

COPING WITH CLIMATE CHANGE: STRATEGIES FROM THE BOTTOM LEVELS

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Abstract

Climate change related issues have been discussed publicly in recent decades. Numerous international agreements have been signed yet the impacts have become more apparent. Some researchers argue that international treaties or agreements do not work effectively. These agreements do not resolve from the roots. The Paris Agreement requires all parties to create Nationally Determined Contributions (NDC) to reduce carbon emissions. Indonesia, as one of the parties, submitted the Enhanced NDC to the UNFCCC Secretariat in 2022 with an increased target at 31.89% unconditionally and at 43.20% conditionally. Drawing on doctrinal legal research, it analyses international, national, and local climate-related regulations and finds that Indonesia governs climate change through a fragmented set of statutes and presidential regulations, lacks a single unified climate law, and relies on decentralisation in place of an explicit multi-level governance framework. herefore, this research argues that local government plays a pivotal role in coping with climate change impacts. The article proceeds in three parts: it examines the regionally differentiated impacts of climate change in Indonesia, evaluates the existing regulatory framework, and assesses the extent to which local governments can—and legally should—shape climate mitigation and adaptation strategies.

INTRODUCTION

Climate change has developed significantly raising a critical question of how a national government mitigate and adapt with its institutional frameworks. The warning

has been discussed from hundred years ago (Thompson, 2019). Natural phenomenon added by human activities in particular started during the industrial revolution is believed to cause earth temperature to warm fast (NASA, 2024). Numerous articles have been published showing the evidence of global warming that causes changes in our climate which were even predicted a long time ago by scientists. Furthermore, recent studies also found that our climate has gotten warmer faster than previous decades (Lindsey Rebecca & Dahlman Luann, 2024). For instance, more than two decades ago, N.W. Arnell predicted some regions would experience drought such as southern Europe, north and southern Africa and central Asia (Arnell, 1999). The Intergovernmental Planet on Climate Change (Intergovernmental Panel on Climate Change (IPCC)) also states that “as a result of global warming, the type, frequency and intensity of extreme events, such as tropical cyclones (including hurricanes and typhoons), floods, droughts and heavy precipitation events, are expected to rise even with relatively small temperature increases (Unfccc, 2006)”

Having ratified the United Nations Framework Convention on Climate Change and the Paris Agreement, Indonesia has bound itself to progressively more ambitious Nationally Determined Contributions (NDCs), submitting an Enhanced NDC to the UNFCCC in 2022 with an unconditional reduction target of 31.89% and a conditional target of 43.20% (Menlhk, 2022). Yet the legal framework through which these national commitments are to be delivered remains absent on the role, authority, and obligations of the local governments that must ultimately implement them. The absent indicates the particular institutional contradiction that this article sets out to analyse. Indonesia's climate obligations are framed, negotiated, and reported at the national level, and its NDC makes no provision for the contribution of regional or local government. At the same time, the country governs itself through decentralisation where regional governments hold the legal right, authority, and obligation to regulate and manage their own actions. The consequence is a doctrinal gap: the actors legally closest to climate impacts, and best placed to design context-specific adaptation, are neither assigned clear competence over climate action nor integrated into the national framework through a multi-level governance (MLG) arrangement. This gap is widened by the fact that Indonesia regulates climate change through a dispersed body of statutes and presidential regulations rather than a single, unified climate law, leaving responsibility fragmented and accountability diffuse (Syaharani, Difa Shafira, & Grita Anindarini Widyaningsih, 2023).

Accordingly, this article reframes Indonesia's climate challenge as a problem of legal governance rather than of general policy. It argues that local governments are indispensable legal actors in achieving national climate targets in the absence of an umbrella climate law and an explicit multi-level governance framework. This research is divided into three parts. Firstly, it examines how the impacts of climate change vary across Indonesia's regions, establishing the empirical basis for differentiated local responses. Secondly, this article analyses the existing international, national, and local regulatory framework in order to identify where legal authority for climate action is, and is not, allocated. Lastly, it assesses the extent to which local governments can influence

mitigation and adaptation strategies, and what legal reform is required to enable them to do so.

