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Multi-Actor Collaboration in Data-Driven Village Development: A Digital Mapping Approach

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Abstract: *Climate change mitigation requires innovative governance approaches that can effectively translate global commitments into local action while accommodating diverse stakeholder interests and complex implementation challenges. This study examines the role of adaptive governance in enhancing Climate Village Program mitigation activities in Soppeng Regency, Indonesia, using a qualitative descriptive approach with data collected through interviews, observations, and document analysis across four participating villages (Timusu, Ganra, Lompulle, and Belo). The research analyzes three key dimensions of adaptive governance: collaborative policy objectives, participatory decision-making processes, and systematic knowledge application mechanisms. Findings reveal that villages achieving higher performance levels successfully implement adaptive governance principles through diverse stakeholder partnerships, flexible decision-making structures that accommodate multiple interests, and systematic integration of scientific knowledge with local experiential learning. The study demonstrates significant knowledge transfer patterns between villages, creating self-reinforcing networks of innovation and organizational learning that extend beyond formal program boundaries. High-performing villages like Timusu and Lompulle establish comprehensive collaboration networks involving government agencies, private sector partners, and community organizations, while implementing participatory decision-making processes that ensure broad stakeholder engagement. The research shows that adaptive governance enables villages to customize implementation strategies to local contexts while maintaining alignment with national climate objectives, contrasting with traditional top-down approaches that prove insufficient for addressing complex, multi-scale climate challenges. These findings contribute to theoretical understanding of adaptive governance in developing country contexts and provide practical insights for scaling community-based climate programs, suggesting that Indonesia's Climate Village Program serves as a viable model for translating global climate commitments into locally meaningful action through institutional arrangements that prioritize collaboration, participation, and continuous learning.*

Keywords: *Adaptive Governance, Climate Mitigation, Community-Based Programs, Stakeholder Collaboration, Knowledge Transfer*

1. INTRODUCTION

Climate change has emerged as one of the most pressing global challenges of the 21st century, triggering widespread environmental, social, and economic disruptions worldwide. Recent scientific evidence demonstrates that human activities continue to be the primary drivers of global warming, with greenhouse gas emissions reaching unprecedented levels despite international mitigation efforts (Hovelsrud & Westskog, 2023). The Intergovernmental Panel on Climate Change (IPCC) 2023 report emphasizes that without immediate and transformative action, global surface temperature increases will exceed critical thresholds, resulting in catastrophic consequences for ecosystems and human societies. Since the First World Climate Conference in 1979, the United Nations has spearheaded global climate governance initiatives, culminating in the Paris Agreement which calls for "an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge." The impacts of climate change manifest through various interconnected pathways affecting water availability, food security, human health, and infrastructure resilience, requiring comprehensive global action across multiple governance levels.

Indonesia, as the world's largest archipelagic nation, faces exceptional vulnerability to climate change impacts while simultaneously ranking as the 7th largest global greenhouse gas emitter. The Climate Village Program (CVP) is one of the national flagship programs of the Ministry of Environment and Forestry of the Republic of Indonesia to support emission reduction and climate resilience (Susetyo et al., 2022). The country's tropical geography, extensive forest cover, and peat-rich ecosystems create both significant emission sources and substantial mitigation potential. Recent climate action assessments indicate that Indonesia's climate policy presents a complex and contradictory picture, marked by tension between gradual renewable energy promotion, continued fossil fuel reliance, and significant deforestation emissions (Climate Action Tracker, 2024). Indonesia's commitment to international climate agreements materialized through comprehensive national climate policies, integrating climate change mitigation into

the National Medium-Term Development Plans from 2010-2024, with targets for 26% emission reduction through national efforts and up to 43.2% with international support by 2030. However, the Climate Change Performance Index 2023 ranks Indonesia 36th out of 67 countries, indicating low performance across greenhouse gas emissions, renewable energy, energy use, and climate policy categories.

