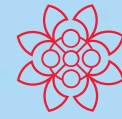




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Social  
Sustainability  
and Inclusion  
INDONESIA AND TIMOR-LESTE

# SOCIAL DIMENSIONS OF CLIMATE CHANGE IN INDONESIA



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# ABBREVIATIONS

ADD	Village Fund Allocation/ <i>Alokasi Dana Desa</i>
AMAN	Indigenous Peoples' Alliance of the Archipelago
APBN	Indonesia Government State Budget/ <i>Anggaran Pendapatan dan Belanja Negara</i>
BAPPEDA	Development Planning Agency at Sub-National Level/ <i>Badan Perencanaan Pembangunan Daerah</i>
BAPPENAS	Ministry of National Development Planning/ <i>Badan Perencanaan Pembangunan Nasional</i>
BNPB	National Board for Disaster Management/ <i>Badan Nasional Penanggulangan Bencana</i>
BPD	Village Deliberation Forum/ <i>Badan Permusyawaratan Desa</i>
BPDLH	Indonesian Environment Fund Management Agency/ <i>Badan Pengelola Dana Lingkungan Hidup</i>
BPS	Central Bureau of Statistics/ <i>Badan Pusat Statistik</i>
DAK	Special Allocation Fund/ <i>Dana Alokasi Khusus</i>
DBH DR	natural resource revenue-sharing from forestry
DD	<i>Dana Desa</i> (village fund)
DID	Regional Incentive Fund/ <i>Dana Insentif Daerah</i>
DPL	Environment Protection Fund/ <i>Dana Perlindungan Lingkungan</i>
EFT	Ecological fiscal transfer
ERs	Emission reductions
FAO	Food and Agriculture Organization of the United Nations
FOLU	Forestry and other land uses
FPIC	Free, prior, and informed consent
GDP	Gross domestic product
GHG	Greenhouse gas
Gol	Government of Indonesia
ha	Hectare
ICCSR	Indonesia Climate Change Sectoral Roadmap
IDM	Village Development Index/ <i>Indeks Desa Membangun</i>
IDM+	Sustainable Village Development Index/ <i>Indeks Desa Membangun Plus</i>
IDR	Indonesian Rupiah
IEA	International Energy Agency
ILO	International Labor Organization
KMPA	Fire Care Community Groups/ <i>Kelompok Masyarakat Peduli Api</i>

LCDI	Low Carbon Development Indonesia
LPP	Fisheries Management Institution/ <i>Lembaga Pengelola Perikanan</i>
MEMR	Ministry of Energy and Mineral Resources
MMAF	Ministry of Marine Affairs and Fisheries
MoEF	Ministry of Environment and Forestry, Republic of Indonesia
MoF	Ministry of Finance
MoHA	Ministry of Home Affairs
MoV	Ministry of Villages, Development of Disadvantaged Regions, and Transmigration
Mt	million ton
NASA	United States National Aeronautics and Space Administration
NDC	Nationally determined contribution
NGO	Nongovernmental organization
NRM	Natural resources management
PCA	principal component analysis
PES	Payments for ecosystem services
PLN	State Utility Company/ <i>Perusahaan Listrik Negara</i>
PNPM	National Programme for Community Empowerment/ <i>Program Nasional Pemberdayaan Masyarakat</i>
PODES	Village Potential Statistics/ <i>Statistik Potensi Desa</i>
PPM	Community empowerment program/ <i>Pengembangan dan Pemberdayaan</i>
ProKlim	Climate Village Program/ <i>Program Kampung Iklim</i> (MoEF)
PUPR	Ministry of Public Work and Public Housing
REDD+	Reducing emissions from deforestation and forest degradation
RKP	Government Annual Work Plan/ <i>Rencana Kerja Pemerintah</i>
RPJMN	National Medium-Term Development Plan/ <i>Rencana Pembangunan Jangka Menengah Nasional</i> or “National Long-Term Plan (RPJMN) 2022-2024” [this is the def. for PRJMN on p 108]
SEEA	System of Environmental-Economic Accounting
SIDIK	Vulnerability index data information system/ <i>Sistem Informasi Data Indeks Kerentanan</i>
SISKEUDES	Village Financial Management System/ <i>Sistem Keuangan Desa</i>
SLM	Sustainable landscape management
TAKEs	Ecology-Based District Budget Transfer
TAPEs	Ecology-Based Provincial Budget Transfers
TORA	National Land Reform Program/ <i>Tanah Obyek Reforma Agraria</i>
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WPP	Fisheries Management Areas/ <i>Wilayah Pengelolaan Perikanan</i>

# GLOSSARY

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This report refers to a range of terms to describe climate events, social groups, administrative and governance institutions, and governance processes. This glossary briefly describes key terms as used throughout this report:

**Adaptive capacity:** The (in)ability of communities to cope with the expected impacts of climatic changes. The capacity to adapt is driven by social and economic factors, such as access to information, political power, and networks; and access to resources and opportunities, including the ability to diversify away from at-risk livelihoods (such as skills, remittances, ability to migrate).

**Community:** A group of people who have loosely defined social ties (often living near to one another) and are likely to share interests and challenges. This term usually refers to groups within villages in Indonesia because village populations sometimes are large. This report refers to communities constituted through proximity, history and regular interaction, including the need to manage shared resources and challenges.

**Community-based approaches:** Participatory local development characterized by principles of community-led decision making and local control over development resources.

**Exposure:** Changes in temperature, precipitation, and the frequency and intensity of disasters.

**Local Governments:** Collectively, villages (*desa* and *kelurahan*), subdistricts (*kecamatan*), and districts (*kabupaten*).

**Sensitivity:** How people will be affected by climactic changes, which often is influenced by socioeconomic factors. These include the extent to which livelihoods are dependent on natural resources, carrying capacity, food security, and economic security.

**Village:** The lowest administrative unit. Indonesia has approximately 75,000 villages of various sizes and populations. Villages are divided into hamlets.

**Village Government:** The elected Village Head and an appointed village administration, as well as elected Village Councils (*Badan Permusyawarahan Desa*, or BPD).



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**Village Law:** Enacted in 2014, the Village Law (Law no 6/2014) mandates that villages will receive funds equivalent to 10 percent of their states' budgets earmarked for regional administration, transferred on an annual basis to address local development needs. The amount of funds allocated to villages is based on a formula that takes into consideration the population size, poverty rate, village size, and its degree of geographic isolation. The Law also mandates a village planning and budgeting process, including requiring village heads to conduct consultative meetings on strategic issues and allocation of budgets. Funds are transferred following the submission to, and approval of, village plans and budgets by district governments. The Law stipulates that planning must involve community representatives including religious leaders, farmers, fishers, women's groups, and marginalized persons and groups.

**Village Planning and Budgeting:** As mandated by the Village Law, village governments undertake an annual village budgeting and planning process to allocate resources from different sources. This process includes a mandatory village meeting.



# EXECUTIVE SUMMARY

**Indonesia is highly susceptible to impacts of climate change, which are likely to deepen socioeconomic vulnerabilities and challenge critical livelihoods.** Indonesia comprises 17,504 islands, 108,000 kilometers (km) of coastline, and 75 percent of its territory is at sea. As a middle-income, archipelagic nation with extensive low-lying and small island areas, Indonesia is extremely vulnerable to climate change risks, ranking in the top one-third of countries globally in natural hazard risks. Expected variation in precipitation and temperature and erratic rainfall patterns are likely to affect agricultural yields and drive food price volatility and food insecurity. The poor and economically insecure are likely to carry a disproportionate burden of the impacts. This is because they are more reliant on agriculture and natural resources, live in areas more prone to climate risk, and have a lower capacity to adapt. Increased exposure to climate risks of women and marginalized groups is expected to result in disproportionate impacts on mortality, livelihoods, food and water insecurity, migration, and threats to cultural identity.

**Indonesia has committed to significantly reduce GHG emissions under the Paris Agreement while strengthening economic and social resilience.** More than 60 percent of the emission reduction target in Indonesia's nationally determined contribution (NDC) is intended to be met through actions in forestry and other land use (FOLU) sectors. Alongside FOLU, the agriculture and energy sectors make up the bulk of Indonesia's targeted reductions in emissions. While being important to climate change mitigation, Indonesia's mangrove forests, peatlands, and terrestrial forests are some of its most important natural assets that support economic growth and sustain livelihoods for millions of people. Indonesia also is one of the world's largest coal producers and exporters, with approximately 39 billion tons of coal reserves, the fifth largest in the world. Coal-dependent regions such as East Kalimantan and South Sumatra have special characteristics that put them among regions most drastically affected by climate change due to their reliance on an industry at the heart of global climate change mitigation efforts. The coal transition will ignite a series of direct, indirect, and induced impacts. These include job losses, dislocation of workers and their families, deepening inequalities, and loss of access to infrastructure and services. If not mitigated, these impacts could drive heightened mistrust, insecurity, and social instability.

**Climate change and climate mitigation policies will have significant impacts on local communities, particularly on poor and vulnerable groups.** The impacts of climate change experienced by communities depend not only on their exposure to climate risks but also on the sensitivity of their livelihoods and cultures to climatic changes, and their capacity to adapt and respond to these changes. Vulnerability varies significantly across the population. Those facing discrimination, limited access to rights and governance platforms, or exclusion from social networks are likely to experience disproportionate impacts from climate risks and have a lower capacity to adapt. Over the past few decades, Indonesia has made admirable progress reducing poverty. However, not addressing the social impacts of climate change and climate change policies could risk reversing some of these gains.

*Climate change and climate mitigation policies will have significant impacts on local communities, particularly on poor and vulnerable groups.*

**This report on the social dimensions of climate change in Indonesia provides a people-centered analysis of climate impacts and policies and puts local communities and governance systems at the heart of climate action.** The report maps differentiated vulnerabilities to climate change across the archipelago and examines the potential effects of climate mitigation and adaptation policies on local communities, with a focus on the poor and most vulnerable. The report also explores how communities and subnational actors have responded to climate impacts and identifies strategies to accelerate climate adaptation and mitigation actions while ensuring that the most vulnerable groups benefit from these initiatives. Finally, the report underscores the importance of investing in social resilience by enhancing the collective ability of communities to withstand, recover from, and reorganize in the face of transitions. Local knowledge, traditions, and skills are important drivers of social resilience, alongside securing access to rights and resources, especially for marginalized groups. Strong local governance institutions which channel resources and technical support directly to local communities play a major role within Indonesia’s decentralized governance structure to manage the impacts of climate change and climate change policies.

*Local governance institutions which channel resources and technical support directly to local communities play a major role within Indonesia’s decentralized governance structure to manage the impacts of climate change and climate change policies.*

**Inclusive climate responses in Indonesia depends to a large extent on the ability to align the interests of local communities with national transition and development goals, and to promote effective local action.** To deliver on national commitments, strong subnational implementation systems are needed to bridge top-down policies with bottom-up processes. Given Indonesia’s decentralized governance

structure, effective climate policy is intimately bound up with reinforcing and clarifying the roles of subnational governments. In addition, community-based and locally led approaches will be key instruments of inclusive local climate action. More inclusive local governance and more space for citizens’ voices in climate policy discussions will drive improved resilience to climate risks and promote inclusive growth.



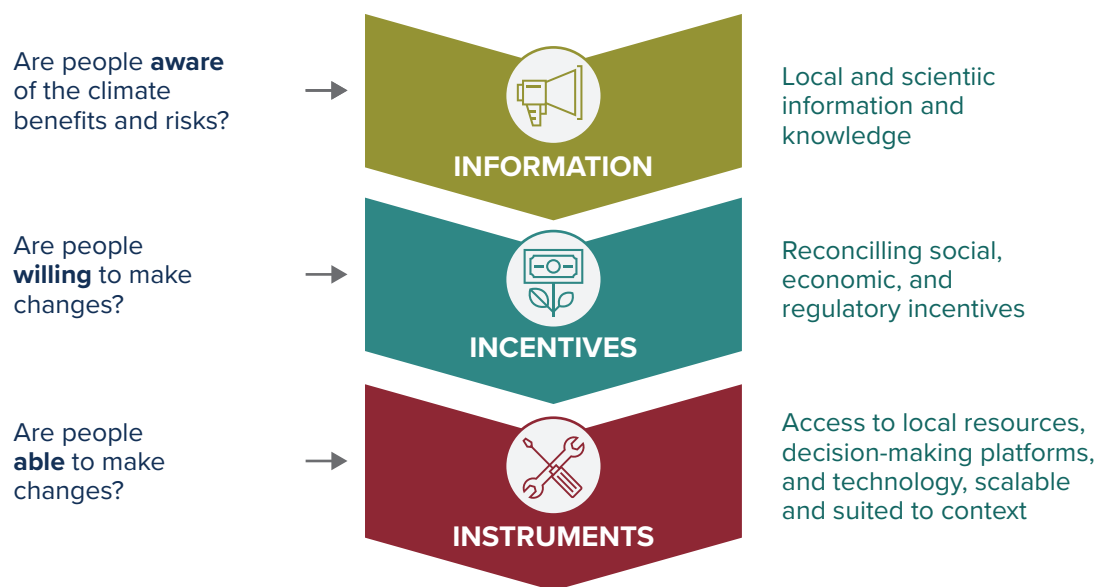


This report proposes a simple framework to guide climate policy and program design and implementation, with a focus on drivers of local action: information, incentives, and instruments. The framework aims to guide practitioners and policy makers in how to incorporate the diverse and dynamic nature of community vulnerability into climate change, understand and change the local incentives, and achieve scalability and cost effectiveness.

- First, the ability for local actors to access and generate *information* on climate change impacts and options for climate adaptation and mitigation is critical to generate buy-in and drives informed decisions and actions.
- Second, various *incentives*, including social, financial, and regulatory, create the conditions for a different set of outcomes by stimulating changes in the behavior and investment patterns of local populations.
- Finally, policy and operational *instruments* such as local budgets, new technologies and skills, and local decision-making bodies enable and empower people to take effective action.

All three pillars work simultaneously to empower and enable locally led climate action.

**FIGURE 0.1** Framework for Locally Led Climate Action in Indonesia



Source: Authors.

**Indonesia already has a mix of policies and programs to promote adaptation and mitigation that could be further strengthened and scaled to promote sustainable and inclusive transitions.**

High-quality data, a suite of national commitments, and effective decentralized platforms for community-led local development provide strong foundations for Indonesia to promote locally led climate action and transition planning. To address vulnerability and implement inclusive decarbonization policies, Indonesia's climate response will need to work effectively across scales. A combination of reforms and investments in national policies, decentralized spatial management, and bottom-up community actions are needed:

*To address vulnerability and implement inclusive decarbonization policies, Indonesia's climate response will need to work effectively across scales.*

1. *Community empowerment programs and the Village Law will continue to be key pillars of Indonesia's development toolkit to promote local climate action.* Indonesia's 75,000+ village governments spend over USD 8bn per year on local development. Village fiscal transfers can fund this diverse basket of local activities, which can be incentivized through payments for ecosystems services or environmental fiscal transfers. However, village planning and budgeting systems are not yet optimized to promote "climate-smart" development. The Village Law is a vehicle that could incorporate stronger community planning and support instruments in implementation, including integrating climate risks in planning and budgeting; strengthen technical assistance and training on climate-smart infrastructure standards and adaptation activities; and improve the monitoring of climate-related expenditures and results.
2. *The capacity of local governments for planning and technical assistance functions can be strengthened.* Effective local action linked to national policy goals is dependent on the supportive and regulatory role of local government. Local government support is especially critical in protected areas and fragile ecosystems, for which effective cross-sectoral approaches are needed to drive more sustainable and inclusive outcomes. Local climate action will require capacity development of local governments in the key functions needed for effective environmental management, including spatial planning and service delivery.
3. *Results-based carbon finance instruments will continue to incentivize mitigation, especially in forested landscapes, but can be strengthened by developing scalable systems with lower transaction costs.* The Government of Indonesia (GoI) has made noteworthy progress in piloting and testing instruments to channel climate finance to communities and implement jurisdictional approaches to climate transitions. Examples are REDD+ in East Kalimantan and a jurisdictional approach to lower emissions across the agriculture and FOLU sectors in Jambi. However, results-based carbon finance programs need more robust and inclusive community-facing outreach and benefits-sharing mechanisms.

4. *To achieve fair and equitable outcomes, community support mechanisms in coal-dependent regions could mitigate the social and distributional impacts of coal transition, and need to be initiated early.* Inclusive and meaningful engagement of communities in coal transition is the first and critical step to help prepare for potential community-wide social impacts; earn the trust of local communities; and deliver direct investments in sustainable economic development to reduce reliance on coal. The last could include providing viable alternative services, jobs, and social support. In affected areas, empowering vulnerable groups will be key to ensure that the process is legitimate and fair and generates equitable outcomes.

**Indonesia has strong foundations for effective climate action, and a range of complementary actions and reforms is necessary to strengthen these existing systems.** At the national level, the GoI and its partners can strengthen centralized data instruments and knowledge products, improve the enabling environment for partnerships with civil society and the space for citizen voice in policymaking, and invest in upstream analytics and planning to support coal transition. At the subnational level, improving systems and capacities to coordinate sustainable landscape management, finance climate adaptation and mitigation, provide technical support to villages and communities, and lead implementation of payments for ecosystem services (PES) schemes will drive stronger implementation of national commitments. At the village level, improved Village Law implementation and improved supply of climate-smart technical assistance to villages will improve inclusive local governance and enhance quality of spending. These recommendations are summarized in Table 0.1, while a more nuanced set of recommendations is provided in Chapter 7.



**TABLE 0.1** Summary Recommendations for National, Sub-National, and Village Governments

ACTION AREAS	RECOMMENDATIONS
Closing gaps in information on climate risks and opportunities, and how these risks will affect local communities.	<ul style="list-style-type: none"> <li>• Improve public access to data and analysis on vulnerability to climate change, sensitivity of local communities to various risks, and adaptive capacity to aid local planning and action.</li> </ul>
Information on the value and future values of critical ecosystems.	<ul style="list-style-type: none"> <li>• Develop and disseminate climate-smart cost-benefit assessments to inform economic development policies and programs, including benefits-sharing plans and alternative livelihoods programs.</li> </ul>
Expanding operational platforms for community and stakeholder engagement.	<ul style="list-style-type: none"> <li>• Strengthen national dialogue on inclusive climate transitions to promote high-level support to citizen engagement and coal transition planning and improve accountability, transparency, and policy design.</li> <li>• Strengthen subnational dialogue on inclusive low-carbon transitions to enhance participatory management of protected areas and critical ecosystems.</li> <li>• Ensure allocation of sufficient and reliable financing for stakeholder engagement and involve communities in monitoring and learning to increase social accountability and improve implementation.</li> </ul>
Improving efficiency, transparency, and scalability in carbon finance instruments.	<ul style="list-style-type: none"> <li>• Strengthen bottom-up accountability mechanisms for climate finance by improving “green accountability” mechanisms to track climate finance.</li> <li>• Strengthen the regulatory and institutional framework for environmental and social risk management, particularly around resettlement, labor market policies, and stakeholder engagement.</li> <li>• Strengthen and streamline mechanisms for climate finance at the subnational and village level and clarify their contributions to broader landscape and jurisdictional management plans.</li> </ul>
Expanding options for partnerships with civil society and non-government actors.	<ul style="list-style-type: none"> <li>• Improve regulatory frameworks for partnerships with civil society to promote local capacity for climate action, innovation, and locally owned implementation of emission reduction and adaptation programs.</li> </ul>
Initiating transition planning in coal-dependent regions.	<ul style="list-style-type: none"> <li>• Initiate just coal transition planning in coal-dependent regions or transition sites by conducting upstream socioeconomic assessments, identifying local development needs, and preparing community development programs to address them.</li> <li>• Broker private sector partnerships to enhance local economic development in coal-dependent regions or transition sites.</li> </ul>
Improving spatial and sectoral planning.	<ul style="list-style-type: none"> <li>• Improve provincial, district, and city spatial planning, particularly in forest conservation zones and marine protected areas, through robust assessments.</li> <li>• Integrate analysis on sensitivity to climate impacts into spatial plans and protected area management plans, both in urban and rural areas.</li> <li>• Incorporate socioeconomic data in spatial planning to identify social groups who are most at risk.</li> </ul>



TABLE 0.1 *continued*

ACTION AREAS	RECOMMENDATIONS
Strengthening local government in key functions needed for effective environmental management.	<ul style="list-style-type: none"> <li>• Build the capacity of district governments to manage critical aspects of sustainable landscapes, including human capital gaps required to effectively drive local economic transition and build resilience.</li> <li>• Build the capacity of subnational governments for climate-smart planning and public financial management.</li> </ul>
Aligning subnational fiscal incentives with a low-carbon economic transition.	<ul style="list-style-type: none"> <li>• Expand the use of performance incentives for locally led climate action, such as through sustainability-based performance indicators for subnational governments and use of Ecological Fiscal Transfer (EFT) mechanisms in fragile ecosystems.</li> <li>• Expand use of environmental fiscal transfers by increasing allocations of Special Allocation Fund/<i>Dana Alokasi Khusus</i> (DAK) and Village Funds to address the risks and costs of transitions.</li> </ul>
Optimizing village planning and budgeting systems to promote climate-smart development.	<ul style="list-style-type: none"> <li>• Build the capacity of communities to participate in environmental protection and economic development programs, as well as village planning and budgeting processes.</li> <li>• Promote climate smart budgeting and expenditure monitoring, such as by revising the annual Village Fund priority guideline and updating Village Chart of Accounts and Village Law nomenclature to provide clearer budget codes for spending on climate adaptation and mitigation.</li> </ul>
Increasing consistent provision of technical assistance to villages.	<ul style="list-style-type: none"> <li>• Strengthen sectoral technical assistance to villages to address landscape-specific risks and undertake mitigation measures by linking village and district government planning and budgeting mechanisms.</li> <li>• Develop and roll out climate smart standards for local infrastructure development to promote the resilience of infrastructure toward predicted changes in temperature or rainfall, and specifications to build resilience to storms and tidal surges.</li> </ul>

Source: Authors.