Literature Review

Climate change has evolved into one of the most complex governance challenges of the twenty-first century, transcending traditional environmental boundaries and entering the domains of law, policy, and institutional design. Contemporary scholarship increasingly frames climate change not merely as a scientific or ecological issue but as a governance problem shaped by fragmented authority, uneven capacity, and competing policy priorities across multiple levels of decision-making (von Homeyer, Oberthür, & Jordan, 2021). This shift in perspective is particularly relevant for countries such as Indonesia, where legal pluralism, decentralization, and geographical diversity complicate the implementation of climate commitments.

At the global level, the architecture of climate governance has undergone significant transformation, especially following the adoption of the Paris Agreement. Unlike earlier regimes that relied on top-down legally binding targets, the Paris Agreement introduced a more flexible, bottom-up approach through Nationally Determined Contributions (NDCs) (Falkner, 2021). While this model enhances political feasibility and inclusivity, it simultaneously creates variability in ambition and enforcement. The success of this framework depends largely on domestic institutional arrangements rather than international compliance mechanisms (Prniyazova, Turaeva, Turgunov, & Jarihani, 2025). Consequently, the effectiveness of global climate governance is intrinsically linked to national and subnational implementation capacities.

This observation has led scholars to emphasize the importance of polycentric and multi-level governance (MLG) systems. Polycentric governance refers to the existence of multiple centers of authority operating at different scales, often interacting in both cooperative and competitive ways (Betsill, 2021). In the climate context, this includes international organizations, national governments, regional authorities, and local municipalities. Research indicates that such systems can enhance flexibility, innovation, and responsiveness, particularly when dealing with context-specific climate risks (von Homeyer et al., 2021). However, polycentric systems also introduce coordination challenges, policy fragmentation, and potential conflicts between levels of government.

Within this governance landscape, local governments have emerged as critical actors in climate mitigation and adaptation. Unlike national governments, which often operate at an abstract policy level, local authorities are directly confronted with the tangible impacts of climate change, such as flooding, droughts, and urban heat stress. Bulkeley highlights that cities and municipalities are increasingly becoming sites of climate experimentation, where innovative policies and practices are developed and tested (Paterson, Bulkeley, Newell, & VanDeveer, 2026). These include urban resilience planning, sustainable land-use regulation, and community-based adaptation initiatives.

The relevance of local governance is even more pronounced in developing countries, where national-level policies may not adequately reflect local realities. In Indonesia, for instance, the impacts of climate change vary significantly across regions due to differences in geography, socio-economic conditions, and environmental vulnerability as also reflected in your manuscript's discussion on coastal versus mountainous areas. This spatial heterogeneity necessitates localized responses that cannot be effectively designed or implemented through centralized approaches alone. However, decentralization while offering opportunities for localized governance also presents significant challenges. Kuzemko et.al also note that decentralized systems can lead to institutional fragmentation and uneven policy implementation, particularly when local governments lack financial resources or technical expertise (Kuzemko et al., 2025). In Indonesia, this issue is compounded by disparities between regions, where some local governments possess relatively advanced administrative capacities while others struggle with basic governance functions. As a result, climate policies often remain unevenly implemented across jurisdictions.

In addition to governance structure, the role of legal frameworks is central to the effectiveness of climate action. Recent studies emphasize that climate laws are most impactful when they establish clear institutional responsibilities, monitoring mechanisms, and enforcement tools (Averchenkova, Fankhauser, & Finnegan, 2021). Yet, many developing countries including Indonesia tend to have fragmented regulatory landscapes, where climate-related provisions are dispersed across multiple legal instruments without a unified framework. This fragmentation reduces policy coherence and weakens accountability, a concern that aligns closely with the findings in your article regarding the absence of a single comprehensive climate law. Moreover, the literature highlights the growing importance of climate litigation and legal accountability as tools for enforcing climate commitments (Setzer et al., 2022). Document a global rise in climate-related litigation, where courts are increasingly used to hold governments accountable for inadequate climate action. Although such developments are more prominent in developed countries, they signal a broader trend toward legalizing climate governance. In contrast, Indonesia has seen limited use of litigation in climate governance, reflecting both legal and socio-political constraints (Setzer et al., 2022).