Table 1. Indonesia's Climate Performance Index 2023

Assessment Category	Weight	Indonesia's Score	Ranking (out of 67 countries)
GHG Emissions	40%	Low	36
Renewable Energy	20%	Low	36
Energy Use	20%	Medium	36
Climate Policy	20%	Low	36
Overall Performance	**100%**	**Low**	**36**

Source: Climate Change Performance Index 2023, Germanwatch

The Climate Village Program (Program Kampung Iklim/ProKlim), established through Minister of Environment and Forestry Regulation No. P.84/MENLHK-SETJEN/KUM.1/11/2016, represents Indonesia's flagship community-based approach to climate change mitigation and adaptation. The government launched this "Climate Village" program to enhance community contribution in addressing climatic hazard impacts through local environmental management integration (Aprianto et al., 2023). This program targets direct community engagement in climate action through five key mitigation activities: energy conservation behaviors, green transportation, waste management, tree planting, and forest and land fire control. The program's implementation follows a bottom-up approach, emphasizing community ownership and local capacity building. ProKlim positively contributes to 'developing community and participation in local planning processes' mentioned in Indonesia's Nationally Determined Contributions under the Paris Agreement (Climate Scorecard, 2023). As of 2024, the program has registered 7,528 villages/sub-districts across Indonesia, with the government targeting 20,000 climate villages by 2030 to support national emission reduction targets.

Despite comprehensive policy frameworks and widespread program adoption, Indonesia's climate governance faces significant implementation challenges that limit program effectiveness. Indonesia's public sector should lead climate mitigation efforts through collaborative approaches that overcome bureaucratic inertia and fragmented environmental governance (Prabowo, 2024). Traditional governance approaches, characterized by top-down decision-making and rigid institutional structures, have proven inadequate for addressing the complex, multi-scale nature of climate challenges. The implementation of climate programs often encounters coordination failures between different government levels, limited institutional capacity at the local level, and insufficient integration between sectoral policies. These governance gaps become particularly pronounced in rural areas where technical expertise, financial resources, and institutional support are limited, resulting in uneven program outcomes across different regions and highlighting the need for more adaptive governance mechanisms.

Adaptive governance has emerged as a promising theoretical framework for addressing complex environmental challenges characterized by uncertainty, multi-scale interactions, and the need for flexible institutional responses. Recent research investigates three central aspects of adaptive governance in climate change contexts: collaboration and shared decision making, flexibility, and context sensitivity (Hovelsrud & Westskog, 2023). This governance approach emphasizes decentralized decision-making structures, learning-oriented processes, and integration of multiple knowledge systems to enhance institutional capacity for managing environmental challenges. Adaptive governance differs from traditional governance models by prioritizing experimentation, continuous learning, and institutional adaptation over rigid planning and control mechanisms. Many stakeholders feel that current climate adaptation policies are too non-committal, with dominant viewpoints underscoring needs for more rules, norms, and sanctions for non-adapting organizations (Termeer et al., 2020). The approach recognizes that environmental systems are inherently uncertain and that governance institutions must be capable of adjusting strategies based on new information and changing conditions.

South Sulawesi Province has demonstrated significant commitment to climate action through integrating climate change mitigation into regional development planning, as outlined in Regional Regulation No. 1 of 2019 concerning the Regional Medium-Term Development Plan 2018-2023. The province participates in the Climate Village Program with 288 villages/sub-districts across various regencies and municipalities, reflecting substantial sub-national engagement in national climate initiatives. Soppeng Regency, located in northern South Sulawesi Province, represents a strategic case study location due to its active participation in the Climate Village Program with 14 participating villages/sub-districts. Among

these, three villages (Timusu, Ganra, and Lompulle) have received Climate Village Program Trophies from the Ministry of Environment and Forestry, indicating successful implementation of mitigation and adaptation activities. However, the majority of participating villages have not achieved similar recognition levels, suggesting variations in program effectiveness and implementation outcomes that require systematic analysis to understand underlying governance factors.

