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Decentralized Ternate as Global Climate Change Adaptation***

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Mapping Climate-related Disaster Preparedness in Decentralized Ternate as Global Climate Change Adaptation

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ABSTRACT

This study seeks to describe the preparedness of Ternate government against climate-related disaster. Through a set of indicators of policy approach, institutional capability, and social capability, this research finds that local governance and local politics in small island government are not supporting the establishment of an adaptive government, particularly on the context of decentralization. In the context of Indonesia, several small islands provinces are decentralized without adequate governing capacity. Previous research widely mentioned the resilience of small islands government, but this study will adapt the concept down to small island provinces and vulnerable communities. However, as climate change progresses slowly, developing countries do not put this as a priority compared to other natural calamities like earthquakes or volcanic eruptions. Ultimately, the case of Ternate highlights the importance to position subnational small islands according to their unique feature as a frontline of climate change adaptation, both in the global and in the national context. This article also recommends that small islands provinces should have special adaptation measures for climate-disasters to create strengthened resilience against global climate change.

Keywords: climate change adaptation; Ternate; decentralization; small islands government

ABSTRAK

Penelitian ini berusaha mendeskripsikan kesiapsiagaan pemerintah Ternate terhadap bencana terkait iklim. Melalui serangkaian indikator pendekatan kebijakan, kapabilitas kelembagaan, dan kapabilitas sosial, penelitian ini menemukan bahwa tata kelola lokal dan politik lokal di pemerintahan pulau-pulau kecil tidak mendukung pembentukan pemerintahan yang adaptif, khususnya dalam konteks desentralisasi. Dalam konteks Indonesia, beberapa provinsi pulau-pulau kecil mengalami desentralisasi tanpa kapasitas pemerintahan yang memadai. Penelitian sebelumnya secara luas menyebutkan ketahanan pemerintah pulau-pulau kecil, namun penelitian ini akan mengadaptasi konsep tersebut hingga ke provinsi pulau-pulau kecil dan masyarakat rentan. Namun, karena perubahan iklim berlangsung lambat, negara-negara berkembang tidak menempatkan ini sebagai prioritas dibandingkan dengan bencana alam lainnya seperti gempa bumi atau letusan gunung berapi. Pada akhirnya, kasus Ternate menyoroti pentingnya memposisikan pulau-pulau kecil subnasional sesuai dengan keunikannya sebagai garda depan adaptasi perubahan iklim, baik dalam konteks global maupun nasional. Artikel ini juga merekomendasikan agar provinsi pulau-pulau kecil memiliki langkah-langkah adaptasi khusus terhadap bencana iklim untuk menciptakan ketahanan yang lebih kuat terhadap perubahan iklim global.

Kata kunci: adaptasi perubahan iklim; Ternate; desentralisasi; pemerintah pulau-pulau kecil

Introduction

This article attempts to expose the vulnerability of small islands provinces against climate change, despite larger authority obtained through decentralization of government. Ternate

is chosen as a case in this study, as an island-city that has strategic importance, both politically and economically, for the eastern part of Indonesia. The island is only 5,710 km² but is rapidly expanding in demographic terms. It is also a part

of Indonesian ring of fire where a series of volcanoes are located. As an archipelagic country and members of Intergovernmental Panel on Climate Change (IPCC), Indonesia has the potential to display global leadership in climate change adaptation. Unfortunately, decentralization of authority in handling disasters through the formation of The Regional Disaster Mitigation Agency (BPBD) is considered inadequate in this article. Despite being awarded a pilot project site of a Climate Change Resilient City by development agencies and government authority, Ternate has yet to adapt to climate-related disasters. Consequently, this article would like to focus on what is the level of preparedness against climate-related disasters in Ternate?

The lack of climate disaster comprehension and preparedness is the main argument of this article. Technical and bureaucratic approaches are implemented; however, this article perceives that the narrative of adaptation and resilience against climate change is not entirely internalized. Recent literature on small islands resilience and preparedness revolves around state-level and rarely on subnational level. Small islands governments in particular, will confront the first and foremost prominent hazard of climate-related natural disasters, as an “early adapters”¹ However, most small island states handle the hazards by migration, both temporary and permanent.²

Adaptation also links closely with risks, and therefore poses socio-cultural and socio-political context around what are the risks, what are the mitigations, and what cost to pay for it.³

¹ Betzold, C. (2015). Adapting to climate change in small island developing states. *Climatic Change*. <https://doi.org/10.1007/s10584-015-1408-0>

² Mortreux, C., & Barnett, J. (2009). Climate change, migration and adaptation in Funafuti, Tuvalu. *Global Environmental Change*.

³ O'Brien, K. L., & Wolf, J. (2010). A values-based approach to vulnerability and adaptation to climate change.

⁴ Moreover, for communities, climate change perceptions should have a certain degree of relevance to their social cohesion and economic impact.⁵

In so-called climate-resilient city of Ternate, competing perceptions on threat of disasters occur among the inter-government agencies and the government against development workers stationed there. As an effort to gain resilience toward climate-related disasters like drought, landslides, and tidal waves; adaptation should be translated as a social learning and self-organization process.⁶

Adaptation is widely proliferated by IPCC⁷ as a United Nations (UN) board of experts. Additionally, international development and humanitarian agencies work together to implement the principles of adaptation as a subset of resilience, as introduced by IPCC.⁸ The presence of development workers enhances the continuation of organizational transformation in the smallest unit of the society.

