultaneously, this study examines the extent to which climate resilience policies in Semarang City have integrated considerations of gender relations as a social space.

This study used a qualitative research method with data collection during 2018-2019 carried out by observations of four sub-districts (Trimulyo, Kemijen, Tanjungmas, and Bandarharjo), interviews with 60 families consisting of husband and wife and children, and then focus group discussions (FGD) were conducted with various stakeholders, including the community, sub-district government, and representatives of the Semarang city government. Meanwhile, related to climate change policy, data collection was carried out using the document of Semarang City's Climate Change Resilience Policy.

The data analysis was carried out by qualitative descriptive methods with a critical reflection approach that was carried out continuously, consciously, and carefully (Crang 2005), to reveal the community's vulnerability to the impacts of climate change, in relation to gender. To analyse Semarang's climate change policy documents, content analysis is used with a critical discourse analysis approach (van Dijk 1993).

Climate Change Impact and Vulnerability in the Semarang Coastal Area

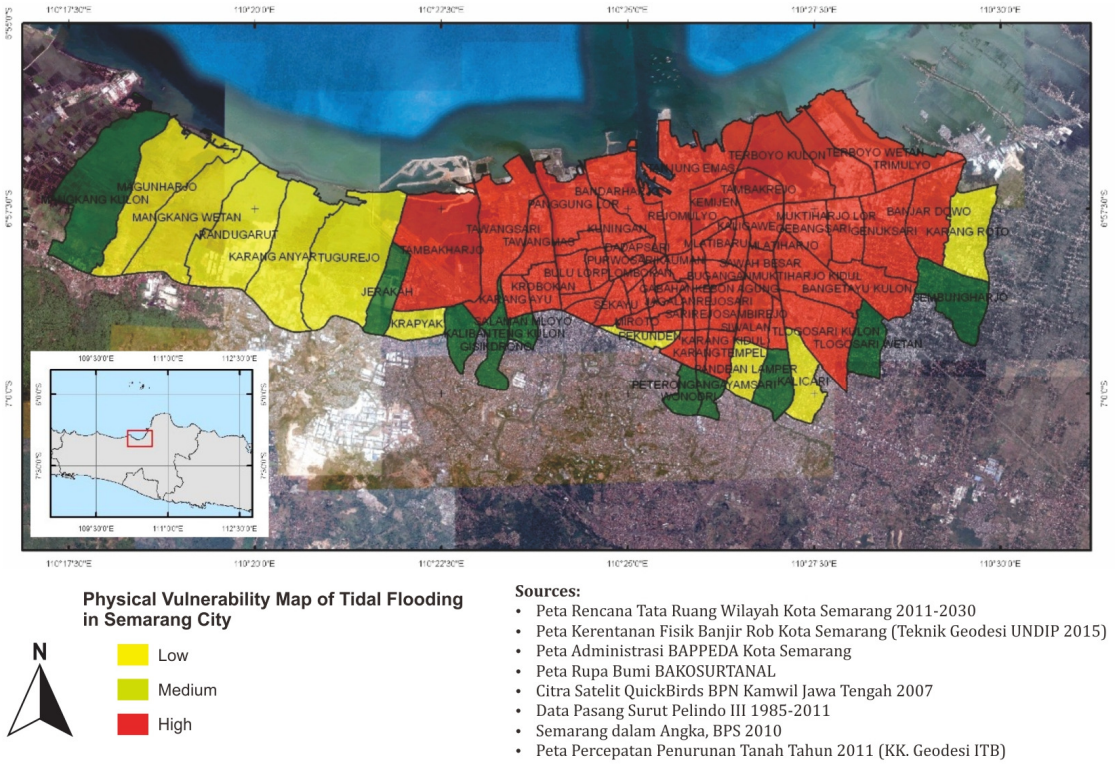
One of the significant impacts of climate change is the rise in sea level. In the coastal areas of Semarang City, this has led to substantial damage to both the physical environment and the socio-economic well-being of the community. Miladan (2009) noted that tidal flooding has damaged approximately 776.34 hectares of fishponds across Tugu, West Semarang, and Genuk sub-districts.