Table 2. Climate Village Program Implementation in Soppeng Regency

Village/Sub-district	Program Duration	Trophy Status	Key Activities	Effectiveness Level
Desa Timusu	>4 years	Trophy Winner	Complete mitigation package	High
Desa Ganra	>4 years	Trophy Winner	Complete mitigation package	High
Desa Lompulle	2-4 years	Trophy Winner	Selective activities	Medium-High
Other 11 Villages	Variable	No Trophy	Limited activities	Low-Medium

Source: Ministry of Environment and Forestry, 2024

The uneven performance outcomes across Soppeng Regency's Climate Village Program participants highlight critical implementation challenges requiring systematic analysis. Assessment criteria for Climate Village Program recognition include seven key factors: number and types of activities, program duration, implementation conditions, effectiveness measures, institutional presence, policy support and community capacity, and socio-economic-environmental benefits. The variation in achievement levels among participating villages suggests that traditional governance mechanisms may be insufficient for ensuring consistent program implementation and outcomes. Preliminary observations indicate that successful villages demonstrate stronger community institutional arrangements, more consistent external policy support, and better integration of mitigation activities with local development priorities. In contrast, villages with limited achievements often face challenges related to institutional capacity, resource constraints, and inadequate coordination between different stakeholders involved in program implementation, highlighting the need for adaptive governance approaches.

Table 3. Climate Village Program Assessment Criteria and Implementation Challenges

Assessment Factor	Trophy Winners	Non-Trophy Villages	Key Challenges
Number & Types of Activities	7-8 activities	3-5 activities	Resource limitations
Program Duration	>4 years	<2 years	Sustainability issues
Implementation Conditions	Good	Poor-Fair	Institutional capacity
Effectiveness (KK benefited)	>500 households	<200 households	Community engagement
Institutional Presence	Strong	Weak	Leadership capacity
Policy Support	High	Limited	Multi-level coordination
Socio-Economic Benefits	High	Low-Medium	Integration challenges

Source: Compiled from Ministry of Environment and Forestry Assessment Guidelines, 2024

While previous studies have examined various aspects of Indonesia's Climate Village Program, significant gaps remain in understanding the role of governance mechanisms in determining program effectiveness. Susetyo et al. (2022) focused primarily on program challenges and strategies at national and sub-national levels, while Aprianto et al. (2023) examined community-based approaches during the COVID-19 pandemic context. However, neither study specifically analyzed how adaptive governance principles could address implementation variations and enhance program effectiveness at the local level. This research gap is particularly significant given growing recognition that effective multilevel governance is essential for empowering local climate action, including political commitment, vertical integration of national policies with local action, and comprehensive mitigation and adaptation plans (UN DESA, 2024). The limited application of adaptive governance theory to analyze climate program implementation in developing country contexts represents a critical knowledge gap. Therefore, this research aims to analyze the role of adaptive governance in Climate Village Program mitigation activities in Soppeng Regency, with specific objectives to: (1) examine current governance mechanisms employed in program implementation; (2) identify adaptive governance characteristics contributing to program effectiveness; (3) assess relationships between governance approaches and mitigation activity outcomes; and (4) develop recommendations for enhancing adaptive governance capacity to improve Climate Village Program implementation. This study contributes to both theoretical understanding of adaptive governance in climate policy implementation and practical insights for improving community-based climate mitigation programs in Indonesia and

similar developing country contexts.

2. METHOD

This research employed a qualitative descriptive approach to examine adaptive governance in climate village program mitigation activities in Soppeng Regency, South Sulawesi Province, Indonesia. The study was conducted across multiple sites including the Soppeng Regency Environmental Agency and four villages (Timusu, Ganra, Lompulle, and Belo) that participate in the Climate Village Program. Using Brunner et al.'s (2005) policy approach framework for adaptive governance, the research focused on three key dimensions: policy objectives as common interests, decision-making processes that accommodate diverse stakeholder interests, and knowledge application for policy adaptation and improvement. Data collection utilized purposive sampling to select key informants including officials from the Soppeng Environmental Agency, village heads/secretaries, community organizations, and local residents from each target village. Primary data were gathered through semi-structured observations, in-depth interviews, and document analysis, while secondary data included government archives, scientific publications, and institutional reports. Data analysis followed Miles, Huberman, and Saldana's (2014) three-stage process: data condensation to focus on research objectives, data display for organized information presentation, and conclusion drawing with verification to ensure validity and confirmability of findings. This methodological approach enabled comprehensive examination of governance mechanisms and their effectiveness in implementing climate mitigation activities at the village level.