Wiley Interdisciplinary Reviews: Climate Change, 1(2), 232–242.

⁴ Wan Mohd Rani, W. N. M., Kamarudin, K. H., Razak, K. A., Che Hasan, R., & Mohamad, Z. (2018). Measuring urban resilience using climate disaster resilience index (CDRI). *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*. <https://doi.org/10.5194/isprs-archives-XLII-4-W9-237-2018>

⁵ Houser, M., Gunderson, R., & Stuart, D. (2019). Farmers' Perceptions of Climate Change in Context: Toward a Political Economy of Relevance. *Sociologia Ruralis*, 59(4), 789–809. <https://doi.org/10.1111/soru.12268>

⁶ Pelling, M. (2010). Adaptation to climate change: From resilience to transformation. In *Adaptation to Climate Change: From Resilience to Transformation*. <https://doi.org/10.4324/9780203889046>

⁷ IPCC. (2014). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Summary for Policymakers*. In *Climate Change 2014: Impacts, Adaptation and Vulnerability - Contributions of the Working Group II to the Fifth Assessment Report*. <https://doi.org/10.1016/j.renene.2009.11.012>

⁸ Falkner, R. (2017). International climate politics between pluralism and solidarism: An English school perspective. In *Traditions and Trends in Global Environmental Politics: International Relations and the Earth*. <https://doi.org/10.4324/9781315206967>

Accordingly, this article seeks to describe the level of readiness of Ternate government to handle climate-related natural disasters through governance perspectives. Governance is examined as a policy instrument in local capacity building.

By mapping the preparedness of Ternate government, this research aims to depict the connection among decentralization, global climate change narratives, and the capacity of local government to maintain resilience toward climate-related natural disasters.

Methodology

Fieldwork of this research was conducted in July 2019 solely in Ternate, North Maluku, Eastern Indonesia. Seventeen resource persons were shortlisted in advance to gather information. Upon arrival, we decided to select our informants based on the recommendations from the Ternate Development Agency and other stakeholders while keeping the shortlist for reference. This had to be done due to unavailability of some pre-shortlisted informants.

The first phase was to develop a three-fold categorization of resource persons, namely the municipal government agencies, local village stakeholders, and civil society representatives. Secondly, we tracked previous record on climate-related disasters in Ternate. A literature review was conducted to narrow down the characteristics and authorities of each agency, to gather the context of the research.

Third, we decoded and analyzed the information and secondary data gathered from the informants, for the purpose of mapping the authorities, roles, and perspectives of the severity of climate-related hazards on Ternate in general. Qualitative research was employed with the case study method, focusing on identifying the generality (diversity) and specificity (particularities) of the research subjects. The

expected outcome is an explanation of the uniqueness of the case study.

Theoretical Framework

There are two approaches in implementing disaster management at the provincial and city or district level. These approaches are rooted from the Hyogo Framework for Action, which consists of disaster risk reduction (DRR) and climate change adaptation (CCA). However, these two are legally considered as a soft law approach that relies heavily on voluntary actions and very difficult to do a scaled evaluation of compliance.⁹

There are several political and legal channels for actualizing this governance into policy, namely by adoption and ratification. Adoption process is the domain of policy innovation and feedback, given the decentralization of government in Indonesia. Climate change policy adoption in municipalities is often associated with social change, crisis, and alliances in the city council¹⁰; when government dynamics, community subtleties, and environmental risks are also prominent as driving factors of adoption.¹¹

However, in practice, DRR and CCA are only slightly different. It is rather difficult to distinguish between the execution of the two types of policy or regulation at the national and sub-national levels. Local governments must be

⁹ Wanner, M. S. T. (2021). The effectiveness of soft law in international environmental regimes: participation and compliance in the Hyogo Framework for Action. *International Environmental Agreements: Politics, Law and Economics*, 21(1), 113–132.

<https://doi.org/10.1007/s10784-020-09490-8>

¹⁰ Kalafatis, S. E. (2018). Comparing Climate Change Policy Adoption and Its Extension across Areas of City Policymaking. *Policy Studies Journal*, 46(3), 700–719. <https://doi.org/10.1111/psj.12206>

¹¹ Yeganeh, A. J., McCoy, A. P., & Schenk, T. (2020). Determinants of climate change policy adoption: A meta-analysis. *Urban Climate*, 31(October 2019), 100547. <https://doi.org/10.1016/j.uclim.2019.100547>

careful in sorting out the planning guidelines, strategies and policies taken, and the implementation of projects or work programs that are carried out. DRR and CCA are also often suggested to be combined, because the integration of the two approaches is considered capable of answering funding and planning problems that are often faced by cross-sectoral stakeholders.

This research embraces the importance of CCA in accordance with the low level of predictability of natural disasters, especially those with climate change nuances. Because climate change takes place more slowly than volcanic disaster intervals, observations are also more problematic. To make climate change a mainstream issue and a long-term disaster management platform, national frameworks need to be addressed. Local government initiatives will be less targeted because of the cross-territorial and multi-sectoral climate change characteristics.