Furthermore, this impact extends to built-up areas, including residential zones, industrial sites, commercial establishments, and service centers. Essential infrastructure, such as road networks and electricity grids, has also sustained damage (Marfai et al. 2008). These built-up areas and fundamental infrastructure are crucial for the economy and community accessibility.

Putra (2012) identified North Semarang Sub-district as having the highest number of flood-inundated buildings. Estimated damage includes 893.24 hectares of industrial areas, 205.41 hectares of residential and mixed-use areas (commercial, service, and residential), and 62,384.30 meters of damaged roads due to tidal flooding, out of a total road length of 251,847.57 meters, representing about 24.77%. These roads are vital arteries for industrial activities, trade, and the distribution of goods to the port. The description of this physical environmental vulnerability can be explained in a map, as shown in Figure 1.

Tidal flooding has a significant impact on the socioeconomic vulnerability of communities, hampering economic activity and placing an additional financial burden on residents through periodic repairs and raising the base of their homes.

Figure 1
Physical-Environmental Vulnerability Due to Climate Change Impact



Source: Rusmadi (2019)

Sofaniadi et al. (2015) noted that numerous households incur substantial economic losses due to the high costs associated with elevating their houses. In Tanjung Mas Village, key adaptation strategies include elevating houses and roads, constructing additional storage in houses, and building embankments. House elevation is typically undertaken every five years, with an average cost reaching up to IDR 50 million per house, requiring an estimated monthly saving of IDR 850,000 over that period.

While road elevation is a collective effort by residents, it often receives financial assistance from the government and support from NGOs. In the absence of government funds, communities independently raise funds through contributions of up to IDR 200,000 per household.

The complexity of this physical and socio-economic environmental vulnerability is further amplified when viewed through a gender lens, as the impacts of climate change manifest differently across social spaces. The impacts of tidal flooding due to climate change in Semarang City's coastal areas indicate that women exper-ience disproportionately greater effects com-pared to men. This disparity is evident in several aspects: 1) a higher number of women are exposed to the impacts; 2) women experience longer durations of

exposure; 3) women face greater difficulty in carrying out their tasks; 4) women encounter more health risks arising from tidal inundation; and 5) women bear a heavier double burden resulting from both physical and socio-economic environmental vulnerabilities. The descriptions of these socio-ecological vulnerabilities are presented in Table1.

This difference in impact is caused by the existence of gender construction in the study area, i.e., Trimulyo, Kemijen, Tanjungmas, and Bandarharjo sub-districts. In these areas, in general, women's roles are constructed to play a greater role in domestic affairs or household affairs (such as washing, cooking, caring for children, and cleaning the house). While men are responsible for the public sphere or affairs outside the home (such as working), women spend more time staying at home. In such conditions, when tidal flooding occurs, women are more exposed than men. The condition of residents' houses submerged by tidal flooding, with women being more affected, is shown in Figure 2.

Gender Issues in Semarang's Climate Change Policy

The Semarang city government has made various responses related to the impact of climate change, especially in climate change policy. The issues of sea level rise and land subsidence, key drivers of frequent tidal flooding, have been acknowledged in Semarang's development policies, both in the Semarang City Medium-term Development Plan (RPJMD) 2016-2021 and Semarang City's Integrated Climate Change Strategy 2010-2020. This policy contains at least strategies for dealing with climate change, both in the context of climate change mitigation and adaptation. This includes strategies for creating a climate-resilient city of Semarang.

Based on the analysis of the climate change policies above, gender issues consideration in climate change policy can be seen in three chapters/fields: a) Overview of Estimated Impacts and Risks of Climate Change, b) Climate Change Goals and Strategies, and c) General Policies and Indications for Climate Change Programs.

It is necessary to critically analyze this document in terms of gender issues, whether it has been considered, and in what form. Therefore, to see in more detail, it is necessary to describe the content of climate change and gender issues to which the Semarang City government responded in the policy document. Details are provided in Table 2.

Based on a gender analysis of the document, Semarang's climate resilience strategies, it can be concluded that the climate change policy in Semarang City is not gender responsive due to the lack of gender considerations. This can be seen from the weak consideration of gender issues in climate change.