3. FINDINGS AND DISCUSSIONS

Policy Objectives in Climate Village Program

The analysis of policy objectives within the Climate Village Program reveals a multi-stakeholder collaborative framework that aligns with adaptive governance principles. The program demonstrates successful integration of community, private sector, and government interests through diverse partnership arrangements across participating villages. Timusu Village established the most comprehensive collaboration network, partnering with the Environmental Agency, Village Waste Bank, Youth Organization (Karang Taruna), and Nursery House, creating a robust institutional ecosystem for climate mitigation activities. This collaborative approach extends beyond mere coordination to encompass meaningful engagement where each stakeholder contributes specific expertise and resources toward common climate objectives.

Ganra Village adopted a more selective collaboration strategy, focusing primarily on internal village capacity building through disaster preparedness youth groups while maintaining essential partnerships with the Environmental Agency and Nursery House for tree planting initiatives. The village's approach reflects a preference for community self-reliance while strategically leveraging external partnerships for specific technical needs. This model demonstrates how adaptive governance can accommodate different organizational preferences and capacity levels while maintaining program effectiveness. The emphasis on disaster preparedness particularly highlights the integration of climate adaptation and mitigation objectives within a single governance framework.

Lompulle Village exemplifies the most innovative collaboration model, extending partnerships beyond local boundaries to include PT. Natural Nusantara from Yogyakarta for organic fertilizer and pest control products, alongside partnerships with the Ministry of Public Works for waste recycling facilities. This approach demonstrates the potential for village-level governance to transcend geographical and sectoral boundaries in pursuit of climate objectives. The village's success in obtaining the Climate Village Trophy validates the effectiveness of expanding collaboration networks to include specialized private sector partners and national government agencies, creating a more comprehensive approach to climate mitigation.

Belo Village represents a minimalist yet effective collaboration model, concentrating on essential partnerships with the Environmental Agency, disaster preparedness groups, and nursery suppliers. Despite having fewer formal partnerships compared to other villages, Belo maintains functional climate mitigation activities through streamlined governance arrangements. This approach suggests that effective adaptive governance does not necessarily require extensive partnership networks but rather strategic alignment of key stakeholders around core objectives. The village's experience demonstrates how resource constraints can drive innovation in governance arrangements while maintaining program integrity.

Table 4. Collaboration Networks and Outcomes in Climate Village Program

Village	Government Partners	Private Partners	Community Partners	Achievement Level	Trophy Status
Timusu	Environmental Agency	Nursery House	Waste Bank, Youth Groups	High	Trophy Winner
Ganra	Environmental Agency	Nursery House	Disaster Preparedness Youth	Medium-High	No Trophy
Lompulle	Environmental Agency, Public Works Ministry	PT. Natural Nusantara, Nursery House	Disaster Preparedness Youth	High	Trophy Winner
Belo	Environmental Agency	Nursery House	Disaster Preparedness Youth	Medium	No Trophy

Source: Research Data Analysis, 2024

The evidence demonstrates that policy objectives in the Climate Village Program effectively embody Brunner et al.'s (2005) conception of common interests within adaptive governance, where diverse stakeholder engagement creates shared ownership of climate outcomes. The program's success in generating behavioral changes—from waste management practices to disaster preparedness—indicates that collaborative governance structures can effectively translate global climate imperatives into locally meaningful actions. The observed knowledge transfer between villages, particularly from Timusu to Ganra and Lompulle, illustrates how adaptive governance facilitates organizational learning and policy diffusion across administrative boundaries. To enhance policy effectiveness, villages should strengthen multi-sectoral partnerships through formalized collaboration agreements that ensure long-term sustainability of climate initiatives, as recommended by recent research on resilient governance networks (Hovelsrud & Westskog, 2023).