Another important dimension concerns the distinction between top-down and bottom-up approaches to climate governance. Top-down approaches typically involve national-level policies imposed on local jurisdictions, ensuring consistency and alignment with international commitments. However, these approaches often fail to capture local complexities. Bottom-up approaches, on the other hand, prioritize community participation, local knowledge, and adaptive learning processes (Sovacool et al., 2020). Empirical evidence suggests that bottom-up strategies are more effective in fostering long-term resilience, particularly in communities with strong social capital and local institutional networks (Giffin, Brown, Nalau, Mackey, & Connolly, 2021).

In the Indonesian context, the relevance of bottom up governance is reinforced by sociocultural diversity and local knowledge systems. Climate adaptation strategies that incorporate indigenous practices and community-based resource management have been shown to enhance both effectiveness and legitimacy (Lestari, 2024). This supports the argument advanced in your study that local governments should not merely act as implementers of national policy but as active agents in designing climate solutions. Furthermore, recent research underscores the importance of integrating climate policy with development planning. Climate change is deeply interconnected with issues such as poverty, inequality, and economic development. Dupont (2020) argue that policy integration is essential to avoid contradictions between climate objectives and development goals. In Indonesia, this integration is particularly relevant given the country's ongoing development agenda and reliance on natural resources. Failure to align climate policy with development planning may result in maladaptation or unintended socio-economic consequences.

The concept of climate vulnerability and adaptive capacity also plays a crucial role in understanding local governance dynamics. Vulnerability is shaped by exposure, sensitivity, and adaptive capacity, all of which vary across regions (Zhai & Lee, 2024). In coastal areas of Indonesia, for example, sea-level rise poses existential risks, while inland regions may face different challenges such as drought or deforestation. These variations reinforce the need for differentiated policy responses tailored to local conditions.

The literature situates this legal-institutional question within broader debates on adaptation. Bottom-up, stakeholder-centred approaches that draw on community participation, local knowledge, and indigenous practice are associated with greater long-term resilience and legitimacy, particularly where social capital and local institutions are strong (Giffin et al., 2021; Lestari, 2024; Sovacool et al., 2020). Because vulnerability and adaptive capacity vary sharply across Indonesia's coastal, urban, and inland regions (Zhai & Lee, 2024), and because climate objectives are entangled with development, poverty, and inequality, scholars stress the need to integrate climate policy with development planning in order to avoid maladaptation (Dupont et al., 2020). These considerations reinforce rather than displace the central legal argument: realising context-sensitive adaptation requires that local governments be vested with clear and accountable legal competence.

Overall, the literature reveals a consistent pattern: while global climate governance provides a necessary framework, its effectiveness ultimately depends on local implementation. Multi-level governance systems offer both opportunities and challenges, requiring careful coordination and capacity-building. Local governments, despite their limitations, are indispensable actors in translating climate commitments into concrete actions. These insights form the conceptual foundation for this research, which seeks to examine how local governments in Indonesia can play a more effective role in addressing climate change through both mitigation and adaptation strategies.

RESEARCH METHOD

This research employs a doctrinal or normative legal research method, which treats law as a coherent system of norms and examines the statutes, regulations, principles, and doctrines that govern a particular problem. Its object is twofold: to identify and systematise the law as it currently stands (*ius constitutum*) on climate change mitigation and adaptation in Indonesia, and to expose the normative gap between the law as it ought to be (*das sollen*) and the law as it operates in practice (*das sein*). Consistent with this approach, the study does not generate empirical data but analyses authoritative legal materials in order to evaluate how legal authority and accountability for climate action are allocated across levels of government.

Three legal approaches are employed in combination. First, a statute approach is used to examine the relevant international instruments, the 1945 Constitution, and the body of national legislation and subordinate regulations governing climate change, with particular attention to their hierarchy and internal consistency. Second, a conceptual approach draws on doctrines developed in climate-law and governance scholarship notably multi-level and polycentric governance, decentralisation, legal competence, and accountability to construct the analytical lens through which the regulatory framework is assessed. Third, a comparative approach is applied in two registers: comparing the differentiated regional impacts of climate change, and contrasting Indonesia's regulatory and accountability arrangements with another jurisdiction, drawing on the Pakistani experience.

The analysis proceeds through qualitative juridical reasoning. The norms are first arranged according to the hierarchy of legal instruments, and apparent conflicts are reconciled by reference to the established *maxims lex superior derogat legi inferiori, lex specialis derogat legi generali, and lex posterior derogat legi priori*. The provisions are then construed using recognised methods of statutory interpretation.