This research is analyzed on several dimensions extracted from relevant literature. First, we studied the respective perceptions on climate-related disaster from national government and from the side of Government of Ternate. There is different emphasis on how response to climate-related hazards is conducted. Scholars take “coping” and “adapting” into separate accentuation.¹² Coping is backward-oriented, basically leaning on immediate responses for survival purposes with high degree of reactivity. While “adapting” focuses on adjustment strategy, predictive measures, and with strategic decision. Government of Ternate

has been decentralized and is more advanced in adaptation compared with another small islands’ government in Indonesia. However, demand for resilient infrastructure has not been fulfilled yet.

Second, on the aspects of institutional capability. Adaptive governance emerges as one of the buzz terms in development studies when particularly related to climate change governance. The trigger of the adaptation in policy context are external shocks (major socio-economic-changes, public opinion shifts, transformations in system governing coalitions, and impacts from other subsystems), and committed political leadership (active policy entrepreneurs, political trust, and capability in conflict resolution and capacity building).¹³

Third and lastly, on the social dimension of governance. Trust, reciprocity, social norms, participation, communication, and social incentives are important to be considered as a part of social capital in small islands developing country.¹⁴ These indicators are supposedly relevant with Ternate as a small island even though it is a subnational entity.

Other factor might influence the degree of climate resilience in Ternate. However, this research limits its explanation on empirical analysis backed by the purpose with mapping the actors and the problem. This research will not elaborate on how economic disparity and socio-cultural structure might influence the governance of climate-related disaster in Ternate.

Findings

Since 2000, disaster types in Ternate are more dominated by floods. Floods in the city of

¹² Lavell, A., Oppenheimer, M., Diop, C., Hess, J., Lempert, R., Li, J., Muir-Wood, R., Myeong, S., Moser, S., Takeuchi, K., Cardona, O. D., Hallegatte, S., Lemos, M., Little, C., Lotsch, A., & Weber, E. (2012). Climate change: New dimensions in disaster risk, exposure, vulnerability, and resilience. In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*. <https://doi.org/10.1017/CBO9781139177245.004>

¹³ Walch, C. (2019). Adaptive governance in the developing world: disaster risk reduction in the State of Odisha, India. *Climate and Development*.

<https://doi.org/10.1080/17565529.2018.1442794>

¹⁴ Hagedoorn, L. C. et al. (2019). Community-based adaptation to climate change in small island developing states: an analysis of the role of social capital. *Climate and Development*.

<https://doi.org/10.1080/17565529.2018.1562869>

Ternate is aftereffect of cold lava, due to the frequent eruption of Mount Gamalama. During rainfall, cold lava deposit melts down and causes flooding and landslides.

As we interviewed random people in public places, generally they did not consider their area is fragile against climate disaster. However, on their direct comment, The BPBD of Ternate understood that the city of Ternate is prone to climate change disasters. However, they also emphasized that disasters like volcano eruptions are immediate dangers, followed by a series of other disasters such as floods and landslides.

According to the interviews, the residents are not too familiar with climate-related natural disasters. As we investigate further with the interview with Mr. Mansur Mahli from the BPBD, he noted that annually, high tides appear. However, people do not consider this a climate catastrophe. They perceived it as an ordinary natural phenomenon caused by the full moon.

Abrasion has occurred along the coastline of Ternate and is deemed a threat for shore tourism.¹⁵ Nonetheless, abrasion is not categorized as a disaster by the community. The government and the community adapt to this by reclamation of the coastline as business and residential area, due to massive urbanization of Ternate. From here, reaching resilience to climate-related natural disaster is still overlooked by all stakeholders in Ternate. Vulnerability is also not embedded in collective memory of Ternate residents.

Focusing on the institutional capability to address this problem, several research have been conducted to determine empirical indicator

to measure resilience from climate disaster using Climate Disaster Resilience Index.^{16 17 18}

A study also formulates an index of climate disaster resilience in urban area, which consists of physical, social, economy, institutional, and natural indicators. On Institutional indicator, the components are mainstreaming of DRR and CCA, crisis management effectivity, response effectivity to disasters, and institutional collaboration with related stakeholders.¹⁹ However, in this article, we reflect that perception toward climate-related disaster is also a feature and needs to be elaborated beyond indices.

There is a strong linkage between resilience and vulnerability where those two are mutually exclusive. Vulnerability is also related to risks. Risks are defined as a combination of exposure to climate change, hazard, and vulnerability. In addition, climate change is seen as a threat to sustainability of societies and economies.²⁰

The two literatures deliver understanding on the critical emphasis of the climate resilience governance. However, subnational small-islands settings are rarely brought up as a case study. Ternate presents as

¹⁵ Muhammad, A., & Hastuti, H. (2019). The Reducing of Potential Hazard in the Shore Tourism; Ternate City. *IOP Conference Series: Earth and Environmental Science*, 271(1), 1–10. <https://doi.org/10.1088/1755-1315/271/1/012024>

¹⁶ DasGupta, R., & Shaw, R. (2015). An indicator based approach to assess coastal communities' resilience against climate related disasters in Indian Sundarbans. *Journal of Child and Family Studies*, 24(3), 85–101.