Several aspects have mentioned vulnerable groups, especially concerning the goal of increasing resilience to the impacts of climate change in the Semarang City Integrated Climate Change Strategy 2010-2020 document, namely "identification of vulnerable groups due to exposure to the impact of tidal flooding", which is a women-led family group. However, this description can be gender biased because it can create stereotypes against women who are weak when they become the head of the family.

This condition cannot be separated from the dominant masculine perspective in public policies, including, in this case, the climate change policy in Semarang City. As a result,

vulnerable gender groups, such as women, have weak access (power and ability) to climate change policies. Ensuring adequate adaptation capacity to climate change is important as women become even more vulnerable when exposed to the impacts of climate change.

Table 1
Differences in Exposure to Impacts between Men and Women

No.	Aspect of Impact	Impacts between Men and Women
1	Total of population	Referring to the number of residents exposed to the impact of tidal flooding, the female group is more exposed than the male group. This is because women are more at home than men, so when tidal flooding occurs, more women are exposed.
2	Length of time exposed	Referring to the length of time of exposure to the impact of tidal flooding, the female group is exposed longer than the male group. This is because women spend more time at home to carry out their domestic tasks than men, so when tidal flooding occurs, women will be exposed all the time.
3	Level of difficulty carrying out the role	In terms of the level of difficulty in carrying out their duties, women are more difficult than men. This is due to the existence of gender in social relations in the community, where women are constructed to be responsible for domestic matters, such as washing, cooking, caring for children, and cleaning the house. When there is a tidal inundation, women's domestic tasks are more difficult to carry out.
4	Health risk	Referring to the emergence of health risks due to tidal flooding, women receive more health risks than men. This can be seen from women being more affected by skin itching due to tidal flooding.
5	Double burden	The vulnerability of the physical and socio-economic environment causes a double burden on women's groups, where women who are constructed to be responsible for domestic affairs are forced to help with public tasks, such as helping men with their work to earn additional income.

Source: Rusmadi (2019)

Figure 2
Condition of Residents' Houses Flooded with Women More Affected Impacts



Source: Rusmadi (2019)

Table 2
Semarang Integrated Climate Change Strategy 2016-2020

No.	Chapter / Section	Climate Change and Gender Issues
1	Overview of Estimated Impacts and Risks of Climate Change	The Semarang City Government has meticulously considered studies on climate change indicators and variables, specifically focusing on trends and projections for increased air temperature, shifts in rainfall patterns, sea level rise, and wind dynamics. This comprehensive approach provides an overview of climate change risks, manifesting as tidal flooding, pluvial flooding, tornadoes, high waves, landslides, scarcity of clean water, and vector-borne diseases. However, it has not been explained in detail regarding the general description of climate change impacts and risks that are gender specific, even though the impacts of climate change are not gender neutral, because they are perceived differently by men and women.
2	Climate Change Goals and Strategies	The Semarang City Government has formulated regional development objectives and strategies extending to 2020, aiming to foster a resilient community capable of confronting climate change challenges and promoting efficient resource and energy utilization. This commitment is encapsulated in the objective: "Increasing Resilience of Semarang City to Climate Change impact and Reducing GHG Emissions by 4% from the conditions of business as usual (BAU) by 2020." Nevertheless, it has not been explained in detail regarding gender-specific goals and strategies for climate change, even though change goals and strategies that have considered gender-specific needs are important for increasing the capacity for climate change adaptation owned by gender groups affected by the impact.
3	General Policies and Indications for Climate Change Programs	Nevertheless, it has not been explained in detail regarding general policies and indications of gender-specific climate change programs, even though general policies and program indications are the basis of a program being implemented and the basis for evaluating the success of a program. By not including gender-specific issues, it is difficult for gender groups who are vulnerable impacted the climate change to become a priority policy. The Semarang City Government has formulated overarching policies for climate change initiatives, aiming to establish Semarang as a "Kota Tangguh" or "Resilience City" in confronting the challenges of climate change. These policies encompass: a) enhancing human resource capacity, b) optimizing energy and natural resource utilization, and c) promoting and facilitating dialogue and cooperation on climate change.