**Indonesia requires ambitious domestic leadership and significant global support to deliver on its climate and development goals.** Looking forward, Indonesia’s highly networked population has the potential to be the engine for change, if local communities can be given the right resources and support, accompanied by transparent and accountable delivery systems. There is significant potential to strengthen one of the country’s most critical tools to reduce poverty—village development program—which will be critical to scale investments to the level needed. When facing challenging policy questions in the past, Indonesia’s government did not shy away from taking bold steps to secure its own long-term interests. It will surely rise to the challenge of addressing the social dimensions of climate change.



# SECTION I.

# CONFRONTING CLIMATE CHANGE IN INDONESIA

**Climate change is a global challenge, but it is experienced and addressed locally, in the daily resource use patterns of people across Indonesia's approximately 80,000 communities.** Indonesia is highly susceptible to impacts of climate change, which has disproportionate socioeconomic effects within and across communities. Recently, Indonesia issued new commitments to low carbon transitions through (a) an enhanced Nationally Determined Contribution (NDC), (b) with a significant reduction of GHG emissions, (c) the goal of transforming the forestry and other land use (FOLU) sector into a net carbon sink by 2030, and (d) an economy-wide net-zero emissions by 2060 or sooner (Republic of Indonesia 2022). Aside from unequally distributed impacts of climate change vulnerability, it is expected that policy actions toward the achievement of these new commitments will have significant impacts on communities, particularly on poor and vulnerable groups. Section I provides a brief background on the social dimensions of climate change in Indonesia and outlines the people-centered approach of this report—which puts local communities and governance systems at the heart of climate action.





## CHAPTER 1

# THE NEXUS OF CLIMATE CHANGE AND SOCIAL SUSTAINABILITY



The impacts of climate change in Indonesia are likely to deepen socioeconomic vulnerabilities and challenge critical livelihoods. Delivering on Indonesia's commitments to decouple growth from GHG emissions also will have significant impacts on local communities, particularly on poor and vulnerable groups.



The social impacts of climate change and climate policies are predicted to be most pronounced in the forestry and other land use (FOLU) and energy sectors, from which targeted emission reductions (ERs) will come; and on the disaster-prone rural and urban poor.



To deliver on national commitments while protecting the poor and vulnerable, strong subnational implementation systems are needed to bridge top-down policies with bottom-up processes. Community-based and locally led approaches will be key instruments of inclusive local climate action to align the interests of local communities with national transition and development goals and to promote effective local action. More inclusive local governance and more space for citizens' voices in climate policy discussions will drive improved resilience to climate risks and promote inclusive growth.

## 1.1 Introduction

**Indonesia is highly susceptible to impacts of climate change, which are likely to deepen socioeconomic vulnerabilities and challenge critical livelihoods.** The country comprises 17,504 islands, 108,000 kilometers (km) of coastline, and has 75 percent of its territory at sea, making it extremely vulnerable to climate change risks. Over the past 2 decades, hydrometeorological events accounted for over 75 percent of disasters in Indonesia and 60 percent of the economic damage (Djalante and others 2021). In the coming years, this trend is expected to accelerate. If adaptation measures are not taken, an estimated 4.2 million people will be exposed to permanent flooding alone (World Bank and Asian Development Bank 2021). Expected variations in precipitation and temperature and erratic rainfall patterns are likely to affect agricultural yields and drive food price volatility and food insecurity. The poor and economically insecure are likely to carry a disproportionate burden of the impacts because they are more reliant on agriculture and natural resources and live in areas more prone to climate risk (World Bank 2023b).

**Indonesia is rising rapidly to the challenge of decoupling growth from greenhouse gas (GHG) emissions and adapting to climate change impacts.** Under the Paris Agreement, Indonesia committed to significantly reduce greenhouse GHG emissions relative to business as usual, while strengthening



economic and social resilience,<sup>1</sup> and has made a number of recent additional commitments to a low carbon transition.<sup>2</sup> Alongside FOLU, the agriculture and energy sectors make up the bulk of Indonesia's targeted reductions in emissions. The 2019 Low-Carbon Development Indonesia (LCDI) strategy outlines a vision "to transform the county's economy into one where progress is measured not only by GDP growth, but also environmental sustainability, resource efficiency, and social equity" (BAPPENAS 2019, 5). In addition, in 2021 Indonesia set out a new path in its Long-Term Strategy for Low Carbon and Climate Resilience 2050 (Republic of Indonesia 2021) to sustain and potentially accelerate its economic transformation from a middle- to a high-income country.

**More than 60 percent of the emission reduction target in Indonesia's enhanced NDC is intended to be met through actions in the FOLU sectors, which include protecting and restoring peatlands and forests.** Indonesia's mangrove forests, peatlands, and terrestrial forests are some of its most important natural assets. While being important to climate change mitigation, these ecosystems support Indonesia's economic growth and sustain livelihoods for millions of people. In recent years, the rate of deforestation has slowed thanks in part to stronger policies and enforcement related to forest and peat protection, alongside conducive weather conditions.<sup>3</sup> Nevertheless, land conversion for agricultural crops and forestry production by large and small holders, as well as use of fire in land clearing and insecure land tenure rights, continues to drive deforestation and land degradation, posing significant costs to health and livelihoods. Reversing these trends will require significant mobilization across natural resource dependent populations.

**Another major planned source of emission reduction is the transition from coal, which will be achieved through phasing down or closing coal mines and coal-fired power plants.** Indonesia's rate of coal production has soared from 77 million tons (Mt) in 2000 to a record level of 616 Mt in 2019 (MEMR 2011, 2020).<sup>4</sup> An estimated 93 percent of Indonesia's energy supply comes from fossil fuels (World Bank. 2023a). After China and India, Indonesia is the world's third largest coal producer and one of the largest coal exporters. Recently, Indonesia has made steps toward committing to a "just transition" from coal while securing the rights and livelihoods of those affected as economies shift to sustainable production. At the 2022 G20 Summit, just energy transition was declared a priority, and the Just Energy Transition Partnership and Indonesia's Energy Transition Mechanism Country Platform were announced. In 2023 a Presidential Regulation was issued on the Acceleration of Renewable Energy for Electricity Supply, detailing the early retirement of coal-fired power plants.

*Indonesia's peatlands and forests sustain livelihoods for millions of people.*

<sup>1</sup> The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the Congress of the Parties (COP) 21 in Paris, on December 12, 2015 and entered into force on November 4, 2016. The goal of the agreement is to limit global warming to well below 2.0, preferably to 1.5 degrees Celsius (compared to pre-industrial levels), as soon as possible.

<sup>2</sup> In 2022 the government made four new commitments to low carbon transitions through (a) an enhanced Nationally Determined Contribution (NDC), (b) with a significant reduction of GHG emissions, (c) the goal of transforming the forestry and other land use (FOLU) sector into a net carbon sink by 2030, and (d) an economy-wide net-zero emissions by 2060 or sooner (Republic of Indonesia 2022).

<sup>3</sup> Between 2010-20, primary forest and tree cover loss in Indonesia declined, with 2019-20 showing an almost 75 percent decline compared to the previous year, and the lowest rate of forest loss since 1990 (MoEF 2022b).

<sup>4</sup> Since the early 2000s, the need for the low-cost expansion of electricity service and universal electrification led to a 60 percent increase in Indonesia's total energy supply, fueled largely by coal, resulting in one of the most emissions-intensive electricity sectors in the world (IEA 2022).

**Delivering on Indonesia’s commitments to decouple growth from GHG emissions will have significant impacts on local communities, particularly on poor and vulnerable groups<sup>5</sup>.**

Climate change is a global challenge, but it is experienced and addressed locally, in the daily resource use patterns of people across Indonesia’s approximately 80,000 communities (box 1.1) (Castro and Sen 2022). Indonesia’s natural resource endowments, such as forests, peatlands, coal, and oil, have been the backbone of economic growth and progress on poverty reduction. Two-thirds of exports are made up of natural resources, and one-quarter of all jobs are in natural-resource-based sectors (agriculture, forestry, and fisheries). Geographically, coal production is concentrated in a few regions, with the population in those areas being almost fully dependent on it. Failure to plan for and invest in climate change mitigation, adaptation and a just transition is predicted to lead to job losses, decline of livelihoods that rely on natural-resource-dependent value chains, skills mismatch, land loss, energy and food insecurity, and reduced access to essential services and infrastructure.

*Climate change is a global challenge, but it is experienced and addressed locally, in the daily resource use patterns of people*

**Climate change affects the whole population, but some groups are more vulnerable to its impacts than others as a result of their socioeconomic status, gender, ethnicity and other identity markers.**

Climate risks both contribute to and are exacerbated by existing social and economic inequalities. Traditionally disadvantaged groups—female-headed households, children, persons with disabilities, indigenous peoples and ethnic minorities, landless tenants, sexual and gender minorities, and older people—are particularly vulnerable to crises. The root causes of their vulnerability lie in a combination of their geographic locations; their financial and socioeconomic status and cultural identity; and their access to resources and services, decision-making power, and justice. For example, in rural communities reliant on natural ecosystems, the poorest often live in remote, fragile, and disaster-prone areas. In urban areas, poor city dwellers often live in the city margins such as in densely built-up areas with poor housing conditions, along riverbanks that are prone to frequent floods, and in areas particularly exposed to air pollution. In both urban and rural areas, the vulnerability to climate risks of women and minority groups often is worsened by their lack of access to decision-making fora and economic opportunities.

**The most vulnerable groups also often are disproportionately impacted by measures to address climate change, necessitating a social lens in policy and program design.**

For example, climate policies such as carbon taxes or the removal of subsidies may place higher financial burdens on poor households. Measures to protect critical natural resources may limit access to traditional livelihoods including fishing and forestry. Social tensions over policies, risks, and how to manage transitions can weaken cohesion and prevent communities from cooperating on adaptive solutions and can lead to instability. Climate adaptation and mitigation investments need to address underlying inequalities and promote stronger social institutions to drive sustainable development.

<sup>5</sup> These trade-offs have been recognized in Indonesia’s Long-Term Strategy for Low Carbon and Climate Resilience 2050 (Republic of Indonesia 2021).



**The cost of *not* acting to manage the social impacts of climate change and climate change policies can be high.** Over the past few decades, Indonesia has made admirable progress in reducing poverty. Nevertheless, not addressing the social impacts of climate change and climate change policies could risk reversing some of these gains. The LCDI recognizes that “failing to act on low carbon policies could lead to over one million more people living in poverty...as well as higher mortality and lower human development” progress in education and health would be slowed down. It also estimates that an increase in annual additional deaths by over 40,000 (BAPPENAS 2019, 5). Indonesia’s resource-rich landscapes and marine territories are the habitats and livelihoods of its people and the source of food security for millions. Its natural assets directly support 50-60 million people (Rodrigues De Aquino, 2021). Poverty is still a priority development challenge, with only 20 percent of Indonesians having reached the economic security of the middle class. The bottom 40 percent remain at considerable risk of falling into poverty, and inequality remains high, particularly affecting remote areas in which natural resource dependency is high (World Bank 2020b). For Indonesia to maintain its poverty reduction record and move toward becoming an upper-middle-income country, addressing the social dimensions of climate change is not a choice, but a necessity.

*The cost of not acting to manage the social impacts of climate change and climate change policies can be high*

## 1.2 Foundations for Addressing the Social Dimensions of Climate Change

**Indonesia has policies and programs to manage the trade-offs inherent in climate-related transitions, including regulatory changes, sectoral policies, and place-based programs** (box 1.1). Indonesia’s enhanced NDC recognizes some of the social impacts on the poor and outlines a vision of a multisectoral approach to address climate change. Two main foci are the rights of local communities (including *adat*<sup>6</sup> groups) and the importance of mainstreaming gender equality. Similarly, the LCDI report states that low-carbon policies will be “implemented in a way that is compatible with just transition” and support “people and communities as they re-deploy and build new capabilities to participate in and benefit from the new low carbon economy.” (BAPPENAS 2019, 15). A range of existing climate-focused development programs aims to promote inclusive transitions from high-emitting activities through, among others, social forestry programs,<sup>7</sup> village development programs to promote resilience to climate impacts, and improved land titling for marginalized groups. Nevertheless, there is a need for broader recognition that the costs and benefits of climate-driven policy reforms will not be shared equally across Indonesia’s diverse populations and geography.

<sup>6</sup> *Adat* means “the way of life.” It refers to “customs” and often is used as a translation or synonym for “indigenous” groups and traditions.

<sup>7</sup> “Social forestry” refers to community-based sustainable forest management systems implemented within the Forest Area or titled forest/*Adat* forest lands by members of local communities or *Adat* community groups. These systems are intended to facilitate improvements to the welfare, environmental balance, and sociocultural dynamics through the establishment of Village Forests, Community Forests, Community Plantation Forests, Private Forests, *adat* Forests and Forestry Partnerships. Social Forestry licenses give local communities rights to conduct sustainable economic activities (such as swidden farming or timber plantations) within licensed areas (MoEF 2022a)

**Given Indonesia's decentralized governance structure, effective climate policy implementation is intimately bound up with reinforcing and clarifying the roles of subnational governments.**<sup>8</sup> Indonesia's climate mitigation and adaptation commitments will be implemented largely through subnational entities and community groups and civil society organizations that contribute to local climate action. In recent years, significant volumes of climate finance and subnational fiscal resources have been channeled to local governments, particularly at the village level, to do business, build local infrastructure, deliver services, produce commodities, and protect critical ecosystems. However, Indonesia's decentralized authorities and budgets are not yet optimized for climate-smart planning and investment. A development model that promotes economic growth while addressing the climate crisis will require significant realignment of resources and programs with climate change targets, as well as the active management of the trade-offs and conflicting incentives that subnational governments and local communities will face throughout the transition.

*Indonesia's climate mitigation and adaptation commitments will be implemented largely through subnational entities and community groups and civil society organizations that contribute to local climate action.*

**Indonesia's intergovernmental fiscal transfer formulas and revenue-sharing system can be reformed to better incentivize ecological actions across a range of sectors.** Currently, support to local planning and budgeting for adaptation is both fragmented and under-resourced, and programs that aim to drive mitigation actions often do not fully compensate opportunity costs to local actors. The GoI publicly announced its support for instruments to redistribute government tax revenues to protect sites of ecological importance and to compensate regional or local governments for environmental conservation efforts. For example, since 2020, the Revenue Sharing Fund (DHB)—an allocation of funds from the national budget given to regions and provinces—has taken into account regional performance in environmental preservation (Hamidi and Puspita 2021). This criterion would improve current systems, which as yet do not include sizable and inclusive ecological indicators nor have consistent systems to track environmental expenditure or outcomes.<sup>9,10</sup> Ecological Fiscal Transfers (EFTs) also have also been piloted, including Ecology-Based Provincial Budget Transfers (TAPes) and Ecology-Based District Budget Transfers (TAKes) in North Kalimantan and Jayapura (Pattiro 2021). Lessons from other initiatives to change the economic incentives, including Indonesia's REDD+ National Strategy 2021-2030 (MoEF 2022a), point to the need to develop lower cost and easier-to-scale instruments to channel climate finance. These instruments will lower transaction costs and increase investments in local communities.

<sup>8</sup> Since the early 2000s, Indonesia has embraced decentralized governance through the enactment of laws that delegate significant decision-making authorities to provincial, district and village governments. Fiscal decentralization implementation in Indonesia began in 2001 when transfer funds from the central government to the subnational government increased by 145.06% from IDR 33.07 trillion (2000) to IDR 81.05 trillion (2001). Over the past 2 decades, the amount of transfer funds increased significantly to IDR 812.97 trillion (2019) but, due to the COVID-19 pandemic, decreased slightly to IDR 762.54 trillion in 2020. On average, transfer funds in the state budget (APBN) have increased 13.03% per year over 2 decades (Badan Kebijakan Fiskal 2021).

<sup>9</sup> According to a policy brief by Universitas Indonesia, supported by USAID. [Link](#).

<sup>10</sup> Currently, the only transfer designated for reforestation, rehabilitation, climate action, social forestry, and forest fire control is the natural resource revenue-sharing from forestry (DBH DR) (Ministry of Finance Regulation 230/2017), which made up 7.7% of total subnational government revenues in 2019 (data from the Directorate General of Fiscal Balance, Ministry of Finance). However, as the allocation of DBH DR remains proportional to timber production in a given province or district, this structure punishes subnational governments who protect land as they receive less revenue, and rewards those who open forests for conversion. The pressure to exploit forests is particularly strong in provinces and districts with large, protected forests.

**BOX 1.1** Examples of Indonesia’s Existing Initiatives to Address Climate Change Mitigation and Adaptation

“Strengthening the environment and improving resilience against natural disasters and climate change” is 1 of 6 major development themes under the Government’s National Medium-Term Development Plan (RPJMN) 2020-24, which guides the government’s annual plans (*Rencana Kerja Pemerintah*, or RKP). Multiple policies and initiatives support this commitment, including select examples below:

- **Moratorium on new licenses for forest conversion.** In 2011 the government placed a moratorium on new licenses for forest conversion in primary forests and peat (a measure made permanent in 2019) and in 2016 strengthened the moratorium for areas of deep peat. These moratoriums protect a combined 66 million hectares (ha).
- **Institutions to access and channel climate finance.** In 2019 the Indonesian Environment Fund Management Agency (*Badan Pengelola Dana Lingkungan Hidup*, or BPD LH) was established. The BPD LH is a unit under the Ministry of Finance (MoF) that is responsible for channeling the financing of climate and environmental projects. In 2021 Presidential Regulation no. 98/2021 on the Economic Valuation of Carbon was introduced to support results-based payments and other market-based instruments that incentivize climate mitigation activities.
- **Land reforms to protect forests and livelihoods.** A commitment to award 12.7 million hectares (ha) of social forestry licenses is helping to reverse local incentives for forest clearing. The National Land Reform Program (*Tanah Obyek Reforma Agraria*, or TORA) aims to formalize land ownership of an additional 9 million ha outside the forest estate. The nationwide Systematic and Complete Land Registration program has progressed at an unprecedented speed, doubling the number of registered land parcels to approximately 100 million in only a few years.<sup>a</sup>
- **Community-based disaster awareness and mitigation.** The government has a suite of programs to drive local climate action and build resilience, including the National Board for Disaster Management’s (*Badan Nasional Penanggulangan Bencana*, or BNPB) Community-Based Disaster Risk Management (*Desa Tangguh Bencana*) program. This program uses national data systems and hazard-mapping technologies to assess risks, works with local communities to put in place risk assessment and response plans, and trains local facilitators to help villages to implement their plans.
- **Climate-smart community development.** The “National Programme for Community Empowerment (*Program Nasional Pemberdayaan Masyarakat*, or PNPM) piloted a “Green” variant of the national program. The pilot project financed block grants for “green” projects, such as sustainable agriculture and disaster risk reduction. More recently, the Ministry of Environment and Forestry (MoEF) introduced the Climate Village Program (*Program Kampung Iklim/Proklam*), which encourages community and stakeholders’ participation in climate adaptation and mitigation at the village level.
- **Ecological fiscal transfers.** These are incentivized funds from higher level governments (national, provincial, or district) to lower level governments (provincial, district, or village) based on their performance in protecting the environment. Between 2019 and 2022, driven by a coalition of civil society organizations led by the Asia Foundation, 18 subnational governments formally adopted ecological fiscal transfer policies.<sup>b</sup>

Source: Authors’ synthesis.