RESULTS AND ANALYSIS

Different Regions, Different Impacts

Climate change has direct and indirect impacts on the environment and humans (Butler, 2018). It has exacerbated the impacts of natural disasters such as severe droughts and heavy rainfall (Abbass et al., 1971). What is more, not only the impact on the environment and human but climate change also has knock-on effects on other sectors on economic, social and health (De Sario, Katsouyanni, & Michelozzi, 2013).

Climate change shows common impacts globally and locally such as uncertain weather patterns, the loss of ice sheets, extreme heats and cold of Global Warming. The most threatening impact according to some scholars is the sea-level rise (Hauer et al., 2020).

"In recent decades, more locations across are facing an increased number of heavy precipitation events, but with regional variations" (Pradhan, Seydewitz, Zhou, Lüdeke, & Kropp, 2022).

In the USA for example, there are different patterns that can be clearly seen in some states. To illustrate, people in the Pacific Northwest states have experienced intense wildfires in recent years (Halofsky, Peterson, & Harvey, 2020), while people in Florida experience high tides (Risa & Toby, 2020). Prajal Pradhan et al studied climate extremes in Europe. They stated that extreme weather events occur more frequently and occur at the same period. Hotspots such as some of Western European countries and the Mediterranean region experienced a hiked number of several climate extremes. Whilst, in Eastern and Northern Europe the number of multiple climate extremes decreased or called coldspots. Sahara and West Southern Africa are projected to warm faster than any other regions in Africa (Iyakaremye et al., 2021). Whilst, extreme rainfall occurred in East Africa in 2019-2020 affected society, economic, infrastructures and loss of lives (Wainwright, Finney, Kilavi, Black, & Marsham, 2021).

Indonesia is an archipelagic country with more than 17,000 islands located at the equator line stretching from west to east making it the third longest coastal state (Cabinet Secretariat of The Republic of Indonesia, 2022). Because of geographical circumstances and archipelagic features, Indonesia is prone to natural disasters and sea level rise is a direct threat (Gaborit, 2022). Karlina Triana and A'an J. Wahyudi assert that

"On the non-climatic and geological theory, the uniqueness of the tectonic setting in Indonesia will create spatial variation in regional sea levels both as static and dynamic changes in a long period of time" (Triana & Wahyudi, 2020).

According to data, Indonesia has lost its 24 little islands (Idris, Chang, Prihandono, & Rasidi, 2024) due to the rising sea level which increases 2.5 mm every year; and it will create security, social, economic and more knock-on-effects. In addition to that, Indonesia has many active volcanoes which create periodic earthquakes and eruptions (Statista, 2023). As a result, Indonesia has a high number of tsunamis, floods, landslides, drought, and forest fires (Colozza et al., 2025). These natural phenomena make Indonesia even more vulnerable to climate change impacts.

Mariah Measey states that

"climate change in Indonesia not only has implications for the country's environment, it also immensely affects its people and development" (Measey, 2010).

This phenomenon has not started in the last ten years but even before. It was reported in 2007 that Indonesian farmers experienced changes in their harvest because of the irregular weather and they were never educated about climate change and global warming (BBC News, 2007).

Much research has been published regarding the impacts of climate change in Indonesia. This research argues that climate change has different effects in each area

from urban to rural and even among the same level areas have different consequences. To illustrate, Yadi Suryadi et.al compares the impacts of climate change in three urban areas: Medan, Palembang and Semarang. The results of their research show that these three cities have various rainfall patterns (Suryadi, Sugianto, & Hadiyanto, 2018).

These regional disparities are not merely geographical; they raise a question of climate justice. The communities most exposed to climate harm in Indonesia—small-island and coastal populations facing inundation, and subsistence farmers whose harvests depend on increasingly erratic weather are typically those least responsible for emissions and least equipped, financially and institutionally, to adapt. Distributive justice is therefore engaged: the burdens of a changing climate fall disproportionately on the politically and economically marginal, while the legal and fiscal capacity to respond is concentrated at the centre and in better-resourced regions. Procedural justice is equally implicated, since affected communities have limited formal avenues to participate in, or to hold authorities accountable for, the decisions that determine their exposure. Read through this lens, the differentiated impacts documented above are not only an empirical premise for localised policy but a normative claim: a climate-governance framework that fails to allocate competence and resources to the worst-affected localities risks entrenching, rather than redressing, existing inequalities (Lau, Gurney, & Cinner, 2021; Markkanen & Anger-Kraavi, 2019a)