Source: Pemerintah Kota Semarang (2013)

Climate Governance for Resilient Cities

To achieve justice in climate resilience, it is important to propose a gender-responsive approach in Semarang's climate governance model. This effort becomes an instrument to ensure that gender-specific issues related to climate change are considered and opens space for the participation of all stakeholders in climate change. Based on studies that have been carried out on the climate change impacts and existing climate change policies, by adopting a model from D'Souza and Smith (2000), the authors proposed a gender-responsive climate governance model in Semarang City, which includes three main elements: intervention, assistance, and the creation of supportive conditions.

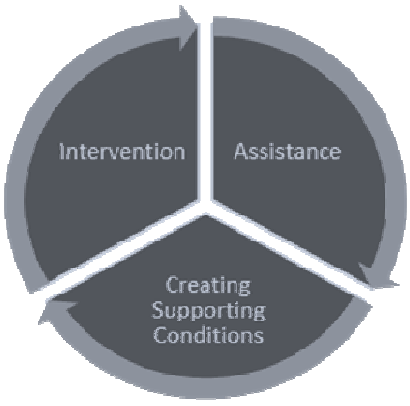
Interventions are steps of direct involvement of the government as the person in charge of policies to realize gender responsive climate

change policies. Meanwhile, assistance is the provision of assistance to reduce operational constraints that arise in efforts to achieve gender responsive climate change resilience. Lastly, the creation of supportive conditions is a continuous and sustainable step. This means that after intervention and assistance, it is necessary to create conditions that can support the creation of gender responsive climate change resilience.

Supporting conditions can be realized with the commitment of various parties, including the government, society, and agencies (academics, NGOs, and the media). These three commitments must be carried out through cooperation between parties through a climate change regulatory framework (climate governance), namely a framework that rests not only on the government, but also on other stakeholders such as the community and agencies. The relationship between the three elements is shown in Figure 3.

The proposed model consists of three main elements. The first is Intervention, which includes direct involvement of the government as the policymaker to realize gender responsive climate change policy in Semarang City. This intervention step is carried out in a participatory manner, starting with: a) mainstreaming gender in climate change policy, both at the input, process, and output stages, by ensuring equal and equitable access, participation, control, and benefits between men and women; b) substantial formulation (arrangement) related to gender responsive climate change policies, in the form of new policies related to climate change in Semarang City that are gender responsive. This step is carried out by analyzing insight-opening data, taking an inventory of gender issues that should be considered, developing gender responsive indicators about climate change policies, and formulating new gender responsive policies. Lastly, c) is the formulation of gender responsive institutional governance to ensure the implementation of gender responsive climate change policies.

Figure 3
The Components of Climate Governance to Promote Resilient Cities



Source: Adapted from D'Souza and Smith (2000)

The formulation of gender responsive institutional governance can be in the form of changes in institutional structures and institutional work mechanisms related to climate change to make it gender responsive. This step, for example, takes the form of establishing (and optimizing the role) of the Gender Mainstreaming Working Group (POKJA PUG) and Gender Focal Point (GFP) in Regional Apparatus Organizations (OPD) within the Semarang City Government, which are the leading climate change sectors such as City Regional Planning (BAPPEDA). The government of Semarang City is responsible for these intervention steps.

The second is Assistance; there are provisions of assistance to reduce operational constraints that arise in efforts to achieve gender responsiveness in Semarang's climate change resilience strategies. These assistance programs can take the form of technical assistance programs, community empowerment, and program funding that take gender-specific needs into account, and the impacts of climate change. As the stakeholder for this assistance is the Semarang City Government, involving other parties who have the capacity, both universities and NGOs.

The third is Creating Supporting Conditions, which involves creating conditions that can support the creation of gender responsive climate change resilience in Semarang. This condition can be realized with the commitment of various parties: a) the government's commitment to realizing gender responsive climate change resilience through the formulation of policies following the needs of the community (community-based approach; b) commitment of community members to understand climate change (climate literacy) and to eliminate gender bias practices in every aspect of life; c) the commitment of related agencies/parties, such as academics, NGOs, and the mass media, to continue promoting gender responsive climate change resilience. The three commitments (government officials, community members, and agencies) must be carried out through cooperation between parties through climate governance. The framework rests not only on the government, but also on other stakeholders such as the community and agencies. Thus, the stakeholders responsible for the steps to create this supportive condition are the Semarang City Government and other parties as agencies, namely academics, NGOs, and the media.