<sup>a</sup> In 2021 the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency surveyed and mapped more than 10 million land parcels.

<sup>b</sup> See this [link](#).

**BOX 1.2** Promise of Community-Based Approaches to Climate Action

Significant global evidence points to the effectiveness of approaches to development programming that work directly with communities to share information, build consensus on local challenges and solutions, and channel resources for local development projects that can be implemented by communities themselves. Community-based approaches to policy or programs are characterized by principles of community-led decision making and local control over development resources. Such programs engage communities meaningfully by devolving decisions and resources to communities, including having communities lead on key aspects of problem diagnosis, solutions, and implementation. Community development projects informed by this approach often have three key features: (a) community members participating in local planning and decision-making processes, (b) resources channelled directly to communities to finance priorities that they have identified, and (c) technical assistance to support transparency in using funds and providing technical assistance (such as engineers to help design village infrastructure).



These programs are popular because they provide a mechanism to channel large volumes of resources directly to communities at low cost for investments that meet national policy goals and are tailored to the needs of local communities. This model has three main advantages. Community-based approaches are more sustainable than top-down alternatives that lack local buy-in. They are more cost effective and accountable in comparison to activities of the same scale implemented vertically by sectoral agencies. Finally, community-based approaches are less likely to put vulnerable groups at risk by depriving them of access to critical resources or assets (Ayers 2011; Cornwall 2000, 2006; Dodman and Mitlin 2011; Guggenheim and Wong 2018).

Community-based approaches have proved effective in supporting climate adaptation and mitigation measures across the globe (Stacey and others 2021). Well-designed community-based approaches can provide (a) local (such as village level) planning fora that incorporate analysis of local climate risks and transition opportunities and provide a platform around which to coordinate service provision; (b) financing and technical support for mitigation and adaptation actions that a community can take, such as improving irrigation infrastructure or addressing soil erosion; and (c) a monitoring and reporting system for local services and illegal activities, such as community forest monitoring.

*Source: Authors' synthesis.*

**In a context of strong national commitments, several instruments are required to incentivize and enforce the attainment of national objectives from the bottom up.** Indonesia's biodiversity, rich forests and coral reefs, agricultural lands, and energy resources are key sites of a low-carbon economic transition. However, they all house vulnerable populations who stand to win or lose depending on how the transition is handled. First, for Indonesia to attain its national commitments for climate adaptation and mitigation in a socially sustainable and inclusive way, community-based and locally led approaches will be key instruments. Stronger mechanisms are needed to directly support the communities most at risk and most critical to climate mitigation actions. Also critical is to ensure that communities on the frontlines of economic transitions can participate meaningfully in, and benefit from, climate initiatives. Indonesia has a wealth of experience in delivering community-based development programs (box

1.2) that leverage local knowledge, leadership, and implementation capacity. These programs provide ongoing robust, long-term systems to support transitions while simultaneously being available for quick responses to emergency situations, such as the 2004 tsunami in Aceh or the COVID-19 pandemic. Indonesia's 2014 Village Law gives village governments and communities significant resources (approximately US\$8 billion per year) and authority to plan and implement development projects. The Law also provides a framework anchored in national and district budgets to which climate funds, technical support, and results monitoring can be added to support locally led climate actions. This mechanism could better integrate climate risks and resilience considerations in local development planning and investments and deliver concrete benefits to local communities.

*Citizens' voices will need to be brought into climate policy discussions*

**Second, citizens' voices will need to be brought into climate policy discussions.** Environmental movements in Indonesia have a long history and have had significant influences on national policy, law, and practice (Peluso and others 2008).<sup>11</sup> Civil-society-led advocacy has ranged widely. It has included agrarian movements and rights-based safeguards (including mapping territories of indigenous groups to support land and resource access claims), and promoting justice-based climate mitigation (Luhtakillio 2022). Religious groups have started to advocate for a just transition in the energy sector and wider climate action, and their leaders have a significant effect on local stakeholders' responses to potential mine and power plant closures.<sup>12</sup> A growing number of *bupatis* (district heads) have formed district-level platforms for dialogue that invite private sector and non-governmental organizations' (NGOs) groups to debate issues and find commonly agreed solutions. All these stakeholders need to be given an increasing voice through meaningful engagement mechanisms to contribute to the transition so that outcomes are perceived as fair and legitimate (Barron and others 2023).<sup>13</sup>

**Third, policies and programs will need to manage tradeoffs and incentive structures at the local level through coordinated, cross-sectoral, and site-specific planning and delivery.** Examples include sustainable landscape management (SLM) approaches<sup>14</sup> in agricultural, forest, and marine ecosystems, and Local Economic Development (LED) approaches to coal transition. For example, rather than a narrow focus on repurposing mining sites, holistic approaches to local economic development in coal-dependent regions are needed to promote economic transformation in a sustainable and inclusive manner. However, these approaches require significant cross-sectoral collaboration and investments. In particular, FOLU, agriculture, and energy sectors are deeply intertwined at local levels because

<sup>11</sup> Environmental organizations occupied a special position as compared to labor and peasant movements during the Sudharto era, as they were considered apolitical (Lounela 2015; Nomura 2007; Peluso and others 2008; Tsing 2005; all cited in Luhtakillio and others 2022). Their influence on policy and practice was significant especially in the early 2000s (Peluso and others 2008).

<sup>12</sup> See appendix D.

<sup>13</sup> Such engagement mechanisms are critical contributors to "social sustainability," that is, when all people feel part of the development process and believe that they and their descendants will benefit from it. How policies and programs are designed and implemented impacts whether these are accepted by all stakeholders as fair and credible (Barron and others 2023).

<sup>14</sup> "Landscape" is understood as a multifunctional geographic area in which environmental, social, and economic objectives compete and are valued differently by different stakeholders (Reed and others 2016; Sayer and others 2013). Landscapes are shaped by the interactions between human activities and the biophysical environment (World Bank 2021). SLM addresses competing interests within multi use ecosystems. It coordinates across sectors and stakeholders to achieve better overall social, economic, and environmental outcomes.



Indonesian business actors and communities increasingly are engaged across both mining and plantation activities within landscapes (Toumbourou and others 2022). For example, East Kalimantan, Indonesia’s third-largest province, has significant forest resources and relies highly on its mining sector. There, interventions to constrain certain forestry activities may deepen dependence on coal. Moreover, if not carefully managed to provide alternative livelihoods options to those who will lose employment, the closure of coal mines or plants may drive additional deforestation.

**In summary, a successful climate response will need to work effectively across scales by which national policies, decentralized governance, and bottom-up community actions complement one another.** The variability of climate risks across Indonesia rules out one-size-fits-all solutions. As such, inclusive and effective climate responses in Indonesia will depend to a large extent on the ability to align the interests of local communities with national transition and development goals to promote effective local action. This in turn will require Gol decisionmakers to design and implement policies that are (1) responsive to local contexts and citizens’ needs, (2) implemented through local governments, and (3) perceived locally as trustworthy and legitimate (Barron and others 2023).<sup>15</sup> Policies to promote locally led climate action enables Gol to leverage the capabilities of its greatest resource—its people—to better manage natural resources and invest in more sustainable development outcomes. For this reason, this report focuses primarily on the important role of locally led actions, and the operational considerations therein.<sup>16</sup>

### 1.3 Report Outline, Data, and Methods

**This report on the social dimensions of climate change in Indonesia focuses on a people-centered analysis of climate impacts and policies and puts local communities and the instruments at their disposal at the heart of climate action.** With a focus on the poor and most vulnerable, the report maps differentiated vulnerabilities to climate change across the archipelago and examines the potential effects of climate mitigation and adaptation policies on local communities. The report also explores how communities and subnational actors have responded to climate impacts and identifies strategies to accelerate climate adaptation and mitigation actions while ensuring that the most vulnerable groups benefit from these initiatives.

**The analyses in this report are based on specific separate but closely linked analytical activities carried out between 2020 and 2023.** They include:

- Statistical and machine learning analyses of a village-level database of local climate change vulnerabilities covering over 80,000 communities of Indonesia, constructed from a combination of spatial and community-level datasets that provide information on local exposures, sensitivities, and adaptive capacities related to climate change (appendix A)

<sup>15</sup> For further explanation on the importance of perceptions of legitimacy of development processes, see Barron and others 2023.

<sup>16</sup> Other reports have focused on the broader social policies needed for an inclusive economic transition. See, in particular, the Indonesia Country Climate and Development Report (World Bank 2023a).

- Ethnographic case studies of 10 villages selected to reflect a broad range of contexts in relation to climate change adaptation and natural resource governance, to examine how local government officials navigate conflicting incentives and tradeoffs (appendix B)
- Randomized controlled experiment with 823 community participants that tested the impacts of sharing facilitated information on climate risks with communities on their knowledge on and understanding of climate impacts, and related preferences for local development spending (appendix C)
- Qualitative analysis of social dimensions of coal transition across 4 districts in East Kalimantan and South Sumatra provinces, based on primary data collection through key informant interviews with 210 individuals. These data came from the public, private, and civil society sectors, an online survey of 108 individuals, consultation workshops with 101 stakeholders at the national and subnational levels, and a desk review of 152 documents and media reports (appendix D)
- Regulatory review pertaining to climate actions across different levels of governance, and public expenditure analysis of village budgets in comparison to various aspects of vulnerability to climate change (appendix E)
- Participatory action research on climate-resilient livelihoods in Eastern Indonesia, a survey on changes in agricultural production in 49 communities in Jambi province, and a range of policy and operational insights and experiences from across Indonesia.

*The report is organized as follows.* Section II (chapters 2 and 3) provides an overview of vulnerability to climate risks across Indonesia's population. While not a comprehensive accounting of the full social, economic, and other costs, section II gives an overview of the social dimensions of climate change, describes trends affecting different population groups and geographies, and outlines potential sources of social resilience. Section II also discusses the specific vulnerabilities of coal-mining communities and the anticipated social risks inherent in Indonesia's expected coal transition.

Section III (chapters 4 through 7) introduces a framework for driving bottom-up climate actions to address some of the vulnerabilities facing the population, in line with Indonesia's national priorities and commitments. In a context in which local communities and local governments are so critical for effective policy implementation, section II focuses on the practicalities of designing programs to best work with the people they are designed to affect, including through village governments, subnational finance for climate action, preparations for a just coal transition, and stakeholder engagement platforms.

The report concludes with Section IV (chapter 7) which provides recommendations for the Government of Indonesia (GoI) and its partners in development, including donors, practitioners, and civil society, to take in driving socially sustainable and inclusive transition toward a low carbon economy.



## SECTION II.

# SOCIAL DIMENSIONS OF CLIMATE RISK AND RESILIENCE

**Social inequalities and exclusion intersect with climate risks and climate policies.** Indonesia faces significant climate risks and the challenge of delivering on an ambitious decarbonization agenda. Both challenges risk deepening existing inequalities. Fortunately, there are proven policy options to build resilience for those most vulnerable to climate impacts and exclusion from low emission transitions. Section I provides an overview of vulnerability to climate impacts in Indonesia, the social factors that deepen the vulnerability of some population subgroups, an illustrative summary of sources of resilience for these groups, and a deep dive into the social dimensions of coal transition.





## CHAPTER 2

# CLIMATE VULNERABILITY AND RESILIENCE IN INDONESIA



The impacts of climate change experienced by communities depend not only on their exposure to climate risks but also on the sensitivity of their livelihoods and cultures to climatic changes, and their capacity to adapt and respond to these changes. Vulnerability varies significantly across the population depending on geographic, economic, and social factors.



Populations who face discrimination, limited access to rights and governance platforms, or exclusion from social networks, face disproportionate impacts from climate risks and have a lower capacity to adapt. The poorest and most vulnerable in remote rural areas and densely populated urban cities are expected to face the most severe impacts from climate change.



Indonesia can improve resilience to climate change by enhancing the collective ability of communities to withstand, recover from, and reorganize in the face of transitions. Local knowledge, traditions, and skills are important drivers of this ‘social resilience’, combined with securing access to rights and resources, especially for marginalized groups.

**Vulnerability to climate change varies significantly across Indonesia’s socially and geographically diverse archipelago.** Vulnerability varies across temporal and spatial scales and depends on economic, social, geographic, demographic, cultural, institutional, governance, and environmental factors (Cardona 2012; Field and others 2014). The multidimensional factors driving climate vulnerability include poverty; exposure to natural hazards, gender, and other social inequalities; access to decision-making processes; and access to knowledge and information (Adger 1999; Ribot 2010; Thomas and others 2019). Resulting from climatic shifts, different population groups in different locations will face a broad range of differing risks and opportunities. Deepening an understanding of vulnerability to climate change means asking who is vulnerable, where, how, and why. Chapter 2 describes these vulnerabilities and highlights various social aspects relevant to understanding and addressing vulnerability and building resilience in Indonesia.

## 2.1 Understanding Vulnerability to Climate Change in Indonesia

**The Intergovernmental Panel on Climate Change defines vulnerability to climate change as a function of exposure, sensitivity, and adaptive capacity** (Cardona 2012; Field and others 2014). The impacts of climate change experienced by communities depend not only on their exposure to climate risks but also on the *sensitivity* of their livelihoods and cultures to climatic changes, and their *capacity* to adapt and respond to these changes (Adger 2006; Thomas and others 2019; World Bank 2009). This three-part

definition encompasses an understanding of localized risks and mitigating conditions that populations face. Research conducted for this report highlights several vulnerabilities for Indonesia (see appendixes A and B for data sources and methodological details).

### Exposure

**As an archipelago located at the intersection of major tectonic plates, Indonesia is highly exposed to natural disasters and the impacts of climate change.** Communities across Indonesia are exposed to a wide range of climate risks stemming from changes in temperature, precipitation, and increased frequency of natural disasters (World Bank and Asian Development Bank 2021). In its extensive low-lying and small island areas, Indonesia has experienced increasing frequency and intensity of natural disasters. Between 1990 and 2021, the country experienced more than 300 natural disasters, including 200 floods that affected more than 11 million people. The frequency of these disasters is increasing, with climate-related disasters accounting for approximately 70 percent of the total and expected to rise (World Bank 2023a). Indonesia ranks in the top one-third of countries in natural hazard risks (World Bank and Asian Development Bank 2021) and twelfth of the 35 countries that face a relatively high mortality risk from multiple hazards.<sup>17</sup> Climate change is increasing storm severity, sea level rise, warmer water temperatures, and shifts in coastal ecosystems and fisheries (World Bank Group 2023a). By the end of this century, Indonesia's sea surface temperatures are expected to warm by 1.39°C to 3.68°C relative to pre-industrial times (MMAF and others 2023). Given its diverse geography, the anticipated changes in temperature, precipitation, and frequency and intensity of disasters will vary substantially across the country. For example, climate projections predict that parts of Sumatra and Kalimantan will be 10 percent-30 percent wetter by 2080 from December to February, and Indonesia's islands below the equator are anticipating a 15 percent decline in precipitation (World Bank 2023a). These trends pose challenges for Indonesia's economy and the people it supports.

*Given its diverse geography, the anticipated changes in temperature, precipitation, and frequency and intensity of disasters will vary substantially across the country.*

**Over 110 million people in approximately 60 Indonesian cities are exposed to the above negative impacts of climate change, with the country's urban poor being the most vulnerable.** This high risk is due largely to the concentration of urban poor in city peripheries, where infrastructure is limited and low quality. Drainage systems vary in their quality. Other hydrometeorological disasters such as landslides, droughts, and heatwaves also are reported in Indonesia's biggest cities, albeit to different degrees. Coastal cities are vulnerable to storm surges, coastal erosion, and sea-level rise, which exacerbate the risk of flooding and saline intrusion. On the other hand, cities including Bekasi, Medan, and Bandung are located inland and face issues related to river flooding and sedimentation. The conversion of natural land cover (such as wetlands and forests) into urban areas and agricultural lands has exacerbated the vulnerability of these cities to flooding and other climate-related hazards.

**Indonesia's largest and most densely populated cities, such as Jakarta, Surabaya, Bandung, Medan, and Bekasi, are expected to face significant challenges as a result of climatic shifts.** Increases in monthly maximum temperatures are expected to range from 7.8 to 9.0 degrees Celsius by 2100, along

<sup>17</sup> See this [link](#).



with increases in rainfall of approximately 100mm/year (World Bank and Asian Development Bank 2021). Exposure to rising sea levels is expected to lead to increased flooding and saltwater intrusion into freshwater sources, particularly during the rainy season when intense rainfall overwhelms drainage systems. For example, forty percent of Jakarta's area, mostly in the north, already lies below sea level so is vulnerable to tidal flooding, storm surges, and future rises in sea levels. In Jakarta, both total rainfall and the intensity of rainfall events have increased, while rising global temperatures and the urban heat island effect have increased average temperatures. Future projections indicate an escalation in the frequency and intensity of extreme rainfall, heightening Jakarta's vulnerability to flooding.

**Rural and remote areas also are exposed to a range of risks.** The poorest rural areas of Nusa Tenggara, Maluku, and Papua show similarities in the projected trends of rainfall and temperature due to climate change for the year 2100. Climate change models suggest that these regions will experience increased temperatures and altered rainfall patterns. Rising temperatures are predicted to lead to more frequent and intense heatwaves, posing risks to human health and agricultural productivity. Simultaneously, changing rainfall patterns may result in more erratic precipitation, including prolonged droughts and heavier rainfall events, leading to increased water scarcity and the potential for floods or landslides. These events can result in infrastructure damage, displacement, loss of livelihoods, and loss of lives. For example, in Maluku, climate-change-induced hydrometeorological events already exact heavy costs. Heavy rains frequently cause flash floods and landslides on Ambon Island and other islands and are likely to increase. Across the province, some islands will see dry seasons becoming drier and wet seasons wetter, whereas others will see hotter and drier weather between rainy seasons. The islands of Buru, Ambon, and Seram may experience decreased rainfall in all seasons, whereas the islands in the south and Aru will experience decreased rainfall only from December to May. These ongoing changes will impact crops, forests, and fresh water sources (USAID 2018a).

### *Sensitivity*

**Across Indonesia, sensitivity to climate change varies significantly depending on social, economic, and political factors that shape the ways that climate change impacts are experienced locally.** These impacts include the extent of reliance on natural resources, access to infrastructure and services, social exclusion, conflict, and access to jobs and income-generating activities (Field and others 2014). Many poor communities live in remote and fragile areas prone to risk and reliant on natural resources, including increasingly fragile resources such as declining fish stocks, degraded forests, or agricultural lowlands. In urban areas, poor communities often live in the areas with poor housing conditions along riverbanks prone to frequent floods, and in areas particularly exposed to air pollution (World Bank 2023b). Within urban and rural communities alike, women and disadvantaged groups tend to be more affected, including impacts on their health, livelihoods, and agency (World Bank 2023b). Increased exposure of women and marginalized groups to climate risks is expected to result in disproportionate impacts on mortality, livelihoods, food and water insecurity, migration, and threats to cultural identity (also see Hallegatte and others 2016; ILO 2017; World Bank 2010a; World Bank 2019).

*Increased exposure of women and marginalized groups to climate risks is expected to result in disproportionate impacts on mortality, livelihoods, food and water insecurity, migration, and threats to cultural identity*



**Access to basic services, infrastructure, capital, savings, credit, and technology is a critical driver of sensitivity to climate impacts.** Uneven delivery of public services contributes to inequality of opportunity and limited resilience to climate impacts. For a far-flung archipelago such as Indonesia, the geographic dimension of these differences cannot be overstated. The rural areas are more disadvantaged because they often lack an equal level of access to hospitals and schools, clean water, and safe sanitation as their urban counterparts (World Bank 2020c).