International, National, and Local Climate-Related Regulations

Historically, environmental related issues were discussed globally in the Stockholm Conference 1972 (Jackson, 2007). In terms of political discourse around climate change, Joyeeta Gupta addresses the trends in 30 years from pre 1990 to the post 2008 (Gupta, 2010). Gupta argues that even though climate change-related issues remain within the global agenda, the global agreement was hard to reach. For example, alternative energy which is believed could reduce global warming, is likely to lead to a new issue. In 1988, the United Nations Environment Programme established the IPCC to

“provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options” (Venturini, De Pryck, & Ackland, 2023).

Decades later for the first time, almost all the global leaders agreed to sign a legally binding agreement, the Paris Agreement, to mitigate and adapt to climate change. The goal of the Paris Agreement is to hold global average temperatures below 2 degree celsius and *“to limit the temperature to 1.5 degree celsius by the end of the century”* (Horowitz, 2016). On the other hand, the two powerful countries as well as the two biggest polluters, the USA and China, were absent in COP28 in 2023 which made international communities doubt the global commitment (Maizland, 2023).

Two main reasons why international environmental law is considered to fail to implement: lack of ability and motivation; and the absence of international susceptible enforcement instruments (Kilduff, 2019). For these reasons, in 1992 the notion of the

roles of national law were mentioned in the Rio Declaration and Agenda 21, and have been developed through years (Neij & Heiskanen, 2021).

Indonesia has ratified climate change-related conventions which have been codified into national laws and other related regulations have been created as responses to climate change, as follows:

1. Law No 16 of 2016 concerning the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change.
2. Law No 31 of 2009 concerning Meteorology, Climatology, and Geophysics.
3. Law No 32 of 2009 concerning Environmental Protection and Management
4. Law No 24 of 2007 concerning Disaster Management.
5. Law No 6 of 1994 on the Ratification of the United Nations Framework Convention on Climate Change.
6. Government Regulation No 21 of 2008 concerning Disaster Management.
7. Presidential Regulation No 98 of 2021 concerning the Government Commitment to Reduce Greenhouse Gasses.
8. Presidential Regulation No 61 of 2011 concerning the National Action Plan for Reducing Greenhouse Gas Emissions.
9. Presidential Regulation No 33 of 2005 on the Ratification of the Beijing Amendment to the Montreal Protocol on Substance that Deplete the Ozone Layer.

Furthermore, the Indonesian 1945 Constitution addresses the environmentally related issues, such as the rights to get a good and healthy environment in the Article 28H (1) and environment-based development in the Article 33 (4). Climate change is governed in several national laws. Mitigation and adaptation is specifically regulated in the Law No 31 of 2009 concerning Meteorology, Climatology, and Geophysics.

In addition to those laws, the Indonesian government has included climate change issues into the Medium-Term National Development Strategy or *Rencana Pembangunan Jangka Menengah Nasional 2020-2024* and reinforced in 2025-2029; and created the National Action Plan to Reduce Green House Gas or *Rencana Aksi Nasional Gas Rumah Kaca* (RAN-GRK) through the Presidential Decree 61 of 2011 concerning the National Action Plan to Reduce GHG Emissions (Haryanto, 2015). Next, Indonesia has the National Action Plan for Climate Change or *Rencana Aksi Nasional Adaptasi Perubahan Iklim*. In 2021, Indonesia submitted its Nationally Determined Contribution (NDC) as part of the commitment to the Paris Agreement. In its latest NDC, Indonesia strengthens its mitigation and adaptation strategies to reflect the Paris Agreement Rule Book (Katowice Package). Along with the NDC, Indonesia submitted a Long-Term Strategy on Low Carbon and Climate Resilient Development 2050 (LTS-LCCR 2050).