<https://doi.org/10.1007/s11852-014-0369-1>

¹⁷ Imani, M., Fakour, H., & Lo, S. L. (2021). Exploring climate disaster resilience: Insight into city and zone levels of southern Taiwan. *Agriculture (Switzerland)*, 11(2), 1–19. <https://doi.org/10.3390/agriculture11020107>

¹⁸ Joerin, J., Shaw, R., Takeuchi, Y., & Krishnamurthy, R. (2014). The adoption of a climate disaster resilience index in Chennai, India. *Disasters*, 38(3), 540–561. <https://doi.org/10.1111/disa.12058>

¹⁹ Wan Mohd Rani, W. N. M., Kamarudin, K. H., Razak, K. A., Che Hasan, R., & Mohamad, Z. (2018). Measuring urban resilience using climate disaster resilience index (CDRI). *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*. <https://doi.org/10.5194/isprs-archives-XLII-4-W9-237-2018>

²⁰ Hay, J. E. (2013). Small island developing states: Coastal systems, global change and sustainability. *Sustainability Science*. <https://doi.org/10.1007/s11625-013-0214-8>

an interesting study since its own disaster magnitude will also affect neighboring district and provinces; despite its feature as an isolated city-island.

Urban context leads the studies on climate resilience. Physical infrastructure resilience, agents (individual, household, and organizations), and institutions are considered the key elements of resilience in urban context²¹ while other survey study in metropolitan urban setting shows that *equity*, *iterative process*, and *environmental factors* are the most important characteristics of resilience²²

This article agrees that urban context is vital to begin analyzing the resilience. However, fragility of each urban area is not addressed where natural disasters are more tangible in active volcanic topography like in Indonesian islands, as the home of the ring of fire. Immature decentralization in Ternate also places Ternate in a transition phase toward political independence in decision making, that still needs to be improved in the long run. The elaboration of our findings related to our arguments is as follows.

a. Policy Approach to Accomplish Climate-Resilience in Ternate

The Ternate Development Agency (BAPPEDA) stated that there are 10 priorities of Ternate City Middle-Range Development Plan (RPJMD)(Perraturan Daerah Kota Ternate no 8 tahun 2016 tentang RPJMD, 2016). One of the priorities refers to the handling of disaster areas, namely by revitalizing disaster areas such as Kalimati (dead river) that is the

track of lava flow. Referring to the geographical consideration itself as an island with active volcano, there are only two evacuation options, namely descending to coastal area in the event of a volcanic eruption and moving to higher terrains when tsunami hits.

However, based on observations in the city of Ternate, there are many signs for evacuation that refer to volcanic eruption (to run to the beach), while in the direction of evacuation for tsunamis and tidal waves are still not available in the field. This is based on the consideration that the activity of Mount Gamalama is more intense than the tsunami disaster, so that more information relating to the volcanic eruption disaster is in highest demand.

A multi-stakeholder initiative had brought together a city-wide assessment in Ternate as a part of Resilient City Program Action Plan. The team, consisting of the USAID, Indonesian Red Cross, American Red Cross, Global Disaster Preparedness Center, International Federation of Red Cross and Red Crescent Societies, and the Ternate Government. The action plan perceives the seawater intrusion as the most threatening disaster. It can affect the provision of clean water and sanitation, as well as declining the quality of the crops.²³

Annually, according to the Head of Ternate Planning Agency, percentage of disaster funds has a dominant portion compared to development of new infrastructure. The components are

²¹ Tyler, S., Nugraha, E., Nguyen, H. K., Nguyen, N. Van, Sari, A. D., Thinpanga, P., Tran, T. T., & Verma, S. S. (2016). Indicators of urban climate resilience: A contextual approach. *Environmental Science and Policy*. <https://doi.org/10.1016/j.envsci.2016.08.004>

²² Meerow, S., & Stults, M. (2016). Comparing conceptualizations of urban climate resilience in theory and practice. *Sustainability (Switzerland)*. <https://doi.org/10.3390/su8070701>

²³ Indonesian Red Cross, & American Red Cross. (2018). *City Wide Assessment Kota Ternate*. <https://www.rerc-resilience-southeastasia.org/wp-content/uploads/2019/01/City-Wide-Asesment-Ternate-Buku-1-Revisi-29Nov2018-JT-Z.pdf>

physical development, procurement of supporting equipment infrastructure, socialization activities to increase communal awareness of disaster prevention culture, and conducting socialization activities with religious clerics, cultural leaders, and other informal networks to disseminate information about environmental sustainability.

b. Institutional Capability

The government of Ternate has main guidelines to adapt to disaster, but there is no distinction of response and legal framework to address climate-related disasters and natural disasters. As an area that has experienced more than 70 eruptions from 1538-2016 following other hydrometeorological disasters, various efforts were made by government of Ternate to cope with the disaster. They issued a policy in the form of Ternate City Regulation No. 10 of 2014 concerning Disaster Management, arranging the standard operating procedure of BPBD related to Ternate City Disaster Emergency Response Command Post, and issued policies in the form of Regional Regulation No. 10 of 2018 concerning Guidelines for Disaster Emergency Response Command.