All these components must be realized in the form of cooperation between parties through a climate governance framework. This framework rests not only on the government, but also on other stakeholders such as the community and agencies (Tyler and Moench 2012). This governance concept is more participatory and accommodating for every stakeholder than the management concept, which relies more on the "super body" as the controlling or co-controlling holder. In the concept of governance, there is no super body because it relies on all stakeholders (Bang 2007; Hadipuro et al. 2014; Kooiman 2007). Thus, realizing gender responsive climate change resilience in Semarang requires the interaction of all components, not just the government.

Conclusion

Based on the results of this study, it can be concluded that one of the impacts of climate change in coastal areas of cities such as Semarang City is tidal flooding. This has an impact on physical-environmental and social-environmental vulnerability. The former includes damage to environmental conditions,

such as settlements, infrastructure, business areas, etc., and the latter includes decreased community income, health risks, difficulties in carrying out roles in the home, etc. The impact of climate change, as mentioned, in the context of social space where there are unequal gender relations, causes the impact to be felt differently between men and women, where women receive more impacts than men. At the same time, climate change resilience policies in the city of Semarang have not provided sufficient responses to the dynamics of the social space, for example, gender construction in relation to climate change. Climate resilience needs to be governed not only by the government, but all the components. With the involvement of all stakeholders, women's groups will be able to increase their access and adaptation capacity.

Thus, the climate governance framework should be gender responsive to ensure that men and women have access and participate. This membership model includes three main components: intervention (direct involvement of the government as the party responsible for the policy to realize a gender responsive in climate policy), assistance (making efforts to help reduce operational constraints that arise in efforts to achieve gender responsive in climate resilience), and creation support conditions (creation of support conditions means that there are conditions that can support gender responsive in climate resilience).

This requires commitment from various parties, including the government, society, and agencies (academics, NGOs, and the media) through participatory cooperation through a climate governance framework, which does not only rely on the government, but also other stakeholders such as communities and agencies. Finally, understanding gender risk assessments and governance processes should effectively reduce vulnerability and support local adaptation strategies. By bringing together all stakeholders, an urban climate governance approach should ensure a more resilient city in Semarang.[]

References

Alber, Gotelind. 2011."Gender, Cities and Climate Change: Thematic Report Prepared for Cities and Climate Change Global Report on Human Settlements 2011." London, UK. https://unhabitat.org/sites/default/files/2012/06/GRHS2011ThematicStudyGender.pdf.

Asian Cities Climate Change Resilience Network. 2010."City Resilience Strategy: Semarang's Adaptation Plan in Responding to Climate Change." https://alnap.org/help-library/resources/city-resilience-strategy-semarangs-adaptation-plan-in-responding-to-climate-change/.

Babugura, Agnes. 2010."Gender and Climate Change: South Africa Case Study." https://www.ipcc.ch/apps/njlite/ar5wg2/njlite_download2.php?id=9614.

Bang, Henrik Paul. 2007. "Governing as Governance - Editied by Jan Kooiman." *Public Administration* 85(1):227–31. doi:10.1111/j.1467-9299.2007.00642_1.x.

BPS Kota Semarang. 2013. "Profil Kependudukan Kota Semarang 2012." https://semarangkota.bps.go.id/id/publication/2013/08/05/ad0280b01763f9742064e278/profil-kependudukan-kota-semarang-2012.html.

BPS Kota Semarang. 2015a. "Profil Kependudukan Kota Semarang 2013." https://semarangkota.bps.go.id/id/publication/2015/06/05/11719d5bed9153c73

f6a08f8/profil-kependudukan-kota-semarang-2013.html.