Despite the quite extensive numbers of international and national regulations, Indonesia has not succeeded to reach its target (Robby Irfany Maqoma, 2022; Climate Action Tracker, 2021). According to the World Research Institute, Indonesia is still one of the ten biggest polluting countries (Johannes Friedrich, 2023). The Indonesian government has failed to implement its international obligation and Indonesian people are not likely to sue the government or bring the case to the court. Contrary to Indonesia, in Pakistan, in *Leghari v. Federation of Pakistan*, (Nurhidayah, Davies, Alam, Saintilan, & Triyanti, 2022a), a group of farmers brought a case against the Pakistani Government for its failure to implement adaptation means in the National Climate Change Policy of 2012 and the Framework for Implementation of Climate Change Policy of 2014-2030.

What is more, the implementation of national laws at local levels has similar experiences with the implementation of international laws at national levels. For instance, Laely Nurhidayah et al argue that after examining the implementation of national regulation at local levels in Semarang and Demak, the complexity of the Indonesian Government system hinders the implementation of national regulations at the local level. Similar to that Leanne Giordono et al assert that local governments are part of the national government which has a complex system of government districts. Accordingly, some activities have to be coordinated with state or federal authorities, but not all events will be accepted (Giordono, Gard-Murray, & Boudet, 2021a).

In addition, even the Indonesian government has created Presidential Regulation No 98 of 2021 concerning the Government Commitment to Reduce Greenhouse Gasses, but this regulation does not govern adaptation. As a result, mitigation measures are compulsory to conduct at national and local levels pursuant to the Regulation of Ministry Home Affairs No 17 of 2021. Another issue is that Indonesia has not implemented multi-level governance (MLG) as mandated by IPCC. Instead, Indonesia still employs decentralisation which in practice limits local government's participation and authorities in international politics. Subsequently, Syaharani et al suggest that Indonesia has to have an umbrella law for climate change issues (Syaharani et al., 2023). They further argue that three major factors on why climate change legislation is critical. First, a legislation can provide a grant and long-term policy design. Second, legislation can tackle poly-centric matters comprehensively. Last, legislation is the most appropriate instrument for compliance and enforcement mechanisms.

The foregoing inventory reveals a regulatory landscape that is abundant in instruments yet weak in legal effectiveness. Three failures are analytically distinct. First, there is an enforcement gap: most climate-relevant obligations are cast as planning and programmatic commitments such as the RAN-GRK and the successive NDCs rather than as justiciable legal duties owed to identifiable beneficiaries, so that non-attainment carries no legal consequence. Second, there is an institutional contradiction at the core of the framework. Presidential Regulation No. 98 of 2021 makes mitigation compulsory for national and subnational authorities, while adaptation—the dimension most acutely experienced at the local level—is left substantially ungoverned; the framework thus

mandates action where local capacity is weakest and remains silent where local knowledge is most needed. Third, the persistence of decentralisation in place of the multi-level governance arrangement contemplated by the IPCC leaves the vertical allocation of climate competence unsettled, allowing responsibility to be disclaimed at every tier (Giordono, Gard-Murray, & Boudet, 2021b; Nurhidayah, Davies, Alam, Saintilan, & Triyanti, 2022b).

The Critical Roles of Local Government

In light of the aforementioned laws, the Indonesian government still struggles to minimise the impacts of climate change or reduce their carbon footprint target (CNN Indonesia, 2021; Robby Irfany Maqoma, 2024). Through the Ministry of Environment and Forestry Regulation P.18/MENHLHK-II/2015 on the Organization and Work Procedures of the Ministry of Environment and Forestry, the Indonesian government has added the Directorate General of Climate Change Control or *Direktorat Jenderal Pengendalian Perubahan Iklim* (DJPPi) to act as the National Focal Point in climate change mitigation. However, climate change is a complex issue to face. This part elaborates on the importance of local government to tackle climate change. Two approaches are proposed to combat the impacts of climate change: bottom-up and top-down approaches. Some research compares top-down approach and bottom-up approach in several regions. The top-down approach is a national program implemented at the local levels (Eicken et al., 2021). Meanwhile, the bottom-up approach, also referred to as the stakeholder-centered approach, prioritizes local participation in determining climate priorities and responses (Setiawati et al., 2023a). Meanwhile, the bottom-up approach or stakeholder-centered approach is where the priorities are implemented at the local level (Setiawati et al., 2023b). These two have strengths and weaknesses. Meanwhile, Abigail M. York et al demonstrate that both bottom-up and top-down approaches are required to combat the challenges of climate change (York, Drummond Otten, BurnSilver, Neuberg, & Anderies, 2021).