On mitigation phase, BPBD is the main party that can involve the community, social institutions, business institutions and or international institutions. Based on this definition, the government has three focus, specifically physical development, awareness raising programs or policies, and capacity building to face the threat of disaster.

On preparedness phase, the government is very conflictual. Based on

Regional Regulations of Ternate City Number 10/2014 concerning Disaster Management, preparedness is mentioned as a series of activities carried out to anticipate disasters through organizing as well as through effective and efficient steps.

BPBD stated to us directly that once every five years there is an urgent need to formulate a disaster document. The document is called the Disaster Management Plan Document which contains a risk map, while the document has expired and has not been updated as we verified in July 2019. Even though there is no recent document yet, BPBD still uses the old risk map as a reference in carrying out tasks in the field.

The BPBD essentially has a different position from the award obtained by Ternate as a disaster resilient city. Because in the Regulation of the Head of BNPB already has a concept of resilient villages and villages, which are further divided into three levels, namely lower, intermediate, and main unit.

Through this concept there is actually an effort to make the village or *kelurahan* can be independently prepared in facing disaster problems. While what happened was through funding from American Red Cross that entered through the Indonesian Red Cross as if it crashed into the concept by replacing it at level one city administration.

Nonetheless, even though institutionally it is deemed to have fulfilled as a disaster resilient city, there are still offices that do not know their duties in the context of disaster. One of them is the Office of Communication, Informatics and Coding, which states

that his current task is only to disseminate information from the Ternate City Government. Based on interviews, technical trainings can be seen at least in two agenda, namely, disaster resilient villages and disaster safe schools.

Furthermore, based on information obtained from National Search and Rescue Agency (BASARNAS), the Search and Relief Office in Ternate has a number of ongoing activities. Personnel at BASARNAS are regularly demanded to continue to improve their competence and preparedness in relation to disasters through various types of training and certain performance achievements.

Until 2019, there are 38 permanent officer personnel (consisting of 8 people as administration, 26 people as rescuer and 4 as sailors) and 34 non-permanent personnel (consisting of 13 as rescuer, 9 as sailors, 6 as cleaning service and 6 people as security). Those numbers are considered insufficient to accommodate the extensive administrative area of the BASARNAS Office.

On the other hand, recruitment to join BASARNAS is open every year, but the competency standards achieved may not necessarily met by prospective personnel. Even in recent years up to 2019 there had been a decrease in competency standards to recruit more personnel.

On the response phase, BPBD supervises the ground requires commitment from all parties. BPBD as the command controller actually has great discretion, based on interview from BASARNAS. Even in this phase, many officers are ready to be assigned if

requested. They also have the ability to extend their aid to distribute logistics, supported by the military or from the National Police, usually both of them even offered to take part in the humanitarian tasks.

Aside from the BASARNAS Search and Relief Office, based on information from the Ternate Regional Representative Office Secretariat, the Logistics Depot is built as an extension of the Logistics Affairs Agency served as a logistics provider according to the requests of BPBD. Technically, logistical matters involving BPBD and the depot are structured in the Mayor Regulation. The Department of Environment of Ternate is also ready with all the necessary sustenance, namely in the experience of the previous pyroclastic cloud disaster by preparing an excavator to transport waste.

The recovery phase in accordance with the definition of the Ternate City Government Regulation No. 10 of 2014 concerning Disaster Management is mentioned as a series of activities to restore the conditions of people and the environment affected by the disaster, by re-functioning institutions, infrastructure, and facilities by carrying out rehabilitation efforts. There are three aspects in it including expertise in assessing damage, expertise in removing debris from disasters and skills for disaster relief.

Despite the award given to Ternate for its Disaster Resilient Community Empowerment Programs and Community-based Integrated Risk Management²⁴, Department of

²⁴ *Walikota Dapat Penghargaan dari PMI Pusat.* (n.d.). Retrieved July 27, 2020, from

Information and Informatics Communication of Ternate does not follow other cities that have launched “smart city” program but is on progress to build “smart islands” concept. Before heading to the smart island idea, the Ternate City Government is trying to build a smart government first in the hope of reaching out to public services as an integrated system. It can be interpreted that the developing information system in Ternate City is heading towards an island-based digital information network. However, the network is in a pioneering period so that in daily life the government still uses conventional patterns of information exchange. The process requires a long time and requires increased expertise.

During the fieldwork, there are only signs for volcanic disaster evacuation routes, while there is no logistical transportation and evacuation map for victims in emergency situations. Sultan Baabulah Airport itself turned out to be included in the cold lava flow route, but there were no alternative plans when the airport will be inactive during a disaster. This was conveyed by BPBD because the Department of Transportation had not prepared a plan related to mobilization during the emergency response. Mobilization of fishermen during emergency response events also does not yet have a specific action plan.

Meanwhile, other anomalies are still found in the implementation of the reorganizing of city plan, especially in the Tubo. There are several locations around Tubo that should have been designated as an agricultural area, but

slowly there were residents who started inhabiting the land.

Although it violates the designation, either as an agricultural area or protected forest area; in fact, the local government has no power to sanction these activities. The government was not authorized because the residents felt they had owned the land for a long time before North Maluku, where Ternate is located, was expanded as a new area.