**Sensitivity to climate change is particularly high in lagging regions such as Eastern Indonesia.** The latter historically have had higher poverty rates, lower levels of basic services, and greater dependence on natural resources for local livelihoods (figure 2.1). In over 90 percent of villages within the lagging districts across Eastern Indonesia, households depend on food crops and livestock and have some of the country's poorest access to basic services, such as improved sanitation, drinking water, and fuel sources (World Bank 2020c). For example, despite gains in poverty reduction in Nusa Tenggara and Maluku, extreme poverty became more concentrated in these lagging regions, which are farther from areas that have served as the economic engine of the country (World Bank 2023b). These infrastructure and services deficits deepen the sensitivity of these areas to climate risks. In other words, the expected changes in precipitation and temperatures hit harder in these communities and have outsized impacts on marginalized groups within them. For example, recent qualitative research in two districts in Maluku and East Nusa Tenggara highlighted that water scarcity in some villages – likely to be exacerbated by changes in precipitation – has major implications for gendered division of labor and community health. The research showed that water shortages may require women to spend more time collecting water, and may impact other household tasks and family health, which tend to be managed by women.

**Farming communities are disproportionately sensitive to climate impacts, with the rural poor hit hardest by disruptions in production and consumption.** Expected variation in precipitation and temperature will negatively affect agricultural yields, which remain a key livelihood for many rural, and often poor, households, and drive food price volatility. Agricultural livelihoods are sensitive to climate change based on the topography and ecological conditions of land. Traditionally, many smallholder farmers relied on familiar cues in the environment to determine their farming practices. Climate change's alteration of weather patterns and temperatures can confuse these environmental signals and disrupt smallholders' understanding of how and when to conduct their farming in a high-emissions scenario.

**Similarly, populations reliant on fisheries and aquaculture are highly sensitive to climate change.** With 17,504 islands, 108,000 kilometers (km) of coastline, and 75 percent of its territory at sea, Indonesia's prosperity is deeply entwined with its oceans. In a high-emissions scenario, the average maximum catch potential in Indonesia's fisheries could decline by 20 percent-30 percent,<sup>18</sup> reducing returns to fisheries by 15 percent-26 percent by 2050 (MMAF and others 2023). These impacts are likely to hit small-scale fishers the hardest, especially around the Arafura, Timor, and Banda Seas, carrying undesirable implications for livelihoods, food security, and economic growth.<sup>19</sup> In Maluku, for example, climate change has significantly affected the ocean currents, negatively influencing fish patterns and the timing of fish cycles (Turner-Walker 2023).

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<sup>18</sup> The low climate change scenario sees declines of up to 20% in some regions, and 5%-15% in most regions, by 2050 (MMAF 2023)

<sup>19</sup> The sector currently contributes US\$26.9 billion annually to the national economy (approximately 2.6 percent of gross domestic product (GDP)), 50 percent of the country's protein, and over 7 million jobs (MMAF 2023).

**BOX 2.1 Geographic Lottery? Neighboring Villages in Maluku Face Different Risks**

The geography and topography of various areas, down to the village level, are significant drivers of vulnerability to climate change in Indonesia. Although there is a range of relevant factors, this outcome is due largely to the influence of land use and availability of water for agriculture and household consumption. For example, quantitative assessments followed by case studies show that the populations of two villages in the same district in Seram Bagian Timur in Maluku Province experience quite different climate impacts, driven by both topographical factors and natural-resource-dependent livelihoods. In coastal Danama village, there are two seasons: the windy “East season” and calm “West season.” Fishing activity is paused during the East season, leaving families to fall back on forest crops such as nutmeg and cloves until fishing resumes in the West season. Climate change has delayed the arrival of the East season and the breeding of sea worms, which usually signal seasonal changes to villages. This delay has confused residents and has made nutmeg and clove harvests less predictable. By contrast, the inland village of Waimakatabu is most exposed to changes in rainfall, which affect the agriculture upon which the population depend. Increased rainfall in Waimakatabu is affecting horticultural crops in particular, making plant pests and diseases increasing challenges.

*Source: Participatory action research conducted for this report by SOLIDARITAS. Summary by Authors.*

**Globally, evidence shows that natural disasters have disproportionate impacts on poor and vulnerable groups and reinforce existing inequalities.** Sensitivity to climate risks often is exacerbated by marginalization or discrimination of some social groups as well as by historic contestations over resources (Elmhirst 2011; Escobar 1998; Mollett and Faria 2013; Prudham 2007; Schroeder 1999; Sundberg 2006). Social disadvantages often reflect historic patterns of inequality and marginalization, including unequal access to natural and financial resources, political power, and information (Thomas and others 2019; Ireland and McKinnon 2013). For example, some groups dominate certain institutions, such as by owning more land or playing stronger roles in official forest management bodies or policing (Vandergeest and Peluso 1995; Brockington 2002).

**Within communities, women are disproportionately sensitive to climate risks.** Local gender norms shape the differential effects of climate change and climate policies and may disrupt the gendered division of labor in various ways. For example, in coastal fishing communities, fishing is rarely the single income source for households, and there a gendered division of household labor. Men go to sea and catch fish while women sell the seafood and forage for additional seafood such as shellfish; tend agricultural plots; and undertake household duties. Future shifts in seasons and timing of foraging for crabs and other seafood may conflict with agricultural seasons, disproportionately impacting women, who dominate both tasks. More broadly, climate impacts magnify existing gender inequalities. In Indonesia, women are more likely to live in poverty than men, have lower literacy, have less access to basic rights such as the ability to move freely and own land, and have lower levels of voice and representation in political processes than men.<sup>20</sup> These inequalities are worsened by climate-related hazards and result in heavier workloads, more occupational hazards, greater psychological and emotional stress, and higher mortality for women. For example, 2 in 5 Indonesian households delegate women household members to carry water (Irianti and Prasetyoputra 2019) meaning that changes in water availability in some areas will have a disproportionate impact.<sup>21</sup>

<sup>20</sup> See World Bank Gender Databank. [Link](#).

<sup>21</sup> BPS data in 2021, accessed on the BPS website.

**In addition, women often are disproportionately sensitive to disasters, indicating that they will continue to be over-exposed to future climate risks.** For example, during the 2004 Tsunami in Aceh, 70 percent of the 250,000 fatalities were women, and women aged 15-44 were twice as likely to die as men. Five years after the 2004 tsunami in Sumatra, the loss of both parents in the tsunami had reduced school enrollment by 40 percent for adolescent boys (aged 15-17) and 55 percent for adolescent girls. Furthermore, young women who had lost their parents as adolescents in the tsunami were 62 percent more likely to be married than their peers who did not lose a parent (Cas and others 2014). Experiences from past disasters and shocks in Indonesia show that they can also disrupt or divert funds from key reproductive health services for women. For example, after the 2004 Indian Ocean earthquake and tsunami and the 2018 Lombok earthquake, medical and contraceptive supplies were disrupted, and midwives reported difficulties in getting around due to closed roads and disrupted travel services (World Bank 2020a).

**Culture and cultural diversity are put at risk by climate impacts, particularly those affecting indigenous peoples and traditional *adat* communities.**

Cultures rooted in particular landscapes and natural resources face unique threats, but they also can prove resourceful in adapting. The heightened sensitivity of indigenous communities often is rooted in dependence on fragile natural resources for their livelihoods, the inconsistency of legal and traditional ownership of or access to traditional lands and resources, and an ability to interpret regular natural cycles and act in accordance with perceived patterns and risks (Kronik and Verner 2010). In Indonesia, traditional *adat* communities often depend for their livelihoods on traditional knowledge, use, and management of natural resources (primarily forest and water resources) (box 2.1). For example, *Aliansi Masyarakat Adat Nusantara* (AMAN), an organization representing indigenous groups, estimates that the total population of indigenous peoples in Indonesia is 50-70 million and claims that 40 million ha of forest land are *adat* forest, but very little of this forest land is recognized as *adat* by the government (Bedner and Arizone 2019).<sup>22</sup>

*Cultures rooted in particular landscapes and natural resources face unique threats, but they also can prove resourceful in adapting.*

### **Adaptive Capacity**

**Adaptive capacity – the ability to respond positively to external shocks or changes – depends on access to opportunities, support systems, technologies, and decision-making platforms that support adaptive measures such as diversifying livelihoods, improving infrastructure, or adjusting farm technologies.** Economic opportunities, basic infrastructure, and services are fundamental sources of resilience to climate change. Equal access to livelihood options, savings, technology, and essential public

<sup>22</sup> The third amendment to the Indonesian Constitution recognizes Indigenous Peoples' rights in articles 18 B-2 and 28 I-3. In more recent legislation, there is implicit recognition of some rights of Indigenous Peoples, in which they are referred to as "*Masyarakat Adat*" or "*Masyarakat Hukum Adat*." These laws include Act No. 5/1960 on Basic Agrarian Regulation, Act No. 39/1999 on Human Rights, and MPR Decree No. X/2001 on Agrarian Reform. Act No. 27/2007 on the Management of Coastal and Small Islands and Act No. 32/2010 on the Environment clearly use the term "*Masyarakat Adat*" and use the working definition of AMAN. In May 2013, the Constitutional Court affirmed the constitutional rights of Indigenous Peoples to their lands and territories, including their collective rights to customary forests.

services and social programs are primary drivers to reduce natural resource dependency and enhance the adaptive capacity of disproportionately affected groups. In addition, a range of “social dimensions” either strengthen or erode adaptive capacity and thus are critical components of vulnerability to climate change. These include social status and resilience to change, and the social cohesion<sup>23</sup> in their communities (Chatterjee, Gassier, and Myint 2023). Both economic and social dimensions are explored below.

**Access to economic assets and opportunities is a critical driver of adaptive capacity.** In Indonesian communities, access to diverse livelihood options is the primary source of adaptive capacity (Field and others 2014). In contrast, lower adaptive capacity is linked to higher poverty rates. For example, of the 76 million flood-exposed people in Indonesia, 40 million (14.3 percent of the population) live on less than \$5.50 per day; and 16 million (5.7 percent) on less than \$3.20 a day (World Bank 2019), resulting in their limited capacity to cope with shocks. For the urban poor, capacity to adapt to risks is constrained by limited access to basic services and resilient infrastructure. In contrast, urban employment in the service sector and manufacturing is less likely to be directly impacted than areas more dependent on agriculture. In rural areas, diverse productive livelihoods improve adaptive capacity. In Danama village (box 2.1), for example, which has seen changes in fishing seasons as a result of climatic shifts, communities have access to the coast, farmland, and forest areas as well as fairly good access to education. When threats to the villagers’ main farming and fishing livelihoods occur, such as poor harvests, or during the windy “East season,” which inhibits fishing, the villagers can fall back on foraging for seafood (such as crabs and shellfish) on the beach and for *melinjo* and ferns from the forest. Some people migrate to nearby towns to work as laborers. In comparison, communities in nearby Waimatakabu do not have access to forest lands or the coastline so have to rely heavily on their farming incomes.

**Social cohesion also is a key component of adaptive capacity.** Social cohesion includes how well networked communities are, how much community members trust one another and are willing to work together, and their access to decision-making fora to interact with the state (Chatterjee, Gassier, and Myint 2023). Social standing, identity, and identity politics shape access to resources and decision-making platforms. Groups with more political power are more likely to secure funding to plan for or cope with climate-related risks and impacts. For this reason, the exclusion of women from decision-making fora in many arenas, including village governance processes and natural resource management bodies, contributes to lower capacity for them to adapt to impacts the experience. Generally speaking, the ability of communities to demand their rights and use local decision-making platforms to allocate resources to tenure security as well as to other elements of natural resources management are key to adaptive capacity. For example, as a result of the villagers’ stronger political networks and ability to advocate for their needs, Waimatakabu village (box 2.1) gets more support from its district government than Danama does from its district government. The former has provided Waimatakabu villagers with funding for clean water and livestock projects, plus annual packages of seeds and farming equipment.

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<sup>23</sup> “Social cohesion” is defined as a sense of shared purpose, trust, and willingness to cooperate among members of a given group, with members of different groups, and between people and the state (Chatterjee, Gassier, and Myint 2023).

**Access to rights and legal status is critical to enable communities to advocate for their needs.** Land administration in Indonesia continues to run on two separate tracks through registration of land rights outside of Forest Areas to the issuance of use licenses inside the Forest Areas.<sup>24</sup> Fierce competition<sup>25</sup> over land among communities, corporations, and government, combined with complex land management systems, often result in social conflict with disproportionate negative impacts on *adat* groups especially. In particular, persistent mismatches between legal/formal institutions and traditional cultural norms for the access, use, and ownership of land often are central to the challenges that *adat* communities face. Notably, significant advances in land registration through a national land registration program have registered approximately 126 million land parcels. These advances have improved the adaptive capacity of many communities by addressing issues related to land tenure, such as discrepancies between legal use and actual use, and lack of access by the rural poor and indigenous groups (McCarthy 2016).

**Access to capital, knowledge and technology also drive adaptive capacity and vary significantly across and within communities.** In communities with “stronger” social institutions, there may be more trust, knowledge sharing, and norms around helping others or sharing resources. These qualities help communities work together to react to changes based on shared goals. Examples are local planning and management institutions to improve local infrastructure in response to (or to prevent) disasters, or adjusting water use and sharing systems. In less cohesive communities, stresses on resources caused by climate change could sow tensions, contribute to increased crime or discrimination, or weaken management of fragile resources (Chatterjee, Gassier, and Myint 2023).<sup>26</sup> For example, although villagers in Danama (Box 2.1) may have more diverse livelihoods, they have limited sources of knowledge and support to help them cope with the changes they are experiencing. Farming knowledge tends to be traditional, passed down through generations. In contrast, farmers in Waimatakabu are organized in farmer groups that have routines of working together and are granted access to training. The migrants who make up the population of Waimatakabu appear to have brought practices more common in Java (such as the use of fertilizers and pesticides) and may have created strong social bonds due to being migrants in a new area.

**Within communities, there also can be differentiated patterns of adaptive capacity, often perpetuated by social norms.** Women commonly have lower adaptive capacity due to unequal access to jobs, incomes, finance, and consultation and decision-making platforms in which they could advocate for their needs (Deininger and others 2023; World Bank 2020a). For example, across forest and marine sectors in which environmental protection programs aim to subsidize and support low-emissions, sustainable enterprises, knowledge and skills gaps and disproportionately low access to credit and capital limit women’s ability to benefit from such programs as accessing technical assistance or competing for business grants. Moreover, poor quality and design of infrastructure creates an uneven playing field for women and could be exacerbated by climate related damages (Deininger and others 2023; World Bank 2020a).

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<sup>24</sup> In the national Forestry Law, Forest Area is designated by Gol and consists of state forest and private forest (including customary forest). Currently, more than 99.9% of Forest Area is classified as state forest.

<sup>25</sup> Land conflict is a prominent feature across Indonesia, with the number of active conflicts steadily increasing, and most frequently occurring in rural areas in which livelihoods depend on land resources (Handoku and others 2019).

<sup>26</sup> On the role of social cohesion in enhancing development outcomes, see Chatterjee, Gassier, & Myint 2023.



**BOX 2.2** Protecting Local Knowledge and Culture among the Climate-Conscious Ngata Toro

The Ngata Toro, a forest-dwelling community in Central Sulawesi, have livelihoods and identities deeply tied to natural resources, which are at risk due to climate change and climate policies. However, local action to protect local identities and maintain local cohesion have helped the community to adapt to changes in policy and to protect their culture. In recent years, the community has seen declining agricultural harvests as a direct result of climate-related increases in average temperatures. Poor harvests have increased the community's reliance on forest-based resources, particularly harvesting rattan. The Ngata Toro place a high value on living in harmony with the environment. Customary "laws" governing resource use, periods of regeneration, and land zoning are tied into deeply held spiritual beliefs and expressed through cultural rituals. As one community member stated:

*Natural resources or forests for Indigenous peoples are seen not only in their economic value but also in spiritual values. There is a connection with the whole of creation. Before there was religion, we already understood that all natural resources are gifts from God. Do not be greedy.*

*When it comes to forests, our customary rules are very strict. Because the forest is the basis of life and identity for the Toro people, if it is violated, the sanctions are very serious. The worst thing is that you have to move out of the village.*

Several rituals or traditional ceremonies characterize the Ngata Toro tradition. One is the land-clearing ceremony. After all the prerequisites for land clearing – whether related to sustainability or zoning rules – have been met and are approved by customary institutions, a procession is carried out involving slaughtering a white chicken or white buffalo. In addition, an annual "thank-you" ceremony is organized to celebrate abundant harvests and to express gratitude to Mother Earth. During the ceremony, the people pray together, inviting the priest and imam to lead the prayers. A feast follows, and then the most exciting part of the event: the areca nut tree-climbing competition.

The Ngata Toro community has historical claims to 18,000 ha of land, which now fall within the Lore Lindu National Park. These claims have not been recognized by the authorities, meaning that the community is not permitted legally to conduct traditional rattan-harvesting practices. This lack of recognition led to many arrests (from 2007-11) of community members who were harvesting timber, and to internal conflicts among groups within the community. These disagreements were over how to respond and the future role of indigenous knowledge and traditions. In contrast, in the same area, several commercial concessions have been granted – reflecting the disparate access to political power and natural resource management governance of different social and economic interest groups.

Many elder members of the Ngata Toro community are concerned that the younger people are losing their local identities and tradition and being seduced by more "consumeristic" values. In response, in 2020 the community established the Tondo Lino Ngata Toro Native School, which serves students from kindergarten to junior secondary level. The school's mission is to preserve indigenous knowledge and culture, inculcate traditional values and local wisdom in the younger generation, and enable the youth to gain the skills and qualifications that the community needs to advocate for its rights. As described by one community leader:

*We have established a nature school to transfer local wisdom to our children. They are taught by one community leader to understand how to use natural resources regularly, including forest resources. The social order can be transformed through the children. [38-AR-02]*

Source: Authors based on qualitative study (appendix B).

## 2.2 Mapping Vulnerability to Climate Change

**Vulnerability is a complex and highly contextual concept. Methods to date have struggled to comprehensively model expected impacts in fine resolution or to document differentiated vulnerability across the country** (World Bank Group and ADB 2021). Vulnerability is underpinned by local social, economic, and political factors that require detailed data not only on projected impacts but also on relevant social and economic indicators. Such granular quantitative analysis is needed to inform both high-level climate policy and local actions. For example, it often is recognized that communities experience the impacts of climate change differently. Nevertheless, the specific vulnerabilities of local populations are not embedded in local planning and resource allocation. In Indonesia, the availability of high-quality granular data at the village level makes it possible to map highly localized climate vulnerability patterns across the country, such as the government-led effort to inform local mitigation and adaptation measures<sup>27</sup> through the *Sistem Informasi Data Indeks Kerentanan* (SIDIK).<sup>28</sup>

**A prototype database developed by the World Bank uses village-level data to show multidimensional climate-related vulnerabilities, providing a tool for future policy and programs to integrate climate vulnerability in development planning.**<sup>29</sup> The database leverages the availability of village-level data with national coverage to develop a data analysis tool that covers each of Indonesia's 80,000 communities.<sup>30</sup> Like SIDIK, it is constructed from a combination of publicly available spatial datasets that provide information on local characteristics related to climate change and village census data (PODES 2018).<sup>31</sup> The new database includes variables with information on several dimensions discussed in the previous section, including (a) past, present, and predicted (2018 to 2100) changes in temperature and precipitation; (b) recent climate hazards and natural disasters; (c) past and present changes in population; (d) past and present land cover change; (e) current infrastructure development for electrification and transportation; (f) current information on majority village livelihoods, natural resource use, and market access; and (g) current information on village development indicators, including majority household sanitation, water source, and fuel type. Table 2.1 outlines the three dimensions of vulnerability and the data points used to map these aspects (see appendix A for methodological details).

<sup>27</sup> Database. [Link](#).

<sup>28</sup> Database. SIDIK, or the Vulnerability Index Data Information System, was developed by the Ministry of Environment and Forestry (MoEF) from 2012-21 based on an index of various indicators of exposure, sensitivity, and adaptive capacity. It ranks the vulnerability to climate change of villages and provinces across Indonesia. [Link](#).

<sup>29</sup> Other datasets combine variables on exposure, sensitivity, and adaptive capacity. However, this new World-Bank-developed dataset draws from a variety of validated scientific research projects. These include downscaled climate projections and remotely sensed land cover data from NASA (United States National Aeronautics and Space Agency) and social, institutional, and economic data from the National Statistics Agency of Indonesia. Although it is the most ambitious effort to compile climate change vulnerability data in Indonesia, this new dataset remains limited in the historical scope and comparatively limited information on the location and diversity of local livelihoods, institutions, and poverty. Nonetheless, this dataset is one of the best examples of how climatic, land cover, and village-level socioeconomic and institutional data can represent local climate vulnerabilities. A full description of methods is available in appendix A.