BPS Kota Semarang. 2015b. "Profil Kependudukan Kota Semarang 2014." https://semarangkota.bps.go.id/id/publication/2015/08/18/ce68c37cdc5763667c41d89a/profil-kependudukan-kota-semarang-2014.html.

Chen, Wenfang, Susan L. Cutter, Christopher T. Emrich, and Peijun Shi. 2013. "Measuring Social Vulnerability to Natural Hazards in the Yangtze River Delta Region, China." *International Journal of Disaster Risk Science* 4(4):169–81. doi:10.1007/s13753-013-0018-6.

Cutter, Susan L. 2009. *Measuring and Mapping Social Vulnerability - Cities at Risk*. Bangkok.

Cutter, Susan L., Bryan J. Boruff, and W. Lynn Shirley. 2003. "Social Vulnerability to Environmental Hazards." *Social Science Quarterly* 84(2):242–61. doi:10.1111/1540-6237.8402002.

D'Souza, Kevin P. V. J., and A. Jeff Smith. 2000. *Design and Pilot Implementation of a Model Scheme of Assistance to Small Scale Miners Phase I*. London: Wardell Armstrong.

Dasgupta, Aparajita. 2024. "Gendered Vulnerabilities in Climate Shocks: The Role of Social Protection Interventions." *Environmental Research: Climate* 3(4):045023. doi:10.1088/2752-5295/ad8d03.

van Dijk, Teun A. 1993. "Principles of Critical Discourse Analysis." *Discourse & Society* 4(2):249–83.

Faqih, Abdul Fikri, Sudharto P. Hadi, and Hartuti Purnaweni. 2018. "Model of Gender Mainstreaming Succession in Green-Budgeting Application in Central Java Province Indonesia." *Asian Journal of Microbiology, Biotechnology and Environmental Sciences* 20(2):465–73.

Girard, Peter. 2019. *New Study Triples Global Estimates of Population Threatened by Sea Level Rise*. Princeton: Climate Central.

Hadipuro, Wijanto, N. A. Rusmadi, Aulia Latif, and Astrid Ekaningdyah. 2014. "Market Triumphalism in Water Governance: A Study of the Indonesian West Tarum Canal Water Allocation." *International Journal of Water* 8(4):368. doi:10.1504/IJW.2014.065793.

Hamdani, Rizkiana S., Sudharto P. Hadi, Iwan Rudiarto, and Hartuti Purnaweni. 2020. "Do we care enough? Revisiting Land Subsidence and Coastal Spatial Planning Policy in Semarang, Indonesia" edited by B. Warsito, Sudarno, and T. Triadi Putranto. *E3S Web of Conferences* 202:06005. doi:10.1051/e3sconf/202020206005.

Kooiman, Jan, ed. 2007. *Governing as Governance*. London: SAGE Publications Inc.

Mainlay, Jony, and Su Fei Tan. 2012. *Mainstreaming Gender and Climate Change in Nepal*. London: IIED.

Marfai, Muh Aris, Lorenz King, Junun Sartohadi, Sudrajat Sudrajat, Sri Rahayu Budiani, and Fajar Yulianto. 2008. "The Impact of Tidal Flooding on a Coastal Community in Semarang, Indonesia." *The Environmentalist* 28(3):237–48. doi:10.1007/s10669-007-9134-4.

Masika, Rachel, ed. 2022. *Gender, Development, and Climate Change*. Oxford: Oxfam GB.

Miladan, Nur. 2009. "Kajian Kerentanan Wilayah Pesisir Kota Semarang terhadap Perubahan Iklim." [Master Thesis]. Magister Teknik Pembangunan Wilayah dan Kota, Universitas Diponegoro Semarang.

Nelson, Valerie. 2011. *Gender, Generations, Social Protection & Climate Change: A Thematic Review*. London: Overseas Development Institute - University of Greenwich.

Nugraha, Arief Laila, Purnama Budi Santosa, and Trias Aditya. 2015. "Dissemination of Tidal Flood Risk Map Using Online Map in Semarang." *Procedia Environmental Sciences* 23:64–71. doi:10.1016/j.proenv.2015.01.010.