The smallest unit of government in Ternate is *kelurahan*, similar to village unit, only on urban context. Tubo Village is a village that is traversed by lava flows and is very vulnerable to cold lava floods. The flow of volcanic material also often erodes this village land. On the other hand, landslides also occurred several times in this *kelurahan*.

On the other hand, this is a blessing for Tubo residents, because stone and sand material can be mined and sold, and land becomes more fertile for nutmeg, clove, and horticultural plantations. Apart from the region's vulnerability to disasters, campuses such as IAIN and Khairun University also stand in this *kelurahan*.

Tubo Village is also in a red zone of disaster, mainly 300 meters south of Tubo, which is the most vulnerable. When there was lava flow and volcanic material, as many as 62 homes were damaged and there were also casualties that could not be found. Therefore, infrastructure development for disaster resilience is mostly built in this *kelurahan*. A total of one Sabo Dam and one check dam were built by the Community Services Program of Universitas Gadjah Mada (KKN UGM) team to hold volcanic material against crumbling into residential area.

In addition, reinforced concrete slabs were built along 1,571 m to withstand cold lava floods and potential landslides. These concrete slabs project was built by PT Wijaya Karya, and its maintenance was continued by the private sector, PT Arafah Alam Sejahtera. This private sector also developed it in a multiyears project (2007-2009) while also identifying lava pockets and other technical needs. Local government funds are also disbursed to help build disaster infrastructure in Tubo.

Head of Kelurahan Tubo said in the interview that the spatial problems in his village helped to exacerbate vulnerability to disasters. Conversion of agricultural land and forests into housing also adds to the potential for landslides. When explored further, agrarian problems are the initial cause. Many buildings are not in accordance with spatial planning, building permits, and tax object selling values (*nilai jual objek pajak/NJOP*). The developer purchasing power is higher than the local NJOP, of course, damaging the market value. In addition, the development of water, electricity and others does not pay attention to the prevailing spatial plan.

c. Social Capability

When faced against emergencies, community adaptation is the key to reduce vulnerabilities. In regard to the volcanic disaster, permanent or temporary migration is inevitable. However, it is predictable that climate refugee will be occurring in this island in future decades. A study suggested that disaster management stakeholders in Ternate can communicate with similar stakeholders

on nearby islands that have the potential for refugee locations. The final evacuation could be in Tidore Island, Hiri Island, Maitara Island, and Halmahera Island (Sidangoli). Administratively, Hiri Island is part of Ternate City. Tidore and Maitara Islands and a part of Halmahera Island is an integrated fragment of Tidore Islands City. Finally, Sidangoli in Halmahera Island is a part of the administrative area of West Halmahera Regency.

However, our fieldwork observed that random priorities were present among different communities during the crisis. One of the parties affected by the volcano eruption disaster is farmers who occupy pieces of land around the mountain. The condition is recognized by the Department of Agriculture but does not provide cash assistance or overall recovery.

So far, the Agriculture Service of Ternate has always provided seed assistance needed by farmers to be able to plant again. Activities are carried out accompanied by assistants who have previously mapped and identified what needs are needed to then be given assistance. The farmers are the most vulnerable group if climate crisis and volcanic crisis occurs, due to their dependency of land that is impossible to be transported and to be replaced.

Floods that have been occurring so far have been in the form of cold lava floods which are a continuing impact of the post-eruption of the volcano. Landslides that occur are suspected to be a result of the conversion of forest land into horticultural plantations and human settlements that are getting denser and closer to the top of the mountain.

Analysis

As an area that has been dealing with disasters for a long time, it is natural to expect that Ternate will be more prepared than other areas that do not exposed to frequent disasters. However, apart from technicalities, Ternate is still in the phase of “coping” “instead of adapting”.

Adaptation is a thorough mechanism to respond toward changes, particularly refers to process, action, outcome in a multidimensional system of the society. Ternate has the organizational structure to respond, nonetheless, it is not well-functioned. In managing risk, hazard, and opportunities, Ternate is still reactive against climate-relate disaster as it is not treated as an immediate threat.

However, this is not a mere organizational or bureaucratic problem. Approaches to disaster risk reduction and climate adaptation itself share many common conceptualizations. Vulnerability is the main milestone of “adaptation” approach, while “awareness” is focusing on awareness and preparedness. The latter term provides a more localized focus and community-based operationality.²⁵ BPBD Ternate as the leading agency in natural disaster mitigation is observed as a technical and strategic leader for the adaptation but is lacking the comprehension on climate change as a threat to small islands. This position unfortunately could not be overtaken by another agencies at place since it is unlawful and technically impossible.

Drawing to a global context, governance of climate disaster is a complex system in terms of integrating the paradigm. Urban disaster risk management is recommended by many development agencies and financiers, emphasizing that urban area is the key milestone

to economic growth and losses. Non-climate related disaster dominates as the cause of damage in Indonesia, however, there is a trend that climate-related disaster is the growing in the urbanized areas.²⁶ Nevertheless, there are no clear guidelines on how adaptation in sub-national small islands government will be conducted, as they stand as a frontier to detect the early impact of climate change.