<sup>30</sup> A note of caution is that this database does not claim to tell the full story of the dynamic vulnerabilities to climate change experienced across the country. Any data tool that aggregates information will need to be combined with local and participatory approaches and should be understood as guidance, not a prescription. However, the database does provide a degree of legibility to an otherwise impossibly complex landscape and has the potential to be developed into different tools for different stakeholders in climate policy – from central government decisions makers to civil society and local communities.

<sup>31</sup> Since the data come from publicly available spatial data and regularly collected proprietary data, the vulnerability clusters and profiles can be updated as new information becomes available.

**TABLE 2.1** Climate Vulnerability Index Data Summary

DIMENSION	SUMMARY OF KEY INDICATORS
Exposure	<ul style="list-style-type: none"> <li>• Past, present, and predicted (2018 to 2100) changes in temperature and precipitation</li> <li>• Recent climate hazards and natural disasters</li> </ul>
Sensitivity	<ul style="list-style-type: none"> <li>• Past and present changes in population</li> <li>• Past and present land cover change</li> <li>• Village altitude and slope (coastal, flat, or sloping)</li> <li>• Current information on majority village livelihoods, natural resource use, and market access</li> <li>• Current information on mortality and nutrition</li> </ul>
Adaptive capacity	<ul style="list-style-type: none"> <li>• Current infrastructure development for electrification and transportation</li> <li>• Current information on village development indicators, including majority household sanitation, water source, and fuel type</li> <li>• Current information on language diversity, crime rates</li> <li>• Current information on health and education services</li> </ul>

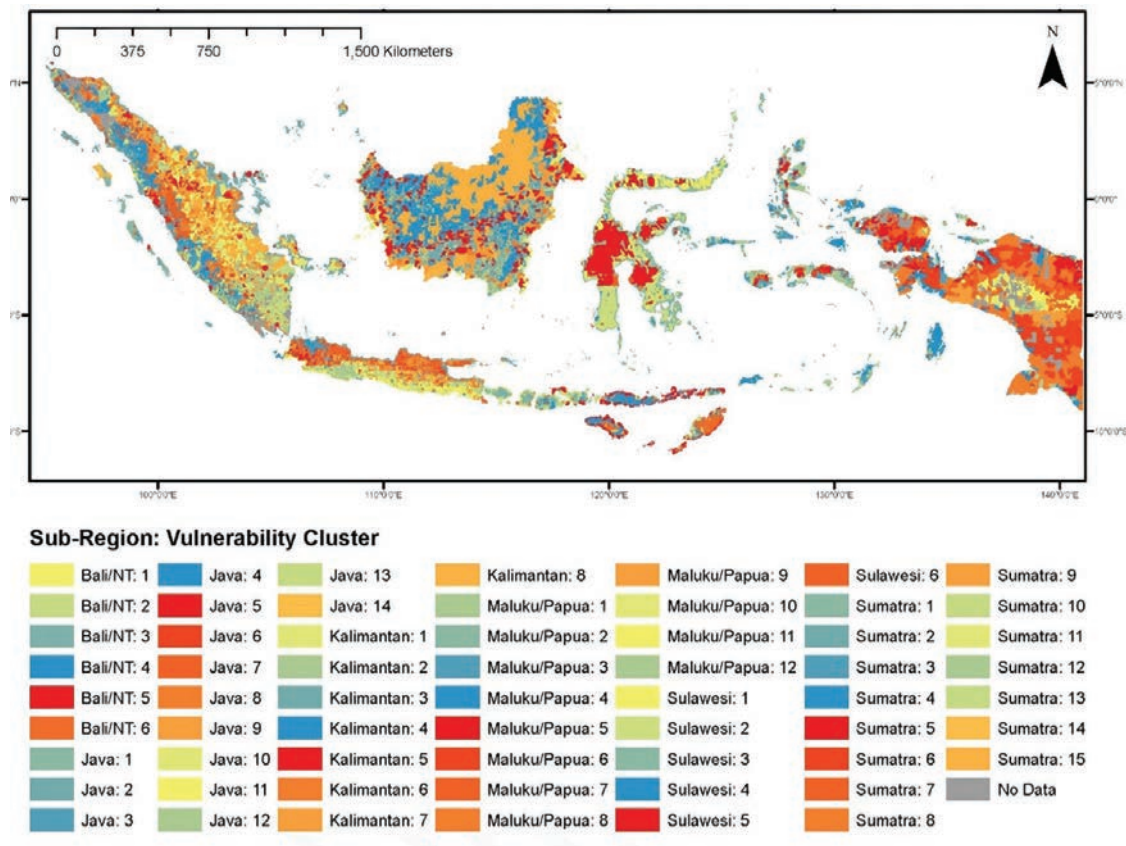
Source: Authors based on climate vulnerability analysis (appendix A).

The data are consolidated in a climate vulnerability map that shows both the diversity of vulnerabilities across Indonesia and the commonalities experienced by clusters of communities across similar ecosystems. Villages facing similar climate change vulnerabilities are clustered based on their vulnerabilities and topographic, ecological, infrastructural, and livelihood qualities; and represented on a national climate vulnerability map. This map containing 61 clusters<sup>32</sup> (figure 2.1) is the basis for qualitative vulnerability profile descriptions (box 2.3) that highlight policy-relevant information unique to each of these clusters within six subregions: Sumatra, Java, Kalimantan, Bali/West Nusa Tenggara/East Nusa Tenggara, Sulawesi, and Maluku/Papua.



<sup>32</sup> These subregions broadly represent Indonesia's diverse demographic patterns, development trajectories, climatic patterns, and ecological zones.

**FIGURE 2.1** Climate Vulnerability Map of Indonesia



Source: Authors based on climate vulnerability profiles (appendix A).

Note:  $n = 61$  across all subregions. Clusters are unique within subregions. Thus, similar colors across regions do not represent the same clusters.

**Granular climate vulnerability data could usefully inform the design and targeting of programs across agriculture, natural resources management (NRM), poverty reduction, and climate resilience.**<sup>33</sup> To promote local adaptations, district governments, villages, or community groups may use vulnerability profiles to identify future risks, and/or engage in peer-to-peer learning and knowledge exchange with other groups in the same cluster about adaptation options. Villages within clusters share many aspects of vulnerability to climate risk, including elements of adaptive capacity. Villages are more likely to find inspiration in adaptations and innovations adopted by villages with similar risks and adaptive capacities based on sharing lessons and expertise among villages within clusters. Similarly, vulnerability maps could inform the decisions of a district governor to prioritize investments in disaster risk reduction (DRR) and ensure access to the skills sets of engineers, agricultural extension workers, and other specialists specific to their needs. Integrating climate vulnerability data in systems that support implementation of the Village Law and other subnational systems for planning and budgeting will optimize these platforms for more effective climate action, for example, by prioritizing activities that promote sustainable landscape management.<sup>34</sup>

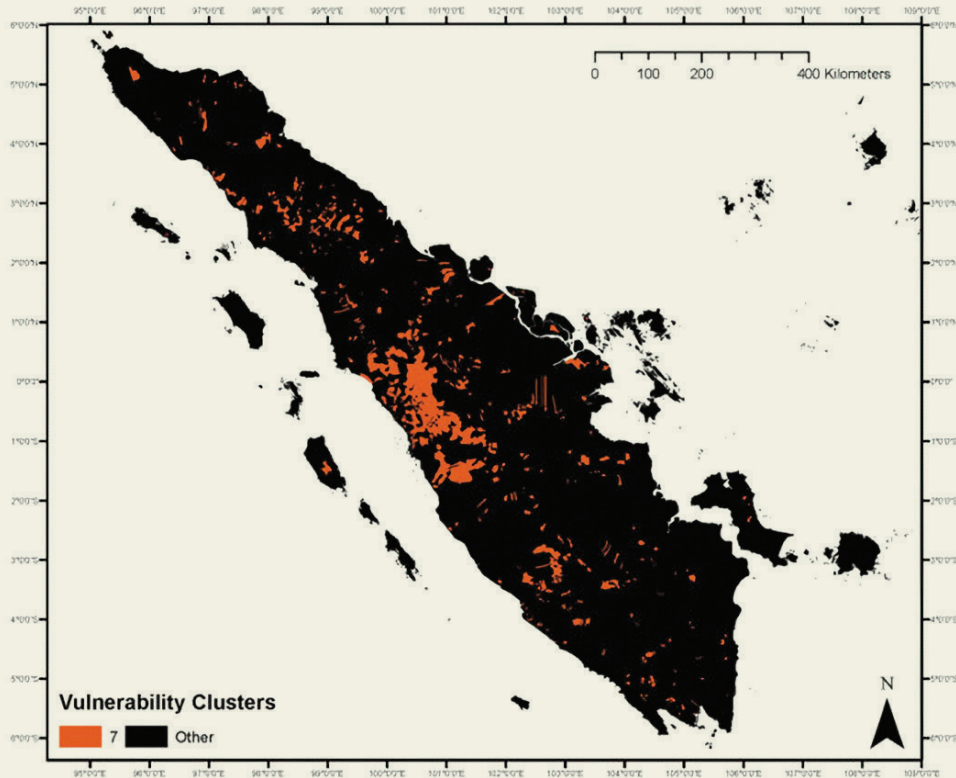
<sup>33</sup> MoEF aims to make available vulnerability mapping and data analysis tools to all stakeholders as the basis from which to assess and address climate risks across Indonesia.

<sup>34</sup> As stipulated in Permendesa 16/2018.



**BOX 2.3** Vulnerability Map and Profile for a Cluster of Communities in Sumatra

Spread throughout inland Sumatra, this cluster consists of 795 villages that have higher-than-average population density and average population growth. By 2100, an increase of average monthly maximum temperatures of 10.2 degrees Celsius is projected in this cluster. Variations in both precipitation and temperature are expected to increase. Forty-six percent of villages in this cluster experienced flooding between 2015 and 2018. This flooding resulted in 17.1 percent of villages reporting disaster-related deaths. The temperature rise for this cluster is one of the highest projected in the Sumatra subregion. Combined with this cluster's history of flooding, the projected changes to climate represent the primary vulnerability facing these villages.



Source: Authors.

Most villages report flat topography with higher-than-average village slope. Forest cover is the predominant land cover category, even though there has been a moderate amount of forest cover loss in favor of mixed-use grassland from 2001 to 2018. There is significant dependence on natural resources, including forests. Almost all income is derived from the agriculture and mining sectors. Fifty percent of the grassland is dedicated to food/livestock crops. The other 50 percent is commodity agriculture (likely timber and agroforestry). This cluster is well developed with 97 percent of households reporting that they are electrified, and 93 percent of villages reporting that the majority of households uses purchased fuel. Only 10 percent and 23 percent of villages, respectively, report that the majority of households has trouble accessing improved sanitation and drinking water.

Source: Authors based on climate vulnerability profiles (appendix A).



**There is demonstrated potential to embed vulnerability profiles in community-driven development processes to drive local adaptation strategies.**<sup>35</sup> For example, a World-Bank-financed project implemented by *Bursa Pengetahuan Kawasan Timur Indonesia*, a nongovernmental organization based in Makassar, is piloting use of the vulnerability profiles to tailor support for target communities in a pilot climate-resilient livelihoods development project.

## 2.3 Building Social Resilience for Mitigation and Adaptation

The preceding discussion suggests that addressing vulnerability to climate change in Indonesia requires addressing the underlying structural drivers of poverty, inequality, and vulnerability, empowering traditionally disadvantaged groups and local communities, and improving the ways that communities relate to one another, organize themselves, and work together. Doing so requires recognizing the differentiated climate change impacts across peoples and places and is expected to build (and build on) social resilience. Hallmarks of social resilience include cooperation in response to disasters, supporting one another, shared awareness of the risks that the community faces, and feelings of trust and solidarity within communities. Resilience to climate change thus requires enhancing the collective ability of communities to withstand, recover from, and reorganize in the face of transitions.<sup>36</sup>

**Local knowledge, traditions, and skills are important drivers of social resilience across Indonesia's diverse population and geography.** In communities with strong ties to their land and a long history of managing local resources, knowledge about how to manage resources and forecast weather change (for example, in plant and animal behavior), and skills to cope with the changing climate are critical to adaptive capacity. In addition, local norms and practices, such as *gotong royong*—traditions of collective action, obligations toward others, and mutual assistance—strengthen adaptive capacity (Barnes and Goonetilleke, eds. 2015; Bowen 1986; Fuentes-Nieva and Seck, eds. 2010). Common applications are environmental protection or collaboration of residents working together, volunteering to help neighbors, and reconstructing infrastructure (Anwar and others 2017; Kusumawardhani 2014).<sup>37</sup> Strengthening social resilience thus requires people-centered, participatory solutions that build on local values and institutions. For example, efforts to promote resilience to climate impacts may seek to integrate programs that promote and protect traditional languages and customs at the same time that they are supporting communities to assess and understand contemporary issues of climatic change and environmental carrying capacity.

*Strengthening social resilience requires people-centered, participatory solutions that build on local values and institutions*

<sup>35</sup> Initial research on the climate vulnerability clusters and profiles sought to validate findings with village heads (*kepala desa*) across Indonesia. This research demonstrated that local experts effectively used the profiles to discuss vulnerabilities and consider how specific adaptations might alleviate the harms from climate change. Additional research demonstrated that sharing information from the vulnerability profiles within communities in a facilitated setting led to changes in their development priorities.

<sup>36</sup> In addition to assets and economic opportunities, a range of social factors strengthens or erodes resilience to climate risks. Building resilience requires taking a holistic approach to understand and address climate impacts, going beyond a narrow focus on economic impacts such as food security, incomes, and jobs (Alier 2003).

<sup>37</sup> However, it also should be noted that not all “traditional” practices are environmentally friendly, especially if underlying conditions such as population pressure and environmental carrying capacity have changed over time. For example, traditional practices such as clearing peatland using fire or hunting and foraging traditions that put pressure on endangered species may not align with sustainable resource management goals.

**Global evidence points to the benefits of granting stronger rights and protections to local communities' land and the resources that they have managed historically, but land tenure and rights in forested areas in Indonesia remains insecure for many.**

Significant progress has been made on this front in Indonesia. For example, in 2021 alone, the government's flagship land registration system surveyed and mapped more than 10 million land parcels. Legal recognition enables communities to position themselves to acquire rights or resources. However, most



forests and forest fringes still lack secure land tenure and clear land use classification because they fall within demarcated state forest areas. Fifty-one percent of Indonesia's land cover is designated as Forest Area (MoEF 2020), and 25,863 villages nationwide, housing 37.2 million people, are partly or wholly located in the Forest Area. (MoEF 2018). Forest occupancy can be regulated through temporary land use permits or customary forest recognition, but the majority of Forest Area occupants do not have any documentation of their holdings. This insecure land tenure disincentivizes investments in production or landscape conservation, and instead encourages fast resource exploitation and conversion of forests to other land uses.

**Protection of land rights is deeply embedded in the politics of local natural resources management, and in social networks.** Despite a widening legal scope for indigenous rights in Indonesia, in practice, land rights on the basis of indigeneity are often granted based on social networks. Successful bargaining and advocacy by communities is often contingent upon support by civil society groups or political patrons who help them to navigate the legal (and political) process to have their claims recognized (van der Muur and others 2017).<sup>38</sup> In contrast, communities who are in conflict with local state actors, or have weaker social ties to organizations focused on advocacy and support, tend to find it more difficult to have their indigenous status recognized and codified.

**Access to information, resources, and support from a range of networks and stakeholders boosts resilience.** Formal and informal networks are key channels for community resilience, and climate adaptation strategies are shown to build on social networks and collective action. For example,

<sup>38</sup> In Indonesia, the demand for indigenous land rights often takes place in the offices of local governments and regional parliaments, which have considerable discretionary power to decide whether particular communities get recognized as 'indigenous.' Thus, groups with stronger social ties to local governments tend to be more successful whereas more socially isolated groups are at a disadvantage (van der Muur 2018). Thus, indigenous *adat* politics is not only a national or legal battle, but also a subnational one. Advocacy and legal efforts have proliferated into many localized short-term '*adat* projects', where communities collectively articulate grievances, demanding state recognition while seeking support from NGOs and international development organizations (van der Muur, W. and others 2019).

farmer fora and networks are common platforms for adopting and replicating climate-smart technologies.<sup>39</sup> Political and cultural organizations also provide key channels to access resources and contribute to policy discussions. Moreover, strong advocacy and civil society support networks have significantly impacted national policy and practice and provide important networks of support and assistance for some communities (Peluso and others 2008; van der Muur 2018). Most farmers and Indigenous peoples across the archipelago are connected to at least 1 of 3 groups: Indigenous Peoples' Alliance of the Archipelago (AMAN), the main advocacy group for Indigenous communities in Indonesia; the Consortium for Agrarian Reform, Indonesia's largest land reform movement organization; and the Indonesian Forum for the Environment, the country's largest green group. All three groups advocate for, and channel resources toward, their members.



*Village governments in Indonesia provide a critical gateway to improve social resilience and advocate for community needs.*

**Village governments in Indonesia provide a critical gateway to improve social resilience and advocate for community needs.**<sup>40</sup>

Elected village heads have significant power and influence on local development and the competing land and resource use issues facing communities. The roles of village leaders as gatekeepers and organizers of the community are a legacy from the precolonial era. Their roles have been strengthened by formalizing villages as the lowest administrative unit of government (World Bank 2023c). Village governments now consist of elected village heads, elected village consultative councils (*Badan Permusyawaratan Desa*, or

BPD), and administrative staff, who are appointed. Village officials – depending on how well connected they are to other powerful stakeholders such as traditional or religious leaders, District governments, or others – play a key role in advocating for what they see as the interests of the village. Village officials use their networks and authority to manage village affairs, including natural resource management. For example, for decades, farmers in Muara Sungsang (Banyuasin, South Sumatra) have been cultivating coconuts on land purchased from its traditional owners, without either party realizing that this land was in fact categorized as Protected Forest. The village administration successfully navigated bureaucratic processes – through the Agrarian Reform Land Objects Program (*Tanah Objek Reforma Agraria*, or TORA) – to have the land rezoned so that coconut cultivation continues to be permitted (see Appendix B).

<sup>39</sup> These have helped with strategic actions such as adapting seed varieties and cultivars, and establishing cooperatives to determine marketing and pricing collectively, as well as pooling transport logistics, and community systems manage shared resources among farmers (such as windbreak vegetation and water resources). These actions extend to responses to market conditions (formulating cooperatives to ensure reliable market prices for produce) as well as to ensure climate change impact-driven issues, such as growing incidence of pests (which requires collective responses to eliminate fungus and pests).

<sup>40</sup> Although, notably, they also can be a constraint if they do not govern transparently or if they exclude certain groups.





**In summary, resilience to climate change is deeply embedded in social institutions.** Social institutions, or the ways that people relate to one another, organize, and work together, determine how climate change is understood, how communities prepare for it, and how they participate in programs for climate adaptation and mitigation. Improving social resilience requires strengthening local institutions that can channel and filter information, resources, and support to local communities. Indonesia also has long-held traditions of village leadership, over two decades of community-driven development programming, and the increased autonomy and resources granted to villages through the 2014 Village Law. All three of these could be leveraged to strengthen communities' climate resilience. The role of existing mechanisms to support social resilience against climate vulnerabilities and climate change policies will be discussed later in this report.







## CHAPTER 3

# SOCIAL DIMENSIONS OF COAL TRANSITION IN INDONESIA



Indonesia is one of the world's largest coal producers and the largest exporter. Coal production is geographically concentrated in a handful of regions that heavily depend on this industry, making them particularly vulnerable to impacts of climate change impacts and policies.



The coal transition in Indonesia will ignite a series of direct, indirect, and induced impacts in coal-dependent regions. The main impacts include job losses, dislocation of workers and their families, deepening inequalities, and loss of access to infrastructure and services. If not mitigated, these impacts could drive heightened mistrust, insecurity, and social instability.



Advance transition planning can proactively address local needs, manage social risks, and reduce communities' dependence on coal in preparation for the phaseout. Social support and economic development investments are required to protect local populations and offer sustainable livelihood alternatives. Stakeholder engagement platforms are essential to provide fora for consultation, grievance redress, and transition planning.