Decision-Making in Climate Village Program

The decision-making structure within the Climate Village Program reveals a hierarchical yet participatory governance model that combines top-down policy direction with bottom-up implementation flexibility. At the national level, program decisions originate from Indonesia's commitment to international climate agreements, particularly the 2007 UNFCCC framework, subsequently translated into the National Action Plan for Greenhouse Gas Emission Reduction in 2011. This top-down policy cascade demonstrates how global climate governance influences national policy formulation, which then requires local-level adaptation and implementation. The hierarchical structure ensures policy coherence across multiple governance levels while maintaining sufficient flexibility for local customization.

Regional-level decision-making occurs through the Soppeng Environmental Agency, which serves as the primary coordinator between national policy directives and village-level implementation. The agency's role encompasses identifying potential participating villages, providing technical guidance, and monitoring program compliance, effectively functioning as a policy translation mechanism that bridges different governance scales. This intermediate governance layer proves crucial for adaptive governance by providing technical expertise and coordination capacity that individual villages may lack while maintaining responsiveness to local conditions and constraints.

Village-level decision-making processes demonstrate significant variation in participatory governance approaches, reflecting the adaptive nature of local implementation. Timusu Village operates through streamlined decision-making structures that emphasize rapid implementation, leveraging its status as the first participating village in Soppeng Regency. Ganra and Lompulle Villages employ more extensive consultation processes, involving Village Consultative Bodies (BPD), community organizations, youth groups, and local residents in program planning and implementation decisions. Belo Village adopts consensus-building approaches that prioritize community agreement before program implementation, ensuring broad-based support for climate initiatives.

The temporal dimension of decision-making reveals how adaptive governance evolves through learning and experience. Early participating villages like Timusu initially focused on basic compliance with program requirements, while later participants like Ganra and Lompulle benefited from accumulated experience and knowledge transfer from pioneering villages. This learning process enables more sophisticated decision-making approaches that better integrate local priorities with program objectives. The evidence suggests that decision-making quality improves over time as villages develop institutional

capacity and inter-village knowledge sharing mechanisms mature.

Table 5. Decision-Making Participants and Mechanisms in Climate Village Program

Village	Government Level	Community Level	Private Sector	Decision Mechanism	Implementation Approach
Timusu	Environmental Agency	Village Consultative Body, Community Groups	Waste Bank, Nursery	Streamlined	Rapid Implementation
Ganra	Environmental Agency	Village Consultative Body, Youth Groups, Community	Nursery House	Consultative	Phased Implementation
Lompulle	Environmental Agency	Village Consultative Body, All Community Sectors	PT. Natural Nusantara	Comprehensive	Integrated Implementation
Belo	Environmental Agency	Village Consultative Body, Community Representatives	Nursery House	Consensus-Building	Gradual Implementation

Source: Research Data Analysis, 2024

The decision-making processes observed in the Climate Village Program align with Brunner et al.'s (2005) emphasis on accommodating diverse interests through flexible institutional structures that enable stakeholder participation in problem definition and solution identification. The evidence demonstrates that effective adaptive governance requires both vertical coordination across governance levels and horizontal collaboration among local stakeholders, enabling responsive decision-making that can adapt to changing circumstances and emerging opportunities. The program's success in facilitating village-to-village learning and knowledge transfer illustrates how adaptive governance can create self-reinforcing networks of innovation and improvement. To strengthen decision-making effectiveness, villages should establish formal inter-village collaboration mechanisms that institutionalize knowledge sharing and joint problem-solving processes, consistent with recommendations for polycentric governance approaches in climate adaptation (Termeer et al., 2020).

Knowledge Application in Climate Village Program

Knowledge integration within the Climate Village Program demonstrates a multi-layered approach that combines scientific expertise at the national level with experiential learning at the village level. At the national policy level, the program's foundation rests on comprehensive scientific assessments of climate change impacts and greenhouse gas emission reduction strategies, reflecting integration of climate science, policy analysis, and implementation research. The program's design incorporates international best practices and scientific recommendations from climate experts, ensuring that local-level activities align with evidence-based approaches to climate mitigation. This top-down knowledge integration provides the scientific legitimacy and technical foundation necessary for effective climate action.