As an awarded climate-resilient city, Ternate should be in position to try out several models of preparedness as global agreement on climate change is now proliferated to developing countries as well. Safeguarding the lawmaking process is also central to organizational capacity building, otherwise, innovation by local government will be considered as illegal. Capacity building is a common conceptualization when faced by incapability of government to adapt against changes. In the theoretical basis, providing adequate opportunities for policy changes and innovation in small islands government toward preparedness.

Small islands government only emerges as a tiny unit of political subject; however, these islands are apparently reliant on each other in terms of economy and social mobilization. That makes small islands within a nation as a networked entity particularly in archipelagic country like Indonesia. As domains, small islands sub-national governments are not given much elaboration on literatures on climate change. This is a problematic gap in increasing the national governance capacity in reporting and monitoring in a more localized context.

Measuring climate-vulnerability on small islands needs more highlight of how adaptation will not extend the vulnerability of

²⁵ Thomalla, F., Downing, T., Spanger-Siegfried, E., Han, G., & Rockström, J. (2006). Reducing hazard vulnerability: Towards a common approach between disaster risk reduction and climate adaptation. *Disasters*. <https://doi.org/10.1111/j.1467-9523.2006.00305.x>

²⁶ Stanton-Geddes, Z., & Vun, Y. J. (2019). Strengthening the Disaster Resilience of Indonesian Cities. In *Time to ACT: Realizing Indonesia's Urban Potential*. https://doi.org/10.1596/978-1-4648-1389-4_spotlight1

the community. For instance, when the farmers of Ternate should relocate their farming land, or fishermen being pushed away from their fishing grounds. There are indeed safer neighboring islands but are not conditioned to accept climate refugees. The coordination lines for refugees are only based on other disasters such as volcanic eruption or tsunami. Arranging compensation in small islands government will eventually lead to political bargaining among local governments and social frictions among communities.

Micropolitics in small islands could hinder the progress to socialize climate-related hazard and its mitigation. *Kelurahan* as a governance unit plays vital roles in gathering information and reporting. Nevertheless, it also has a little capability to assess long-time necessity for climate-disaster preparedness. Political decentralization makes vulnerable Ternate more dependent on external assistance since the reliable authority on climate disasters is not present and its assessment of its problems is fragmented. Furthermore, economic aspects are still prioritized due to Ternate's position as a strategic city in North Maluku Province and Eastern Indonesia in general.

Conclusion

Constructing climate change as a threat to human welfare in Ternate is at the intersection with decentralization politics. Decentralization in Eastern Part in Indonesia is knowingly slower compared with other parts of Indonesia. Emulation process in the community and transfer

of authorities is not accompanied with the substantial knowledge and social cohesion. This is a central discussion whether decentralization in small island could accelerate or decelerate the progress of internalizing climate-disaster preparedness.

The fieldwork should be prolonged to gather more assessment from civil society's understanding about the grave threat of climate change to their welfare. In fact, climate change is not widely discussed compared to the community's appeal for infrastructure development and connectivity to other areas in North Maluku. These contending discourses should be addressed well in measuring the vulnerability.

The case of Ternate emphasizes the importance of developing a solid governance model in small islands government, particularly those in the form of provinces or regencies. This study could be replicated in other provinces in Indonesia as well. As a diplomatic modality in international negotiations on climate-disaster preparedness, Indonesia could strengthen this area of research to further represent its interest in designing the future climate governance frameworks that is still highly state-centric in execution.