**Coal-dependent regions of Indonesia have special characteristics that put them among the regions most drastically affected by climate change impacts and policies.** Apart from the usual array of climate impacts, these areas confront additional vulnerabilities due to their reliance on an industry at the heart of global climate change mitigation efforts. Coal is the world's most dominant source of energy and the leading driver of GHG emissions. Transitioning from coal has been identified as one of the most important steps to attain the objectives of the Paris Agreement. The transition from coal also was at the heart of the 2022 United Nations Climate Change Conference of the Parties (COP 27), in which the conversation centered on the logistics of this monumental shift, specifically the financial implications and the cost burdens. As one of the world's leading coal exporters, Indonesia's transition away from coal is particularly significant.

**Indonesia has recently made a policy commitment to embark on a transition from coal.**<sup>41</sup> Coal transition refers to a shift characterized by gradual reduction or closure of coal-powered plants and coal mines. This shift can be catalyzed by public policy or market conditions that make the continued operation of these facilities economically unfeasible. In Indonesia, coal transition policies and programs are starting

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<sup>41</sup> Just transition to clean energy and the rapid phase-out of coal were at the heart of COP26. More than 40 countries pledged to phase out coal power. One hundred and ninety countries committed to scale up clean power and ensure a just transition from coal. Major international banks committed to end all international public financing of new unabated coal power by the end of 2021. At least 25 countries and public finance institutions committed to end international public support for the unabated fossil fuel energy sector by the end of 2022.

to be debated at the national level. Despite an increasing focus on energy policy and the financial dimensions of coal transition, the understanding of the anticipated social impacts, particularly at the subnational level, is limited.<sup>42</sup> Indonesia's substantial coal-dependent economy necessitates a careful and inclusive approach to ensure the transition's fairness, legitimacy, and viability. If the transition is not managed carefully, it could disproportionately affect the livelihoods or vulnerability of communities and certain social groups.

### **BOX 3.1 Principles of a Just Transition from Coal**

Just transition is a process of economic restructuring that ensures that the benefits of a green economy are shared widely, while supporting those who stand to 'lose' (economically, socially, and politically) from the transition. The latter include workers in industries that are being phased out, such as coal mining and fossil fuel extraction, and communities who are dependent on these industries.

A just transition represents a strategic response to global socioeconomic transition induced by climate change. Rooted in three foundational principles—*distributional justice*, *procedural justice*, and *restorative justice*—just transition offers a tailored approach, acknowledging that a “one-size-fits-all” method does not apply in navigating the unique complexities of transitioning to an environmentally sustainable economy and society. In recent years, the concept has gained traction and is being incorporated in climate change policies and agreements. As an example, the Paris Agreement calls for “...a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities”.

*Distributional justice* refers to the fair distribution of the benefits and burdens of a transition from coal. Distributional justice includes ensuring that workers who are displaced from coal jobs can find new, good-paying jobs and that communities who rely on coal for economic activity are not left behind.

*Procedural justice* refers to the fair and transparent process of making decisions about a coal transition. Procedural justice includes ensuring that all stakeholders have a voice in the decision making and that the process is not dominated by special interests.

*Restorative justice* refers to repairing the harm to communities and individuals resulting from coal mining or coal use. Examples of such justice could be restoring land rights and addressing harmful impacts such as pollution.

Source: UNEP 2016; UNFCCC 2015; World Bank 2021b.

**Chapter 3 discusses the anticipated impacts of coal transition in Indonesia and highlights the social aspects relevant to a just transition from coal.** The World Bank's framework for regions in coal transition underlines highlights three key pillars: the welfare of people and communities, policy and strategy development, and land and environmental remediation (Stanley and others 2018). Understanding the unique socioeconomic dynamics of Indonesia's coal communities is necessary to foster a just and equitable transition. Based on a desk review, qualitative fieldwork, and stakeholder interviews across four districts in East Kalimantan and South Sumatra (appendix D), chapter 3 provides an early identification of key social issues and potential responses for consideration for a “just transition” from coal (box 3.1).

<sup>42</sup> Multiple political economy studies on coal discuss the role and power of national governments and businesses in shaping policy and national direction (Bridle 2018; Fünfgeld 2020; Hartanto 2021; Lucarelli 2010; Ordonez and others 2021). More recently, such studies have included a nod to subnational government (Fünfgeld 2016, 2020). In other literature, the social dimensions of coal in Indonesia are portrayed narrowly from the perspective of environmental injustice in which social and land conflicts emerge and local identities change and struggle to surface (Indriastuti 2019; Muhdar and others 2019; T. Toumbourou and others 2020; T.D. Toumbourou and others 2022).

### 3.1 Coal Dependence across Indonesia

**Indonesia is one of the world's largest coal producers despite decarbonization efforts in other sector of the economy.** Over the last two decades, Indonesia's decarbonization efforts focused primarily on its forest and land use sectors, followed by the energy sector (ICCSR 2010).<sup>43</sup> Meanwhile, coal mining and coal power plants had continued to flourish since the 1990s, especially in Java, Kalimantan, and Sumatra regions (Arinaldo and Adiatma 2019). In the early 2000s, the rate of growth of coal production accelerated due largely to the growing domestic demand for electricity (figure 3.1). Coal production consistently exceeded government target limits, and numerous new coal power plants were accommodated within the national electricity business plan (Citraningrum and Tumiwa 2022). In 2014 Indonesia made a decisive move toward renewables, setting a target for a 23 percent renewable energy mix by 2025. Despite the subsequent policy support and incentives for renewable sources, these efforts often were hindered by cross-sectoral coordination challenges, renewables pricing regimes and costs, and the capacity of the grid to accommodate intermittent power sources. The tide began to turn in 2022, when the early retirement of coal power plants was announced along with new renewables pricing regimes and a moratorium on new coal power plants connected to the power grid. These steps marked a shift in the country's energy policy, bringing coal phase-out to the fore, mandating cross-ministry cooperation, and introducing improved renewable energy tariffs.

**The majority of coal produced in Indonesia is exported, though domestic demand remains strong.** Indonesia still prioritizes its domestic energy supply (Lucarelli 2015), but a large share (nearly 80 percent in 2022) of the coal is exported, with China and India receiving about 50 percent of Indonesia's coal exports due to their significant demand.<sup>44</sup> The remainder is consumed domestically, the majority (75 percent) of which is used in coal-powered plants (mostly on Java) (Bulmer and others 2021; Carmen 2022). From 1990 to 2019, the country's electricity generation amplified by 900 percent, with coal-fired electricity escalating at a significantly higher rate. As a result, coal's representation in the electricity mix surged from 30 percent to 60 percent, highlighting its substantial contribution to the grid (Bulmer and others 2021).

**Coal production in Indonesia is highly concentrated in Kalimantan and Sumatra regions, which host the majority of Indonesia's coal reserves.** Indonesia has approximately 39 billion tons of coal reserves, which are the fifth largest in the world and estimated to last for 65 years at current production levels. The province of East Kalimantan is Indonesia's third-largest province with the largest coal reserves; and is the country's largest coal producer, accounting for more than 40 percent of the total production. East Kalimantan is followed by South Sumatra, the second largest producer at 25 percent, and by South Kalimantan, Central Kalimantan, and West Kalimantan (also all on Borneo) at 15, 10 and 5 percent, respectively.<sup>45</sup> In some of these provinces, coal production contributes a significant share to the provincial GDP (figure 3.2).

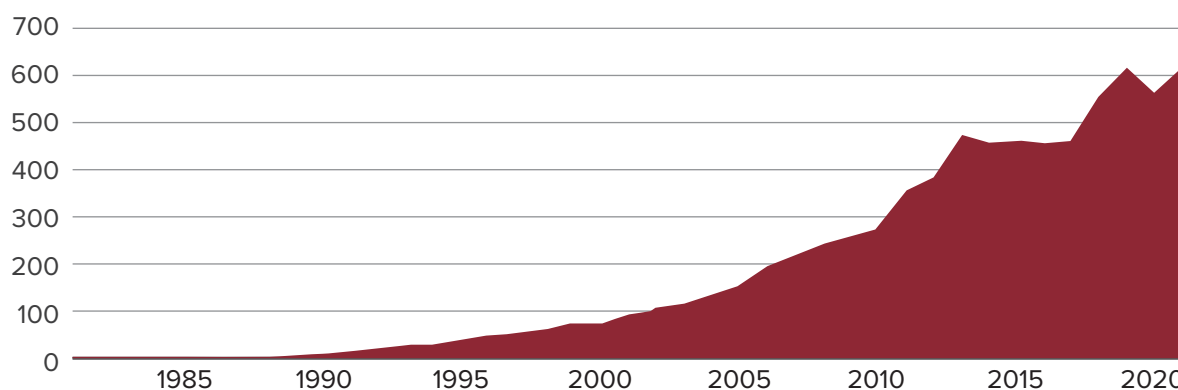
<sup>43</sup> However, during this time, total carbon dioxide emissions still quadrupled — due mainly to electricity and heat producers—with rising per capita incomes, population growth, and the increasing use of coal in energy production being key drivers (Li and others, 2021).

<sup>44</sup> Global Data 2022. [Link](#).

<sup>45</sup> MEMR data. These figures include production from underground and open pit mines. They do not include production from surface mines, which are a relatively small source of coal in Indonesia.

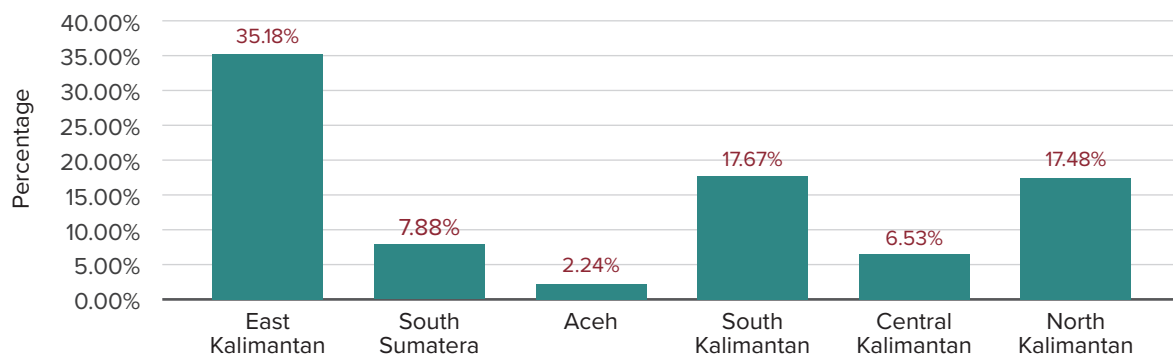
**The nature, history, and scale of coal operations across provinces vary.** Although, in East Kalimantan, coal mining started only in the 1990s, today mining there is operated on a massive scale and feeds a wide range of coal-related value chains. The industry is dominated by a handful of large companies, which account for 35 percent of the provincial GDP (figure 3.2). In the past two decades, the province has gone from a densely forested region to also include cultivated plantations and extractive industry estates along with remaining forests (around 50 percent of the province). The expansion of mining sites, oil palm estates, and timber plantations is likely to place continued pressure on land use change in East Kalimantan. On the other hand, in South Sumatra, coal and lignite mining contribute approximately only 8 percent of GDP and are overshadowed by other economic sectors that still have significant growth potential. Although large-scale mining is still relatively new, coal has been mined in the province since the late 1800s and is led largely by local communities. Over 700,000 ha are occupied by illegal mining operations run by local collectives. The gradual legalization of many of these mines has enabled local communities to participate in and benefit from coal extraction (Trijatnika and Llewellyn 2021). The coal-related employment share within provinces also varies from district to district, ranging from negligible up to 15 percent of all employment (Bulmer and others 2021). Over the next 3-5 years a number of small- to medium sized coal companies are slated to close due to depleting reserves and market pressure, thus consolidating production among larger companies.

**FIGURE 3.1** Indonesia Coal Production, 1981-2021 (mil tons)



Source: CEIC 2022. Indonesia Produksi Batubara. [Link](#).

**FIGURE 3.2** Share of Provincial Gross Domestic Product from Coal and Lignite, by Province, 2021 (%)



Source: Statistics Indonesia 2021.

**The impacts of the coal transition will be felt differently across provinces.** The Gol recently announced that several coal-fired power plants will be retired early, starting with those in the Java region. Most coal mines in Kalimantan and Sumatra supply coal to these plants, so they also will be adversely affected, along with the local communities that host them. In East Kalimantan, particularly, local development indicators such as *Index Desa Membangun* (IDM) or village development index, correlate with the presence of mining activities.<sup>46</sup> At the subnational level, the political economy of coal production is characterized by significant political influence of industry actors. The substantial value-addition and financial contributions from the coal-mining industry create a compelling incentive for subnational governments to maintain coal industry profitability and keep coal mining as a key economic activity and revenue source (Ordonnez and others 2021). Concurrently, other challenges to the transition process include the intricate task of aligning national policies with their practical applications at the subnational level and relatively weak enforcement capabilities at the local level. National and subnational scenario-mapping workshops conducted for this report in 2023 revealed companies' unreadiness to deal with the impacts of reduced demand, and the limited human resources and capacity in relevant institutions allocated to focusing on a just transition.

**The characteristics of the stakeholders involved in the transition vary across provinces.** In South Sumatra, numerous small coal producers are involved. Therefore, transition efforts will need to connect with a broad set of stakeholders with deep links in local communities. In East Kalimantan, national coal-mining companies will be the primary stakeholders, but the indirect and induced impacts of the transition will extend to a long, complex web of coal-dependent value chains. Coal transition in East Kalimantan will also be closely intertwined with transitions in the FOLU sectors. Importantly, local stakeholders in East Kalimantan may become more dependent on forest and agricultural resources as coal transition advances but simultaneously may become more reliant on the coal economy as FOLU transitions advance. The province has progressive climate change regulations and is actively participating in a series of programs to reduce emissions from FOLU sectors, including REDD+. Thus, simultaneous transitions in FOLU and coal sectors need to be managed concurrently and carefully to avoid creating conflicting effects.

### 3.2 Anticipated Social and Distributional Impacts of Coal Transition

**The coal transition will ignite a series of direct, indirect, and induced impacts across coal regions.** Based on global experiences, projected impacts will include these four: (a) job losses for coal workers and upstream and downstream sectors, including those providing goods and services in coal towns; (b) dislocation of workers, their families, businesses, and whole communities; (c) deepening inequalities, with the impacts being more severe for the poor and vulnerable, indigenous peoples, women, youth and the elderly; and (d) communities losing access to basic services and infrastructure, including education, health, water, electricity, housing, and economic infrastructure (Stanley and others 2018). Depending on how the transition addresses these impacts and the affected populations' demands for procedural and restorative justice (box 3.1), the transition could be compounded and confounded by heightened mistrust, insecurity, and social instability. Transcending the immediate concerns of job disruption, livelihood loss, or alterations to essential services, communities also will grapple with societal shifts which challenge identities and relationships within these communities. The exact nature of impacts will vary based not only on the level of dependence on coal but also on the willingness and ability of national and subnational governments to address them.

<sup>46</sup> A forthcoming analysis by the World Bank shows that the *Index Desa Membangun* (IDM) of villages around mine sites correlate positively with the growth of coal mining in Kalimantan, but not in Sumatra.



## Access to Employment

**First and foremost, the transition from coal will have directly adverse impacts on those who depend on coal for their livelihoods.**

While the coal industry in Indonesia employs a relatively small number of workers (estimated at 250,000 direct workers in 2020, or a mere 0.2 percent of total employment), a high multiplier effect is expected given the large revenues that the industry generates across multiple value chains (Simanjuntak 2022). In East Kalimantan and parts of South Sumatra, in which coal mining has been a significant source of employment, the closure of mines and the nascent national shift toward renewable energy sources will result in job losses and economic hardship. Coal-dependent employment is 11 percent in East Kalimantan and 3 percent in South Sumatra, but a staggering 80 to 90 percent of these employment opportunities stem from mining services companies (IESR 2022). Therefore, in these regions, the closure of mines and the nascent national shift toward renewable energy sources will result in job losses and economic hardship.

*The transition from coal will have adverse impacts on those who depend on coal for their livelihoods.*

**Job losses will be borne by directly affected workers and their communities and will trigger ripple effects across regional and national economies.**

The coal value chain in Indonesia encompasses a series of activities involved in converting raw coal into usable product, including coal mining, coal preparation, coal transportation, and coal utilization (IESR 2022). The expansion of coal production between 2007 and 2012, particularly in South Kalimantan and East and North Kalimantan, increased jobs by a net total of 726,000. Approximately, 110,000 of these were coal-mining jobs (Bulmer and others 2021). This growth signifies a robust annual average growth rate of 21 percent in coal-mining employment. Even though the overall job creation in non-coal sectors considerably outnumbers the new coal jobs, these mining positions, similar to other extractive industry roles susceptible to boom and bust cycles, catalyze large spillover effects in the local economy.

**In the coal sector, workers with different contracts, associations with coal, and skill levels will be affected differently.**

Coal-mining positions in Indonesia represent premium employment opportunities, offering remuneration superior to most other sectors in the economy. More than 95 percent of jobs in coal mining are formal and employ individuals with education surpassing the average, primarily those holding secondary school qualifications (Bulmer and others 2021). The demographic profile of coal-mining workers is predominantly young and male, engaged primarily in production roles or as machine operators. The compensation for coal-mining jobs is more than double the average wage in agriculture, 86 percent higher than the average construction wage, and 59 percent higher than the average manufacturing wage (Bulmer and others 2021). These characteristics make it difficult for coal workers to switch to other industries (IESR 2022). Unfortunately, there has been very little research on the impacts of transition on artisanal miners, (informal or illegal miners). This gap in analysis should be closed by improving (gender disaggregated) data on the number and demography of involved people in the coal business.

**Coal employees interviewed for this study stated that they expect engineers and highly trained workers to transition to other sectors, but that the transition from coal will result in fewer jobs because alternative energy production methods are less labor intensive.**

If displaced miners hesitate to accept alternative employment due to lower wage prospects, the resulting economic shock to the local community could be intensified, leading to a potentially protracted recovery period (Bulmer and

others 2021). While formal industry workers are likely to have support from their employers, auxiliary services and informal workers such as vendors and service providers' employees will be more at risk of unmitigated job losses with little to no compensation or retraining. Those who have marketable skills may be more likely to migrate from coal sites while others may remain, unemployed.

**There likely will be broader economic impacts across coal communities.** The 2015–16 drop in coal prices that led to the temporary hibernation of coal-mining operations affected primarily low-ranking workers, surrounding microbusinesses, and company subcontractors and their workers. Respondents suggested that workers such as cleaners, support staff, and maintenance staff would have difficulty finding work. Fears of transition impacts were realized by local communities in 2020 when coal trucks were rerouted from public roads in West Merapi. The result was the instant disappearance of the roadside restaurants and shops that had served truckers. In the context of an actual transition, the support of capital from coal companies could allow most unskilled and low-skilled technical workers previously working in or around the coal industry to move to new livelihoods such as agroforestry or farming. Several respondents suggested that unskilled workers could return to farming if they have access to land, but otherwise will seek jobs in the palm oil sector—a driver of deforestation in the province—which will have limited capacity to support ex-mine workers.

### *Access to Local Infrastructure, Services, and Housing*

**Coal transition is likely to reduce communities' access to local infrastructure, services, and housing.** Many employees live in housing provided by mining companies, which also operate local schools and hospitals. Community infrastructure and services shape social lives around them, embedding relations of power and inequalities. The former also have cultural meanings and imbue a shared sense of identity, community, and belonging among local inhabitants. Community services and infrastructure that are financed by coal companies may suffer for lack of funds if plans are not in place for local governments to take them over. In addition, job losses from these services (such as teachers, nurses) also could result in immediate outmigration from the areas by those who have the skills to acquire new jobs elsewhere.

**As coal production declines, declining tax revenues likely would shrink local governments' fiscal space and thus their ability to deliver frontline services.** The local government collects both tax and non-tax revenues from the mining sector (Atteridge and others 2018). The non-tax revenue consists mainly of royalties and land rent, which are shared between national and regional governments. Depending on the type of mining (open pit or underground) and quality of coal (calorific value), the royalty rate ranges from 2 percent to 7 percent of the sales revenue. In East Kalimantan, 25 percent of local government revenues are collected from coal companies, with some districts depending on coal revenues for up to 75 percent of their revenues. The decline in coal production likely will increase the fiscal burden on local governments (if alternative revenue sources are not identified early on), which will struggle to deliver much needed services to meet basic needs, diversify the local economy, and promote transition to new livelihoods.