The advantage of the top-down approach is a consistent framework creation which can be used to predict future impacts (Aaheim, Orlov, & Sillmann, 2022). On the other hand, despite the criticism of the Law No 22 of 1999 concerning Regional Government, Indonesia started practicing decentralisation. Eventually, it is suggested that a bottom-up approach will be suitable for Indonesia for several reasons.

First, as it is previously discussed in the beginning of this research, Indonesia is a big country that covers mountainous and sea areas with a complex typology of climate (Naylor, Battisti, Vimont, Falcon, & Burke, 2007). Alwafi Ridho Subarkah states that the closer an authority is to the affected areas, the issues will be more effectively addressed (Alwafi Ridho Subarkah, 2023). To illustrate, Martiwi Diah Setiawati et al conducted a study on Bintan Island. Their research found that Bintan Island is vulnerable to extreme weather events dominated by climate hazards. In response to those disasters, the local government has created a 2021-2026 regional development plan document which puts more focus on mitigation measures. Furthermore, urban areas and rural areas are

impacted differently by climate change as well. For example, land use conflicts in urban areas tend to center on infrastructure expansion and spatial planning, while in rural areas unsustainable land use practices and agricultural expansion are significant drivers of deforestation, both of which contribute to global warming and climate change. To add, besides the geographic and regional characteristics of Indonesia that is expansive, the cultural characteristic is also diverse. As a multicultural country, Indonesia has around 700 local languages (Language Studies Indonesia, 2022) and 500 diverse ethnic groups. This sociocultural diversity means that climate change impacts are experienced differently across communities, with varying levels of awareness, adaptive capacity, and traditional ecological knowledge. Consequently, broader aspects such as sociological, cultural, and even moral dimensions are important to consider when designing climate change responses. If these aspects are not included in the climate change policies, they are likely to increase inequalities (Lau, Song, et al., 2021; Markkanen & Anger-Kraavi, 2019b).

The second issue is time. It is argued that climate change occurs everywhere across the world, therefore, it is required international cooperations and strategies to respond to the issues. However, reaching an international agreement requires so much time and commitment that it is often hard for the global leaders to contest (Jørgensen, Jogesh, & Mishra, 2015). Thus, attention shifts to perform climate agenda at the lower levels of government. IPCC addresses governmental approaches to face climate change-related issues, emphasizing that effective responses require coordinated action across multiple levels of governance (Jørgensen, Jogesh, & Mishra, 2015). Moreover, the Sustainable Development Goals (SDGs) — to which global leaders have committed — are grounded in the principle of *“No One Left Behind,”* which means that achieving global targets requires meaningful contributions from every level of governance, including local governments and individuals.

Third, Indonesia practices regional autonomy. In the article 1 (C) of the Law Number 5 of 1974 concerning Principles of Government in the Regions — which has since been superseded by Law No. 23 of 2014 on Regional Government, as amended by Law No. 9 of 2015 — states that

“Regional Autonomy is the right, authority and obligation of the Region to regulate and manage its own household in accordance with the applicable laws and regulations.”

The current framework under Law No. 23 of 2014 retains this principle while further elaborating the distribution of authority between the central and regional governments. Dadang Hilman (2009) proposes a top-down approach to mitigate climate change’s impacts in Indonesia. Hilman suggests from the administrative law perspective that due to the complex nature of the issue, a multi-layer approach has to be applied. In Lena Neij and Eva (2021), Heiskanen asserts that “sufficient autonomy has also enabled cities to adapt climate responses to local contexts and conditions. Pascaline Gaborit

(2022) examined government adaptation and mitigation strategies in ten cities in Indonesia. Gaborit contends that each city has different needs and priorities.

Notwithstanding the strong suggestions to conduct climate change mitigation and adaptation strategies at the local level, these approaches have some challenges. First, the individual capacities of each local region in terms of its finance, technologies, and understanding vary. Gaborit suggests that

“local governments play a key role in terms of climate adaptation and cities, yet have limited financial capacities.”

As a consequence of decentralisation practices in Indonesia, cities have to find the best and appropriate mechanisms to create mitigation and adaptation programs according to their needs.