References

- Betzold, C. (2015). Adapting to climate change in small island developing states. *Climatic Change*. <https://doi.org/10.1007/s10584-015-1408-0>
- DasGupta, R., & Shaw, R. (2015). An indicator based approach to assess coastal communities' resilience against climate related disasters in Indian Sundarbans. *Journal of Child and Family Studies*, 24(3), 85–101. <https://doi.org/10.1007/s11852-014-0369-1>
- Falkner, R. (2017). International climate politics between pluralism and solidarity: An English school perspective. In *Traditions and Trends in Global Environmental Politics: International Relations and the Earth*. <https://doi.org/10.4324/9781315206967>
- Hagedoorn, L. C., Brander, L. M., van Beukering, P. J. H., Dijkstra, H. M., Franco, C., Hughes, L., Gilders, I., & Segal, B. (2019). Community-based adaptation to climate change in small island developing states: an analysis of the role of social capital. *Climate and Development*. <https://doi.org/10.1080/17565529.2018.1562869>
- Hay, J. E. (2013). Small island developing states: Coastal systems, global change and sustainability. *Sustainability Science*. <https://doi.org/10.1007/s11625-013-0214-8>
- Hidayat, A., Marfai, M. A., & Hadmoko, D. S. (2020). Eruption hazard and challenges of volcanic crisis management on a small Island: A case study on Ternate Island - Indonesia. *International Journal of GEOMATE*. <https://doi.org/10.21660/2020.66.ICGeo43>
- Houser, M., Gunderson, R., & Stuart, D. (2019). Farmers' Perceptions of Climate Change in Context: Toward a Political Economy of Relevance. *Sociologia Ruralis*, 59(4), 789–809. <https://doi.org/10.1111/soru.12268>
- Imani, M., Fakour, H., & Lo, S. L. (2021). Exploring climate disaster resilience: Insight into city and zone levels of southern Taiwan. *Agriculture (Switzerland)*, 11(2), 1–19. <https://doi.org/10.3390/agriculture11020107>
- Indonesian Red Cross, & American Red Cross. (2018). *City Wide Assessment Kota Ternate*. <https://www.rcrc-resilience-southeastasia.org/wp-content/uploads/2019/01/City-Wide-Assesment-Ternate-Buku-1-Revisi-29Nov2018-JT-Z.pdf>
- IPCC. (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Summary for Policymakers. In *Climate Change 2014: Impacts, Adaptation and Vulnerability - Contributions of the Working Group II to the Fifth Assessment Report*. <https://doi.org/10.1016/j.renene.2009.11.012>
- Joerin, J., Shaw, R., Takeuchi, Y., & Krishnamurthy, R. (2014). The adoption of a climate disaster resilience index in Chennai, India. *Disasters*, 38(3), 540–561. <https://doi.org/10.1111/disa.12058>
- Kalafatis, S. E. (2018). Comparing Climate Change Policy Adoption and Its Extension across Areas of City Policymaking. *Policy Studies Journal*, 46(3), 700–719. <https://doi.org/10.1111/psj.12206>
- Lavell, A., Oppenheimer, M., Diop, C., Hess, J., Lempert, R., Li, J., Muir-Wood, R., Myeong, S., Moser, S., Takeuchi, K., Cardona, O. D., Hallegatte, S., Lemos, M., Little, C., Lotsch, A., & Weber, E. (2012). Climate change: New dimensions in disaster risk, exposure, vulnerability, and resilience. In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*. <https://doi.org/10.1017/CBO9781139177245.004>
- Meerow, S., & Stults, M. (2016). Comparing conceptualizations of urban climate resilience in theory and practice. *Sustainability (Switzerland)*. <https://doi.org/10.3390/su8070701>
- Mortreux, C., & Barnett, J. (2009). Climate change, migration and adaptation in Funafuti, Tuvalu. *Global Environmental Change*. <https://doi.org/10.1016/j.gloenvcha.2008.09.006>
- Muhammad, A., & Hastuti, H. (2019). The

- Reducing of Potential Hazard in the Shore Tourism; Ternate City. *IOP Conference Series: Earth and Environmental Science*, 271(1), 1–10. <https://doi.org/10.1088/1755-1315/271/1/012024>
- O'Brien, K. L., & Wolf, J. (2010). A values-based approach to vulnerability and adaptation to climate change. *Wiley Interdisciplinary Reviews: Climate Change*, 1(2), 232–242. <https://doi.org/10.1002/wcc.30>
- Pelling, M. (2010). Adaptation to climate change: From resilience to transformation. In *Adaptation to Climate Change: From Resilience to Transformation*. <https://doi.org/10.4324/9780203889046>
- Stanton-Geddes, Z., & Vun, Y. J. (2019). Strengthening the Disaster Resilience of Indonesian Cities. In *Time to ACT: Realizing Indonesia's Urban Potential*. https://doi.org/10.1596/978-1-4648-1389-4_spotlight1
- Perraturan Daerah Kota Ternate no 8 tahun 2016 tentang RPJMD, Mayor of Ternate (2016). https://id.wikipedia.org/wiki/Kota_Ternate
- Thomalla, F., Downing, T., Spanger-Siegfried, E., Han, G., & Rockström, J. (2006). Reducing hazard vulnerability: Towards a common approach between disaster risk reduction and climate adaptation. *Disasters*. <https://doi.org/10.1111/j.1467-9523.2006.00305.x>
- Tyler, S., Nugraha, E., Nguyen, H. K., Nguyen, N. Van, Sari, A. D., Thinpanga, P., Tran, T. T., & Verma, S. S. (2016). Indicators of urban climate resilience: A contextual approach. *Environmental Science and Policy*. <https://doi.org/10.1016/j.envsci.2016.08.004>
- Walch, C. (2019). Adaptive governance in the developing world: disaster risk reduction in the State of Odisha, India. *Climate and Development*. <https://doi.org/10.1080/17565529.2018.1442794>
- Walikota Dapat Penghargaan dari PMI Pusat. (n.d.). Retrieved July 27, 2020, from <https://ternatekota.go.id/news/walikota-dapat-penghargaan-dari-pmi-pusat>
- Wan Mohd Rani, W. N. M., Kamarudin, K. H., Razak, K. A., Che Hasan, R., & Mohamad, Z. (2018). Measuring urban resilience using climate disaster resilience index (CDRI). *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*. <https://doi.org/10.5194/isprs-archives-XLII-4-W9-237-2018>
- Wanner, M. S. T. (2021). The effectiveness of soft law in international environmental regimes: participation and compliance in the Hyogo Framework for Action. *International Environmental Agreements: Politics, Law and Economics*, 21(1), 113–132. <https://doi.org/10.1007/s10784-020-09490-8>
- Yeganeh, A. J., McCoy, A. P., & Schenk, T. (2020). Determinants of climate change policy adoption: A meta-analysis. *Urban Climate*, 31(October 2019), 100547. <https://doi.org/10.1016/j.uclim.2019.100547>

Other References

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