### *Access to Land and Advancing Restorative Justice*

**A transition from coal may deepen inequalities in access to land.** Access to land in Indonesia is unequal, with women, people living in rural areas, indigenous people, and other marginalized groups having disproportionately low levels of land ownership. These inequalities are due to a number of

factors, including lack of legal recognition of land rights and lack of access to credit and other resources. In many coal communities, massive job losses will compel those who depend on coal value chains to return to agriculture. However, many may not have access to land, even if they wanted to revert to farming. Mining activities often leave agricultural land degraded and unusable for other activities, at least in the near term. The time and investment necessary to rehabilitate land for productive agriculture or forest purposes - if it can be recovered at all - and who will bear the cost of rehabilitation, are not clear. Moreover, even if there is a move toward rehabilitating and restoring land rights, local elites are more likely to have inside knowledge about the transfers and prices and therefore will be in a better position to purchase any ex-mining land, thus widening inequalities.

**Local communities are interested in reclaiming and restoring the land of ex-mining pits, especially for smallholder agriculture.** Within the framework of restorative justice, a critical objective involves not only rectifying the historical damage inflicted on the land but also actively addressing current disparities in land access, striving to ensure equitable distribution. Experiences in East Kalimantan and South Sumatra reveal that some, but not all, ex-open mining pits were backfilled and replanted with hardwood trees. In East Kalimantan, ex-open mining pit areas are being used for agrotourism, aquaculture, and drinking water reservoirs in collaboration with the local water company. There is a short-term plan to convert ex-open mining pits into floating reservoirs. For giant open pits, the cost of converting to other industrial uses often is lower than the costs of reclamation. In addition, the impacts of converting can be seen immediately, unlike soil revitalization to restore the land for agricultural use, which takes much longer.

**Access to land rights has special meaning for indigenous communities living in coal regions.** It is common to find coal mines located on lands that indigenous groups consider their customary or ancestral lands. As a result, in these areas, most jobs and income come from coal mining and power generation. The customary rights of indigenous peoples often are either poorly defined or unrecognized. In contrast, coal companies have legal permits issued by the government to operate in these areas. For decades, some *adat* communities living around mining sites have struggled for recognition of their land rights. After being displaced, some *adat* communities have had to move far away into forests and now live with limited access to jobs, infrastructure, and basic services. With a future phaseout of coal activities, there is an expectation by some *adat* groups that the lands will be returned to their communities in a condition resembling their original conditions within a reasonable timeframe. Nevertheless, questions remain around how such land claims for ex-mining sites will be handled; and how, if at all, the degradation of the lands under claim by the communities will be compensated.<sup>47</sup>

### **Social Cohesion**

**Heightened economic insecurity resulting from unemployment and other losses could destabilize the social fabric of communities and weaken social cohesion.** Respondents interviewed for this study expressed concerns about the potential rise in crime rates, specifically highlighting the vulnerability of youth groups. These groups, accounting for approximately 50 percent of the local workers in coal mines, face challenges due to limited access to land and reliance on monthly salaries. In the event of

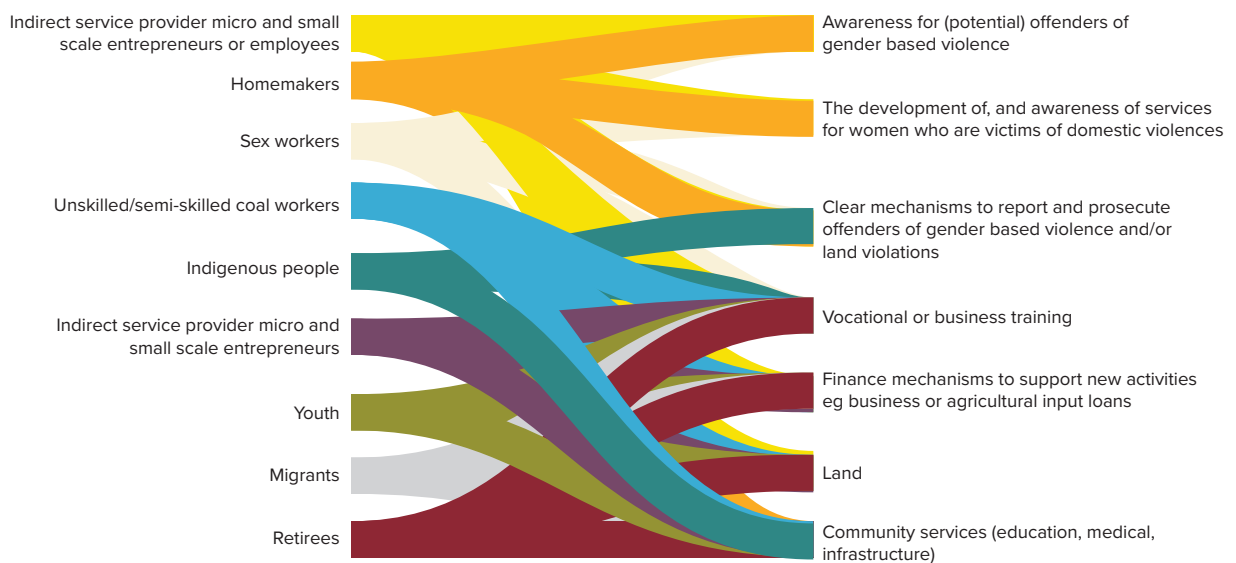
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<sup>47</sup> The Regulation of the Minister of Agrarian Affairs No. 18/2019 on Procedures for Administration of Customary Land Units of Indigenous Peoples provides some guidance but is unclear regarding ex-mining sites for which Indigenous communities have been unable to exercise their land claims in the past.

job loss and difficulty in finding alternative employment, they may be particularly susceptible to adverse circumstances. Experience demonstrates that transitions away from coal can create opportunities for renegotiating and challenging gendered divisions of labor at the household level (Miewald and McCann 2004). In certain countries, men who have been laid off from mining jobs have shown increased engagement in care work at home while women pursued employment outside. The traditional notions of masculinity linked to mining work, emphasizing physical strength, toughness, and bravery, also can be disrupted as men face job losses. While this presents a chance to redefine masculinity, it also can lead to tensions within households, potentially increasing the risk of gender-based violence. The respondents in this study voiced similar concerns regarding shifting gender dynamics within households, particularly in relation to financial pressures, relocation for employment opportunities, and their negative impacts. These factors can strain families, contribute to higher divorce rates, and adversely affect the well-being of children. Workers over the age of 40 will be forced to retire early with few support structures in place. In companies, gender considerations often are absent from retirement planning.

**More broadly, increased competition for resources may divide communities and cause intergroup conflict if the specific vulnerabilities of each group are not addressed or if the transition process is perceived to be unfair.** Indonesian coal-mining communities typically comprise a mix of social groups from different backgrounds: local groups, indigenous peoples, economic migrants, and transmigrants (migrants resettled from other parts of Indonesia as part of a government program). The social structure of these communities often is hierarchical and centered around the coal mine companies, which provide jobs, housing, infrastructure, and livelihood opportunities to the local groups. During the coal phaseout, some of the expected impacts discussed above can lead to conflict and tension within communities, especially when competition for jobs and resources intensify and there is perceived unfairness in the management of the transition. It will be important to address the specific vulnerabilities of each group through a bundle of interventions (figure 3.3), while ensuring that no particular group feels unheard, excluded, or left behind.

**FIGURE 3.3** Examples of Affected Social Groups and Their Transition Needs



Source: Authors based on “Social Dimensions of Coal Transition” study, a data report (appendix D).

### 3.3 Voice and Participation in Decision-Making

**How and when coal transitions are planned and managed are the defining factors in how severely the impacts will be felt by affected populations.** Experience points to the necessity for advance planning (a) to proactively address needs for reskilling and mine/plant repurposing and (b) to deliver advance support and communications programs. In addition, it is necessary to allocate significant resources to address the broader spectrum of social impacts. Civil society can play an important role. For example, the East Kutai People's Faction in East Kalimantan advocates for local communities affected by mining, including documenting customary laws of the Dayak Basap, and transgressions of rights. The East Kutai group recently won a citizen lawsuit over a flood case caused by noncompliance with environmental regulations. Religious groups have started to advocate for a just transition and wider climate action, and their leaders have a significant effect on local stakeholders' responses to transition planning.

**On the other hand, a lack of planning and consultation can breed resistance.** To achieve procedural justice, it is essential to prioritize genuine community engagement and transparency in decision-making processes. An inclusive and participatory approach builds trust, fosters shared ownership of the transition, and paves the way for a just and sustainable energy future for workers and local communities. However, national and subnational scenario-mapping workshops organized for this report revealed companies' unreadiness for transitions in the coal sector. Some respondents suggested that enforcement of the laws can be weak, and they had little reason to believe that the enforcement of transition policies would be any different. Some respondents felt that, since they are not being consulted in transition planning, there is little chance they will benefit. Others articulated that changes tend to benefit only existing elites. Their fears are reinforced by the status of closure planning, and the limited liability of coal companies to support longer-term transition after coal mines or plants are retired. Corporate social responsibility frameworks tend not to cover the full spectrum of social and economic impacts expected by coal-dependent communities.

**The range of stakeholders involved in Indonesia's coal transition is wide.** Stakeholders include coal mines and communities upstream, mine-mouth power plants near coal mines and distant power plants downstream, and transport-related businesses operating between the two. Other stakeholders are NGOs, private and state-owned enterprise operators, and communities directly and indirectly affected by the coal industry. Within the government, the coal sector is managed centrally<sup>48</sup> whereby provincial, regency, and district governments extend to some degree the national government's sectoral function. Subnational entities look to the central government for direction and programs to mitigate local impacts of the coal transition. Subnational entities provide services and execute programs set nationally by the central government but do not have extensive authority in local decision making. Village governments have considerable authority within the boundaries of their villages to set their own programs and prepare communities for the coal transition., but limited influence over supra-village regulations or investments needed to transform local economies.

*How and when coal transitions are planned and managed are the defining factors in how severely the impacts will be felt by affected populations.*

<sup>48</sup> Although this was not always the case (box 3.2).



**BOX 3.2 Authority over Coal Mining in Indonesia**

The power dynamics within Indonesia's coal sector have been affected by decentralization and recentralization policies. The 2009 revised mining law gave subnational governments extensive authority to manage and grant mining licenses in predetermined areas (Atteridge and others 2018). This revision led to a massive coal rush, along with its side effects such as environmental damage and social conflict<sup>a</sup> (Muhdar and others 2019; Toumbourou and others 2020). To reverse these impacts, in 2014 subnational governments' authority gradually was reduced, which returned district governments' authority to provincial and national governments (Fünfgeld 2020; Setyowati and Quist 2022). Most recently, the authority was returned entirely to the national government.

Recentralization reduced the power of subnational governments, including their ability to collect royalties and rents from the industry. To regain some power, local governments have started issuing regulations in the areas of the coal industry that they can still influence. For instance, South Sumatra has regulated how coal trucks may use public roads. The Passer District government issued a memorandum to coal companies asking them to prioritize local workers in their activities and in upcoming transitions.

The frequent changes in authority structures has impacted stakeholder engagement at the local level. When social issues emerge, communities are confused about where to channel their voices because their existing communication channels at subnational levels have little authority. This confusion about where authority lies leaves a vacuum from which informal channels of mediation and influence can emerge at the local level. For example, when conflicts around illegal coal-mining operations continued in East Kalimantan, local elites became involved, using their influence to resolve disputes, and not always in communities' favor. Similarly, local authorities often are called to resolve daily issues.

*Source: Authors based on "Social Dimensions of Coal Transition" study (appendix D).*

<sup>a</sup> See this [link](#).

**Although national engagement platforms on transition policies are becoming more common, it is not clear that such mechanisms exist or are working effectively at the local level.** Civil society organizations (CSOs) and NGOs are participating at the national level in planning the coal transition, as exemplified by the government's engagement of an NGO coalition as part of a public consultation on designing investment plans for the transition. However, meaningful public participation is not as common at subnational levels. The recent transfer of mining sector authority to central government has reduced the ability of local CSOs and other actors to voice their opinions. Meaningful public participation is critical to ensure the implementation of just transition policies at the local level and mitigate the risk of vested interest in the coal sectors having a disproportionate say in how the just transition policies play out.

**Building effective transition plans will require a range of stakeholders and a range of complementary programs.** Coal companies themselves should play a significant role, in line with their legal commitments. In addition, central government, local governments, communities, private sector, and education and training institutions all should be involved early to develop a suite of complementary programs to offer social support, local economic development infrastructure and services, and reskilling and training opportunities. Community development programs can play a key role in not only delivering basic development projects to communities but also providing fora for consultation, grievance redress, and local planning – aspects critical to improving perceptions of legitimacy and credibility in transition

processes.<sup>49</sup> A cross-sectoral but targeted approach also will be needed to mitigate and manage out-migration, including social, economic, and logistical barriers to moving, and those left behind. Some of these interventions are discussed in detail in the next section, in the context of both managing a coal transition and promoting local climate action toward sustainable and inclusive climate change mitigation and adaptation.

**In summary, the coal transition in Indonesia is expected to result in a range of social impacts beyond employment, particularly in coal-dependent regions such as East Kalimantan and South Sumatra.** The way coal transitions are planned and managed will have a significant impact on how severely the impacts are felt by stakeholders. The range of stakeholders involved in Indonesia's coal transition is wide, and it is important to build effective transition plans that involve a range of complementary programs from coal companies, central government, local governments, communities, private sector, and education and training institutions. Community development programs can play a key role in delivering demand-driven development projects to communities, providing fora for consultation, grievance redress, and local planning, as well as promoting local economic development initiatives to reduce communities' dependency on coal. Advance planning is essential to proactively address local needs before the coal phaseout takes place and to manage the broader spectrum of social risks, impacts, and political resistance to change. Addressing these challenges will constitute a major building block of Indonesia's response to the social dimensions of climate change over the coming decades.



<sup>49</sup> For further explanation on “process legitimacy,” see Barron and others 2023.







## SECTION III.

# FRAMEWORK FOR LOCAL CLIMATE ACTION

Inclusive climate responses in Indonesia depend to a large extent on aligning the interests of local communities with national transition and development goals and promoting effective local action. Aligning the interest of local actors with national transition and development goals requires a multi-pronged approach, starting with ensuring that they are fully informed about climate risks and opportunities, and how these risks will affect them. In addition, the social and economic pressures driving unsustainable practices and sectoral activities at the local level—such as illegal land clearing and an overdependence on coal value chains—will need to be addressed. Once local interests are aligned with the need for change, communities and local governments need to have access to the right tools with which to act, including financial resources, technical assistance, and coordination platforms. This will require designing and implementing policies that are responsive to local contexts and citizens' needs, implemented through local governments, and are perceived locally as credible and trustworthy.<sup>50</sup>

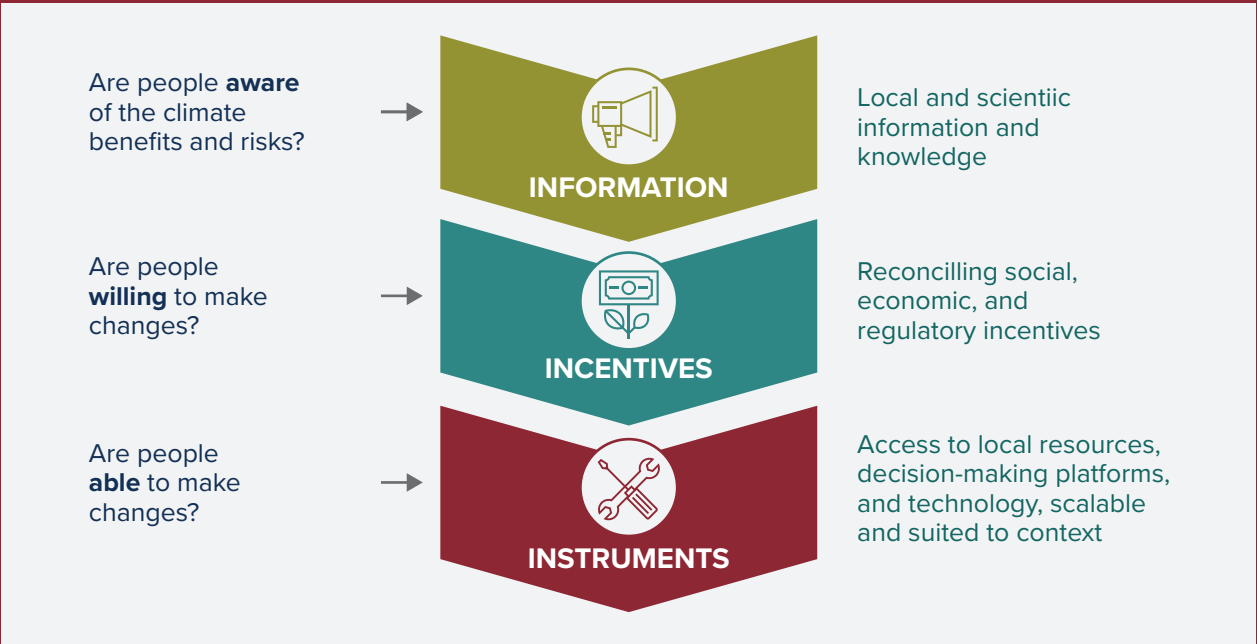
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<sup>50</sup> For further explanation on the importance of perceptions of legitimacy of development processes, refer to Barron and others 2023.



Section II focuses on the practicalities of policy and program design and implementation to support an inclusive and resilience low-carbon transition. The following chapters elaborate a framework to guide locally led climate action through three interlinked pillars: information, incentives, and instruments (see figure 0.1). The framework aims to guide practitioners and policy makers on how to effectively drive local action by incorporating the diverse and dynamic nature of community vulnerability to climate change, understanding and changing the local incentives, and providing scalable and cost-effective tools. The three pillars of the framework are interdependent and interlinked; they work simultaneously to empower and enable locally led climate action.

Figure II.1 Framework for Locally Led Climate Action in Indonesia



Source: Authors.





## CHAPTER 4

# ENABLING LOCAL CLIMATE ACTION THROUGH INFORMATION



Aligning the interest of local actors with national transition and development goals starts with ensuring that they are fully informed about climate risks and opportunities, and how these risks will affect them. A combination of detailed scientific knowledge and highly localized knowledge is needed to facilitate effective strategies that address the impacts of climate change at the local level, target those who are hit the hardest, and promote context-appropriate investments in climate adaptation.



Information gaps, mistrust in information, or limited outreach to some groups can undermine the effectiveness of policy and program implementation. Communities need information on local climate risks and adaptations from sources they trust, tailored to the communication needs and norms of different groups.



Deliberative discussions and interaction across social groups are effective for disseminating climate messages while supporting people to generate, share, and exchange information on climate risks and policies. Such platforms also give those affected by climate change and climate policies the opportunity to meaningfully engage in proposing and implementing locally owned solutions.

**Locally led climate action relies upon information, which directly and indirectly shapes vulnerability to climate change, and local responses** (Thomas and others 2018, 10). Adaptation strategies require multiple forms of knowledge and information (Keenan 2015) from environmental awareness and education to awareness of hazards and risks, to knowledge of community rights and local resources, to detailed information on how to access resources for adaptation or apply new technologies. However, the basis of decision making on adaptation often is characterized by asymmetries in communication and information (Singh 2020; Bunclark and others 2018) and competing sources of information (such as advice from traditional elders, private sector outreach, and government-led campaigns). Access to information and knowledge shapes who can benefit from various natural and financial resources, and how (Thomas and others 2018). While information alone is insufficient to drive action, studies of agricultural adaptation, for example, have shown that increased awareness of climate change itself increases the ability of farmers to adapt to it (Sen and others 2021; Ajuang and others 2016) whereas informational gaps are a critical barrier to adaptation.

**Chapter 4 discusses the role of information in enabling effective local climate action.** Though the data is available, the specific impacts of climate change and vulnerabilities of local populations often are not well mapped nor systematically embedded in local planning and resources allocation mechanisms, such that local government and communities have access to it to guide their responses. Do communities

know the risks they are facing, and the opportunities and resources to which they must respond? When they access the requisite information, do they use it well to drive effective climate action? A combination of detailed scientific knowledge and highly localized knowledge is needed to facilitate effective strategies that address the impacts of climate change at the local level, target those who are hit the hardest, and promote context-appropriate investments in climate adaptation.