Furthermore, the absence of climate change law is also an issue. Even though Indonesia has enacted Law No 31 of 2009 concerning Meteorology, Climatology and Geophysics; and Law No 32 of 2009 concerning Protection and Management to respond to the climate change, it is aforementioned that Indonesia still does not enact yet a specific law (*lex specialis*) on climate change that can govern the issues comprehensively and holistically, and the climate change-related regulations are still dispersed in numerous laws.

Next, pragmatic circumstances. To illustrate, uncontrolled urbanisation in Indonesia can create disaster and climate vulnerability. Urbanisation is closely related to high land use demand and land use change. Land use and ownership and spatial planning regulations is mostly governed at the national level which are based on forests, ecosystems, and natural buffers to climate disaster protection. In contrast, such policies are hardly implemented due to economic capacities, urbanisation demand, and industrial needs. In addition, large-scale development policies such as the construction of the new capital city (*Ibu Kota Nusantara/IKN*) and the food estate program have driven widespread land clearing and deforestation, further exacerbating Indonesia's greenhouse gas emissions and complicating climate adaptation at the local level. Thus, climate adaptation mechanisms are hardly to be implemented by the local authorities.

Accordingly, to anticipate the challenges, local government scan build partnerships with international networks. For instance, regional or provincial governments can join the “Under2 Coalition” program which facilitates provinces and states cooperation to reduce emissions and achieve better climate agreements. Provincial governments are allowed to broaden their networks and cooperation. In addition, every province has to create *Rencana Aksi Daerah* (RAD) or Regional Action Plan. RAD is a mandatory document which contains the programs and activities of the five-year Regional Government SDGs work plan.

Put in another way, the Minister of Environment and Forestry (LHK) Siti Nurbaya Bakar stated in the event entitled 'Virtual Ministerial Dialogue with Local and Regional Governments Strengthening Coordination to Implement the Paris Agreement:'

Taken together, the local-government provisions expose a deeper institutional contradiction. The legal order simultaneously proclaims regional autonomy—vesting regions with the right and obligation to manage their own affairs under Law No. 23 of 2014—and withholds the substantive climate competence, fiscal capacity, and adaptation mandate that would make that autonomy meaningful for climate action. Local governments are therefore charged with delivering outcomes they are neither legally empowered nor resourced to secure, a mismatch the empirical record bears out. The Bintan Island study is illustrative: confronted with acute climate hazards, the local government could do little more than fold mitigation language into a medium-term development plan, lacking both a dedicated legal mandate and the means to implement adaptation (Setiawati et al., 2023a). Voluntary expedients such as the Under2 Coalition and the mandatory Regional Action Plans (RAD) partially fill the vacuum, but they substitute discretionary networking and planning documents for enforceable legal duties.

This is ultimately a climate-justice deficit as much as a governance one. Because vulnerability is unevenly distributed across Indonesia's regions, a framework that leaves the worst-affected and least-resourced localities to self-finance adaptation, without enforceable claims on national support, allocates the heaviest burdens to those least able to bear them. The corrective is legal rather than merely administrative: an umbrella climate statute that (i) confers explicit mitigation and adaptation competence on regional governments, (ii) couples that competence with guaranteed fiscal transfers and a defined share of national climate finance, and (iii) establishes justiciable duties and review mechanisms through which affected communities and subnational authorities can hold the centre to account. Only by converting aspirational commitments into enforceable and equitably resourced legal obligations can Indonesia give practical effect to the constitutional right to a good and healthy environment under Article 28H(1) at the level where climate change is actually experienced.

CONCLUSION

All things considered, climate change has been a problematic issue since the latest decades which require multidisciplinary approaches. While globally, its impacts show common changing in temperature and degradation in ecosystem, sea-level rise shows significant threat to the archipelagic states, leading to security, economic, health, disparity, inequality and social issues. This research contributes to the legal governance discourse through the evaluation of climate action plans in Indonesia. This research evaluates legalislatiive gap. To illustrate, even though Indonesia has adopted international environmental-related agreements and have been codified into the national laws but a single unified climate change law is still absent. Accordingly, this research indicates Law

No. 23 of 2014 on Regional Government, legally give roles to the local governments to fill this legislative vacuum. Considering the geographical features of Indonesia, local governments are positioned as vital legal actors which are believed to be capable of interpreting international climate obligations into localised actions. Three regulatory suggestions for practical frameworks: unifying national legislative, mainstreaming local level and creating frameworks for fiscal and transnational cooperation.

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