Village-level knowledge application occurs through direct engagement with researchers and academics who conduct studies on program implementation and outcomes. Timusu, Ganra, and Lompulle Villages have hosted multiple research initiatives, including studies by Hasanuddin University researchers, creating opportunities for academic-practitioner collaboration that enhances program effectiveness. These research partnerships enable villages to access external expertise while contributing to broader knowledge development about community-based climate action. The research engagement also facilitates reflective practice, where villages can evaluate their experiences and adjust implementation approaches based on systematic analysis.

The program's approach to experiential learning demonstrates how adaptive governance incorporates lessons from previous policy implementations. All participating villages acknowledged that Climate Village Program activities build upon existing community practices such as waste management, tree

planting, and environmental maintenance that were previously implemented with varying degrees of success. The program's contribution lies in providing systematic frameworks, performance incentives through trophy competitions, and technical support that transform ad hoc environmental activities into coordinated climate action. This approach exemplifies how adaptive governance leverages existing local knowledge while introducing new organizational and technical elements.

Knowledge transfer mechanisms between villages represent a crucial dimension of adaptive governance that enables organizational learning across administrative boundaries. The documented influence patterns—from Timusu to Ganra and Lompulle, and subsequently from these villages to Belo—illustrate how successful implementation experiences become knowledge resources for other communities. This peer-to-peer learning process creates networks of practice that extend beyond formal program structures, enabling villages to adapt successful approaches to their specific contexts while avoiding implementation pitfalls experienced by others.

Table 6. Knowledge Integration and Application Mechanisms

Knowledge Source	National Level	Regional Level	Village Level	Application Method	Outcome
Scientific Research	Climate science, Policy analysis	Technical guidelines	Academic partnerships	Evidence-based design	Program legitimacy
Experiential Learning	Previous policy lessons	Implementation guidance	Community practices	Adaptive implementation	Improved effectiveness
Peer Networks	Inter-regional sharing	Cross-village coordination	Village-to-village learning	Knowledge transfer	Program diffusion
External Research	International best practices	Regional studies	University partnerships	Collaborative research	Innovation development

Source: Research Data Analysis, 2024

The knowledge application patterns observed in the Climate Village Program effectively demonstrate Brunner et al.'s (2005) conception of science integration within adaptive governance, where multiple knowledge systems—scientific, experiential, and local—combine to inform policy implementation and adaptation. The program's success in creating feedback loops between research, implementation, and policy adjustment illustrates how adaptive governance can systematically incorporate learning into ongoing operations while maintaining responsiveness to local conditions and emerging challenges. The evidence of knowledge transfer between villages and the integration of academic research with practical implementation demonstrates the potential for community-based programs to serve as living laboratories for climate action innovation. To enhance knowledge application effectiveness, the program should establish formal knowledge management systems that systematically capture, document, and disseminate implementation lessons across villages and regions, building on recent advances in collaborative knowledge platforms for climate governance (UN DESA, 2024).

4. CONCLUSION

This research demonstrates that adaptive governance principles effectively enhance Climate Village Program implementation in Soppeng Regency through three interconnected mechanisms: collaborative policy objectives, participatory decision-making, and systematic knowledge application. The evidence reveals that villages achieving higher performance levels, particularly Timusu and Lompulle, successfully implement adaptive governance approaches by establishing diverse stakeholder partnerships, implementing flexible decision-making processes that accommodate multiple interests, and systematically integrating scientific knowledge with local experiential learning. The observed knowledge transfer patterns between villages—from Timusu to Ganra and Lompulle, and subsequently to Belo—illustrate how adaptive governance creates self-reinforcing networks of innovation and organizational learning that extend beyond formal program boundaries. While traditional top-down governance approaches prove insufficient for addressing the complex, multi-scale nature of climate challenges, the adaptive governance model enables villages to customize implementation strategies to local contexts while maintaining alignment with national climate objectives. The study's findings contribute to both theoretical understanding of adaptive governance in developing country contexts and practical insights for scaling community-based climate programs, suggesting that Indonesia's Climate Village Program serves as a viable model for translating global climate commitments into locally meaningful action through adaptive

institutional arrangements that prioritize collaboration, participation, and continuous learning