Parikh, Jyoti, Dinoj Kumar Upadhyay, and Tanu Singh. 2012. "Gender Perspectives on Climate Change & Human Security in India: An Analysis of National Missions on Climate Change." *Cadmus: Promoting Leadership in Thought That Leads to Action* 1(4):180–86.

Pemerintah Kota Semarang. 2013. *Strategi Perubahan Iklim Terpadu Kota Semarang Tahun 2010 – 2020*.

Pujiastuti, Ratih, Suripin Suripin, and Syafrudin Syafrudin. 2016. "Pengaruh Land Subsidence Terhadap Genangan Banjir dan Rob di Semarang Timur." *Media Komunikasi Teknik Sipil* 21(1):1–12. doi:10.14710/mkts.v21i1.11225.

Putra, Danang Insita. 2012. "Analisis Kerentanan Masyarakat terhadap Bencana Rob: Studi Kasus Kota Semarang." [Master Thesis]. Universitas Pertanahan Indonesia, Jakarta.

Rattani, Vijeta, Somya Bhatt, and Deepak Singh. 2021. "Climate Change, Adaptation and Gender Concerns: Approaches and Learnings from Global and Indian Experiences." Pp. 311–22 in *Environmental Resilience and Transformation in Times of COVID-19*. Elsevier.

Rodenberg, Birte. 2009."Climate Change Adaptation from a Gender Perspective: A Cross-Cutting Analysis of Development-Policy Instruments." https://www.pacificclimatechange.net/document/climate-change-adaptation-gender-perspective-cross-cutting-analysis-development-policy.

Rusmadi, Rusmadi. 2019. "Model Kebijakan Perubahan Iklim Responsif Jender di Kota Semarang." [Doctoral Thesis]. Program Doktor Ilmu Lingkungan, Sekolah Pascasarjana Universitas Diponegoro Semarang.

Rusmadi, Rusmadi, Sudharto P. Hadi, and Hartuti Purnaweni. 2017. "Gendering the Climate Change Policy: A Study of Gender Analysis on Semarang's Integrated City Climate Strategy." *Advanced Science Letters* 23(3):2556–58. doi:10.1166/asl.2017.8697.

Rusmadi, Rusmadi, Sudharto P. Hadi, and Hartuti Purnaweni. 2018. "Climate Change and Gender Nexus: A Study of Gender Dimension on Climate Change Impact in Semarang Coastal Area." *International Journal of Civil Engineering and Technology* 9(7):1030–1039.

Sofaniadi, Safrinal, Rusmadi Rusmadi, and Aniessa Delima Sari. 2015. *Protect, Adapt or Relocate? Responding to Climate Change in Coastal Indonesia*. London: International Institute for Environment and Development.

Sophian, R. Irvan. 2010. "Penurunan Muka Tanah di Kota-kota Besar Pesisir Pantai Utara Jawa (Studi Kasus: Kota Semarang)." *Bulletin of Scientific Contribution* 8(1):41–62.

Suhelmi. 2012. "Kajian Dampak Landsubsidence terhadap Peningkatan Luas Genangan Rob di Kota Semarang." *Jurnal Ilmiah Geomatika* 18(1).

Terry, Geraldine, ed. 2009. *Climate Change and Gender Justice*. Oxford: Practical Action Publishing in association with Oxfam GB.

Tyler, Stephen, and Marcus Moench. 2012. "A Framework for Urban Climate Resilience." *Climate and Development* 4(4):311–26. doi:10.1080/17565529.2012.745389.

World Bank. 2010. *Cities and Climate Change: An Urgent Agenda*. Washington D.C, USA: World Bank Group.

Yuwono, Bambang Darmo. 2013. "Korelasi Penurunan Muka Tanah dengan Penurunan Muka Air Tanah di Kota Semarang." *Teknik: Jurnal Ilmiah Bidang Ilmu Kerekayasaan* 34(3):188–95.

Yuwono, Bambang Darmo, Hasanuddin Z. Abidin, and M. Hilmi. 2013. "Analisa Geospasial Penyebab Penurunan Muka Tanah di Kota Semarang." in *Prosiding SNST ke-4 2013, Fakultas Teknik Universitas Wahid Hasyim, Semarang*.