REFERENCES

1. Aprianto, T. C., Bisri, M. B. F., Johar, A., & Firdaus, A. R. (2023). Community-based approach for climate resilience and COVID-19: Case study of a climate village (Kampung Iklim) in Balikpapan, Indonesia. Land, 12(3), 650. https://doi.org/10.3390/land12030650
2. Brunner, R. D., Steelman, T. A., Coe-Juell, L., Cromley, C. M., Edwards, C. M., & Tucker, D. W. (2005). Adaptive governance: Integrating science, policy, and decision making. Columbia University Press.
3. Climate Action Tracker. (2024). Indonesia: Policies & action. https://climateactiontracker.org/countries/indonesia/policies-action/
4. Climate Scorecard. (2023, July 13). Indonesia's ProKlim project supports its NDC commitments by coordinating national climate-related targets with local-level actions. Climate Scorecard. https://www.climatescorecard.org/2023/07/indonesias-proklim-project-supports-its-ndc-commitments-by-coordinating-national-climate-related-targets-with-local-level-actions/
5. Germanwatch. (2023). Climate Change Performance Index 2023. Climate Action Network, Germanwatch, New Climate Institute.
6. Hovelsrud, G. K., & Westskog, H. (2023). The role of adaptive governance in climate mitigation and adaptation: A local perspective. In S. Juhola (Ed.), Handbook on Adaptive Governance (pp. 192-206). Edward Elgar Publishing.
7. Hovelsrud, G. K., & Westskog, H. (2023). The role of adaptive governance in climate mitigation and adaptation: A local perspective. In S. Juhola (Ed.), Handbook on Adaptive Governance (pp. 192-206). Edward Elgar Publishing.
8. Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC.
9. Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). Qualitative data analysis: A methods sourcebook (3rd ed.). SAGE Publications.
10. Minister of Environment and Forestry, Republic of Indonesia. (2016). Regulation No. P.84/MENLHK-SETJEN/KUM.1/11/2016 concerning Climate Village Program. Ministry of Environment and Forestry.
11. Ministry of Environment and Forestry, Republic of Indonesia. (2024). Climate Village Program (ProKlim) assessment data and guidelines. Directorate General of Climate Change Control.
12. Prabowo, A. (2024, July 13). Public-sector leadership can power Indonesia's climate change mitigation. East Asia Forum. https://eastasiaforum.org/2024/07/13/public-sector-leadership-can-power-indonesias-climate-change-mitigation/
13. Provincial Government of South Sulawesi. (2019). Regional Regulation No. 1 of 2019 concerning Regional Medium-Term Development Plan of South Sulawesi Province 2018-2023. South Sulawesi Provincial Government.
14. Susetyo, D. B., Budihardjo, M. A., Sutikno, F. R., & Purwanto, P. (2022). Challenges to and strategies for the climate village program plus: A lesson learned from Indonesia. Sustainability, 14(9), 5530. https://doi.org/10.3390/su14095530
15. Termeer, C. J. A. M., Dewulf, A., van Rijswick, H. F. M. W., van Buuren, A., Huitema, D., Meijerink, S., Rayner, T., & Wiering, M. (2020). Governance of climate adaptation, which mode? An exploration of stakeholder viewpoints on how to organize adaptation. Climatic Change, 162(4), 1535-1553. https://doi.org/10.1007/s10584-020-02683-9
16. UN DESA. (2024). UN DESA Policy Brief No. 162: Multilevel governance for climate change mitigation and adaptation. United Nations Department of Economic and Social Affairs. https://desapublications.un.org/policy-briefs/un-desa-policy-brief-no-162-multilevel-governance-climate-change-mitigation-and
17. United Nations Framework Convention on Climate Change. (2015). Paris Agreement. UNFCCC.