*... scientific knowledge and highly localized knowledge is needed to facilitate effective strategies that address the impacts of climate change at the local level, target those who are hit the hardest, and promote context-appropriate investments in climate adaptation.*

## 4.1 Types of Information

**The most essential information that communities need concerns their exposure to the risks of a changing climate.** This information includes expected changes in rainfall and temperatures and the risks of hydrometeorological hazards, such as floods and storms. Indonesia's climate risks and impacts are highly variable and are based on local biophysical and socioeconomic characteristics (chapter 2). Information gaps about the likely climate change impacts and risks at the local level are a key barrier to adaptation, and so could drive sporadic and inconsistent decision-making on adaptation measures across Indonesia. For example, farmers and people who depend directly on natural resources usually are aware of, and concerned by, the effects of climate change that they experience.<sup>51</sup> However, their understanding of predicted future changes is more limited. Information on risks and vulnerabilities could be shared in a variety of ways and embedded in local planning and budgeting processes, education systems,<sup>52</sup> and other forms of public outreach.

**Second, communities need information on the sensitivity of local environments and livelihoods to the climatic changes relevant for their localities.** This information includes changes to patterns of availability of water resources or the likelihood of pests and diseases affecting crops. Even when risks to lives and livelihoods are well understood by some in communities, they may not be understood by all, including those most affected. Ensuring broad-based awareness of the risks to lives and livelihoods can help build consensus around the need to invest in coping strategies or to protect critical landscapes.

**Third, communities and local governments and other actors need information on the value and future values of critical ecosystems.** Such information includes the importance of forests in watershed management or as sources of future benefits from carbon payments, or the importance of resource management traditions to customary identities. For example, the value of ecosystem services provided by Indonesia's mangroves outweighs the costs of rehabilitation and the benefits from converting to aquaculture or other land uses at a macro level (World Bank 2022).<sup>53</sup> At subnational levels, these

<sup>51</sup> Finding based on research presented below and in appendixes A and B.

<sup>52</sup> Climate change education can help young Indonesians understand risk, uncertainty, and rapid change. Climate change education helps nurture students' behavior toward ecology consciousness and pro-environmental actions. It also helps to build citizens' capacity to adapt to natural disaster events, in addition to changing their behavior and beliefs needed to make informed decisions in a dynamic context (World Bank 2023).

<sup>53</sup> Indonesia's mangrove ecosystems provide significant and high-value ecosystem services across the country, including coastal protection, support for fisheries, climate regulation, and tourism. Spatial analysis highlights cost-benefit ratios from <1 to 5 depending on factors such as opportunity costs of land and spatial distribution of various benefits. For example, coastal protection benefits are higher in areas that experience more tidal flooding). (World Bank 2022).

values can be used to inform land use zoning and environmental protection activities. More granular assessments of the costs and benefits for different groups within communities can inform discussions within communities about short- versus long-term costs, potential trade-offs, and benefits of protecting mangrove forests rather than converting them to commodity production. Cultural values placed on ecosystems, such as the value of religious sites or traditional lands for social cohesion and identity, are harder for outsiders to identify and evaluate objectively. In contrast, local communities can debate both the economic and noneconomic value of natural resources based on their shared views on what is important.

*... local communities can debate both the economic and noneconomic value of natural resources based on their shared views on what is important.*

**Fourth, information on adaptation and mitigation policies and technologies is essential for effective responses to meet local needs.** This information includes re-skilling opportunities for coal workers, or the specifications of infrastructure needed to withstand future hazards, such as different grades of concrete for buildings to withstand higher temperatures. Introducing new technologies and adaptations and sharing successful practices among communities who face shared challenges and opportunities can promote local adaptation actions and investments. Sharing technologies and practices also can help to standardize the production and quality of key commodities, promoting market access. For example, a string of coastal villages may share climate-smart production and pest management techniques for seaweed farming and drying, thereby offering buyers more consistent product quality.

**Finally, given Indonesia's highly decentralized governance structure, to be able to inform contextual interventions, communities need information on local spending and entitlements.** This information includes access to district-level services to help with pest control or village budgeting processes. Ensuring that residents understand their entitlements and relevant eligibility criteria or application processes can encourage their uptake of opportunities. Key examples include eligibility and registration criteria for REDD+ benefits-sharing programs, financing schemes for local enterprises (credit schemes or grants), and local development budgets. Similarly, understanding the decentralized fiscal transfer mechanisms and their role and opportunities to access village-level funding sources, such as the *Dana Desa*, is essential.

## 4.2 Improving Access to Information to Drive Climate Action

**Evidence from Indonesian and global experience points to several key lessons to expand and improve the information that local actors have to drive climate-smart investments and decisions.** These lessons are discussed below.

### *Leverage Local Knowledge*

**While much new technology development, scientific data, and information about new risks or opportunities often come from outside communities, a wealth of critical knowledge also is generated and reproduced within communities – from site selection of flood protection infrastructure to knowledge on local fauna and flora.** This two-way information-sharing makes for stronger program

design and implementation. Communities have intimate knowledge of local social and economic issues and ecosystems at a level of detail and nuance not available to outsiders. Local knowledge may be the difference between adaptation and “maladaptation”, such as expansion into new crops that might not be suitable to the local seasonal patterns. For example, combining local knowledge, such as on agricultural techniques or common seasonal pests, with other government-supported adaptation schemes is shown to improve success and cost effectiveness in climate-smart technology adoption. Local populations also are best placed to understand their own vulnerabilities to climate change, such as what will happen to them and their families if their yields decrease or water sources diminish, and what they think could help them to adapt (Ayers 2010).

*Communities have intimate knowledge of local social and economic issues and ecosystems at a level of detail and nuance not available to outsiders.*

### **Leverage Local Social Groups and Leaders to Disseminate Information**

**Information on climate change will be seen as more or less trustworthy or relevant depending on how it is shared, and by whom.** Information about exposure to climate impacts – weather forecasts, climate predictions, and disaster risk warnings – are communicated through a variety of channels, including interpersonal communication, social media, radio, and news outlets (Thomas and others, 2018, 11). Within communities, existing institutions—families and schools, producer groups, workers groups/unions, religious groups, youth groups, traditional and cultural groups—act as “filters” for information, determining who accesses information, how they interpret it, and how they respond. Information from external actors designed to drive local climate action, such as campaigns to promote protection of mangrove forests, prevent forest fires, or inform communities about increased flood risks, will trickle down through community groups in a variety of ways and have a range of impacts based on communities’ various experiences, perceptions, and interests (Rondhi and others 2019). Determining who has the power and influence to bring about change among the broader community and convincing these individuals of the benefits of the change, enables programs to leverage the influence of existing thought leaders to propagate knowledge, technology, and leverage local capacity more widely for action. For this reason, field school approaches introduce technologies through applied, “learning-by-doing” approaches in small groups while involving local influencers.

**Interventions to help communities adapt to the impacts of climate change can have mixed results if the information on new technologies is not understood by local actors.** For example, in Kiafatu village in East Nusa Tenggara, climate change has caused water shortages and crop failures, leading government agencies and NGOs to focus on improving water infrastructure (by digging deep wells) and introducing more climate-resilient livelihoods (such as drought-resistant crop varieties). However, these initiatives have largely been ineffective—water infrastructure has broken down and few farmers have adopted the introduced technologies. The local agricultural agency introduced seeds promoted as producing better yields than traditional varieties, but uptake was limited because farmers were not convinced yields would be higher and preferred to use traditional seedstocks. Those farmers who did use the new seeds generally were persuaded to do so by individuals who, while not holding any formal position in the village administration, were regarded as high-status individuals according to the customary clan system and were participating in farmers’ groups to propagate the seeds. Farmers tended to regard these individuals as trustworthy sources of information.



### *Avoid Climate Jargon and Focus on the Experience of Communities*

**Climate change adaptation and mitigation programs often need to spend less time communicating about what climate change is or its causes and instead highlight what it means for communities.**

Using scientific jargon about a global collective and public goods problem when communicating to remote, rural communities (for example) can alienate people, and can contribute to the tendency of having the poorest and most vulnerable individuals and groups being told they are responsible for cleaning up the mess richer countries and people have made. For example, “limiting global warming to 1.5°C,” or “achieving Indonesia’s NDCs” can be hard for people to relate to and may seem like elusive goals. Instead, socialization and outreach should focus on assessing local risks and opportunities in ways that the intended audience can relate to. Communications campaigns should analyze and cater to the communications needs of various social groups – including local languages and terms, literacy levels, and access to various media.

### *Engage People in Deliberative Fora to Process and Exchange Information on Climate Change*

**Local participation and deliberation fora enable people to generate, share, and exchange information on climate risks and policies; and gives those affected by climate change and climate policies the opportunity to meaningfully engage in solutions.**

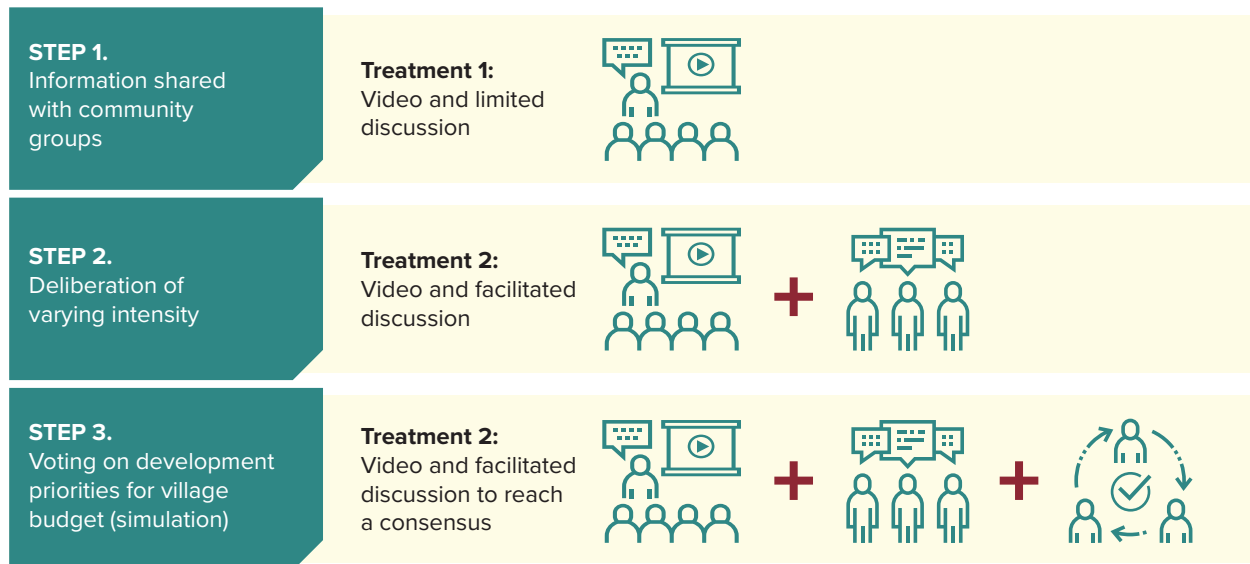
For example, community meetings with broad-based participation can remove barriers to climate adaptation by grounding new information in local realities. Many such platforms already exist, formally or informally. Additional support to training and deploying facilitators to such fora can strengthen the ability of existing community groups to consider and act upon the risks and opportunities presented by climate change and ensure those most affected are able to participate in discussion. Well facilitated community meetings build collective understanding of the climate action priorities. Collective understanding can be particularly effective in working with those most vulnerable to climate impacts, who often are the most marginalized and therefore the least likely to access and trust formal sources of information and participate in or benefit from locally led climate actions Thomas and others 2018, 13).

**Experimental research undertaken for this report investigated the impact of different deliberative discussion models on local capacity to address climate risks, using the climate vulnerability profiles introduced in chapter 3.**

The research measured changes in individual comprehension of climate change and stated preferences related to local allocation of the local development budgets.<sup>54</sup> Information on climate change and its causes, and on local climate impacts and risks was communicated to over 800 people in focus groups in 15 target villages. Communication was tailored to rural, semi-literate populations: an animated video explaining climate impacts generally and then a facilitator reading and explaining the local vulnerability profile. The three Treatment Arms (figure 4.1) tested varying degrees of intensity in deliberations linked to sharing scientific information. After the video and groups discussions, participants voted on preferences for how villages budgets should be allocated to local development priorities. A full description of methods and findings can be found in appendix B.

<sup>54</sup> Voting on village budget priorities was scenario based. In practice, most villagers have less control over village spending decisions than in the scenario in which they imagined themselves to have significant decision-making power.

**FIGURE 4.1** Design of the Experimental Study



Source: Authors based on facilitated communication of climate vulnerability (appendix C).

The results showed that the more intensive the facilitated discussion, the more participants' comprehension of climate change risks improved, and the more likely they were to adjust their stated spending preferences toward investments in mitigating the perceived risks.<sup>55</sup> Treatment 3 participants were 16 percent more likely to list climate-relevant spending in their top three Village Fund priorities for their families ( $\beta=0.148$ ,  $SE=0.0525$ ), and they were 12 percent more likely to state climate-relevant spending as a top Village fund priority for their villages.<sup>56</sup> Overall, the tailored communication about climate change improved understanding of the causes and risks of climate change. While video was an effective way to communicate such messages (Treatment 1 still showed improvements in comprehension), it was the addition of more intensive facilitated discussions that had the most significant impacts on improving understanding and changing spending preferences towards addressing the risks faced.

**Generate and Share Information on Transition and Development Programs and Policies Early**

**Projects and programs that will significantly impact communities should start early on communications and outreach.** Especially in the case of large-scale transitions, engaging early helps to build buy-in, set expectations, and engage youth and marginalized groups. Building buy-in and understanding community needs from project conception is critical to avoid common mistakes

<sup>55</sup> The research team are not suggesting that climate-related expenditures are more or less important than other sectoral policy priorities. The team also actively advise against a proliferation of disparate communications campaigns or expecting residents to spend endless hours in deliberative meetings on competing priorities.

<sup>56</sup> It is important to note that the research team did not hold normative views on what villages “should” or “shouldn’t” select in local development budgets because a comprehensive analysis of needs and priorities cutting across sectors had not been conducted.

that engender mistrust or maladaptation. In addition, national communication campaigns on key issues can help to shift perspectives before resistance to reforms or programs sets in. Information can be embedded in education curricula, nation-wide deliberation and citizen engagement efforts, and public media campaigns to build a broad-based awareness and skills related to climate change and natural resource management across generations. Sharing information on rights, entitlements and eligibility criteria can help local actors to prepare accordingly, and to mobilize the resources they need to participate or adapt. In particular, a key component of transition plans in coal-dependent areas is local engagement and community dialogue.

*Especially in the case of large-scale transitions, engaging early helps to build buy-in, set expectations, and engage youth and marginalized groups.*

**In summary, communities need information on local climate risks and adaptations from sources they trust, and benefit from tailored communications and the ability to collectively process new information.** A combination of detailed scientific knowledge and highly localized knowledge can facilitate effective strategies that address the impacts of climate change at the local level, target those who are hit the hardest, and promote context-appropriate investments in climate adaptation.





## CHAPTER 5

# ADDRESSING LOCAL INCENTIVES AND TRADEOFFS



Communities have the capacity for collective action, but face a range of contradictory incentives from markets, enforcement of laws and regulations, and social and political pressures in addressing climate risks and transitions. Policies and programs need to align national and global climate goals with local incentives for natural resource management and local development to promote local climate action.



Economic incentives shaped by markets, commodity prices, and jobs can be steered toward sustainable alternatives through schemes, such as payments for ecosystem services. Regulatory incentives shape behavior and can strengthen protection of critical ecosystems if they are effectively enforced. Social and cultural influences also are a driver of local perspectives and choices, shaping what people see as appropriate and desirable. Balancing competing incentives through a mixture of interventions is critical to driving sustained behavior change but is challenged by vested interested in maintaining status quo.



Shifting the incentives requires a multi-pronged approach, which involves assessing and addressing various costs and benefits for different social groups; including poor and marginalized groups in policy dialogue; removing regulatory and procedural barriers to participation in transition initiatives; and building trust in climate change initiatives by delivering on commitments in tangible and visible ways.

**Communities face a range of contradictory incentives in natural resource management and local climate action.** When deciding what crops to plant where, where to fish, whether to cut down a tree, whether to take a job in a plantation or pursue a career in tourism, what to invest in, and whom to vote for, local inhabitants' decisions are shaped by a range of economic, regulatory, and social incentives. Regulatory reforms in Indonesia have already delivered significant progress in reducing deforestation. They include the moratoria of primary forest and peatland conversion, forest and land fire management, and broader land tenurial and agrarian reforms<sup>57</sup> including social forestry schemes.<sup>58</sup> Economic incentives, such as expanded use of results-based payments and environmental fiscal transfers, can take progress to the next level, including in areas still experiencing increasing rates of deforestation.<sup>59</sup>

<sup>57</sup> The GoI is committed to implementing Agrarian Reform through the legalization and redistribution of assets. The TORA targeted (a) asset legalization and land redistribution covering 9.8 million ha; (b) systematic land certification targets of the Ministry for Agrarian Affairs and Spatial Planning and National Land Agency of 23 million parcels by 2019; and (c) MoEF Social Forestry program to release 12.7 million ha of forest lands for communal uses.

<sup>58</sup> See this [link](#).

<sup>59</sup> Four provinces in Kalimantan continue to have increased deforestation rates. In 2020 their combined deforestation increased to 372.8k ha tree cover loss and 121k ha primary forest cover loss.



Social incentives, including the influence of NGOs, formal and informal community leaders, and social and cultural norms also drive behavior (Li and others 2021, and case studies conducted for this report, see Appendix B).

**Balancing competing incentives and realigning the incentive structures can be complex.** When it is in their interests, communities have the capacity for collective action. However, making the “cost-benefit” analysis work for local populations on a daily basis is no small task. From the perspective of communities, economic incentives to engage in more extensive agriculture may clash with governance incentives to preserve forests or with traditional forest management systems. Medium-term economic incentives to preserve mangrove forests or critical watershed management areas may clash with short-term incentives to clear land to maximize profits.

**Chapter 5 summarizes the main basket of incentives that shape local community action, and lessons for how to realign them effectively to drive a low-emissions transition from which local people can benefit.** How can local communities benefit from local and national climate transitions? Is it in communities’ interest to support climate adaptation and mitigation efforts and take local actions? What local incentives and tradeoffs do they face, particularly in the short and long terms, to take action on climate change? Different actors may have different abilities to benefit from incentives depending on their social standing, legal status, or access to information (Kolstad and Søreide 2009; Meehan and Tacconi 2017; Myers and others 2016; Ribot and Peluso 2003; Tacconi and Williams 2020; Tsing 2005). Common incentives for land use change and conservation efforts identified by local populations include offers of employment and wages, cash payments, regulatory changes, access to infrastructure and services, access to rights and legal status, information, peer pressure, religious and cultural influences, and training and education (Myers and others 2015).

**BOX 5.1** People on the Front Lines of the Climate Battle: Interdependencies among Transitions in Coal and Forestry and Other Land Use Sectors

Muara Siran village in East Kalimantan province is located on a river adjacent to extensive peatlands. It is home to the rare Mahakam porpoise, an endemic river dolphin threatened with extinction due to mining and the conversion of fish spawning habitats to industrial oil palm plantations. Families in Muara Siran rely on fishing and harvesting nontimber forest products, such as bird nests and honey. The peatlands are a critical habitat for fish and birds and a source of food for the endangered river dolphin.

The village recently rejected a proposal to convert the local peat forest to a palm oil plantation. Advocates for maintaining the peatlands from Muara Siran emphasize the importance of the peatland to their livelihood activities and to future eco-tourism revenues. A group of young people have set up some basic facilities, including a swimming platform and kayaking in a nearby lake, and a guest house overlooking the river mouth where the dolphins come to feed. However, many people in Muara Siran rely on jobs in the nearby coal mine, and tourist numbers are very low. Many visitors are put off by the constant traffic of coal barges and fishing vessels. Villagers admit it would be harder to turn away the palm company if they did not have coal jobs to fall back on. The short-term economic benefits of clearing the peatland still far outweigh any tourism revenues, and habitat loss and noise pollution from coal barges and local fishers also risk driving the porpoise to extinction. Protecting local livelihoods and biodiversity will require both changing the incentives facing local families and addressing the interdependencies among the energy and FOLU sectors that drive the local economy.

*Source: Authors based on qualitative study (appendix B).*

## 5.1 Types of Incentives and Trade-offs

**Policies and programs to support climate mitigation and adaptation need to connect local and global interests in sustainable resource management and help communities balance competing incentives.**

The mix of economic, regulatory, and social incentives needs to be re-balanced to manage trade-offs among short-term interests in over-exploitation of natural resources with medium-term climate change mitigation *and* long-term adaptation. This section briefly explores the incentives driving local behavior, and tools to shift them.

**First, market-driven economic incentives continue to drive landscape degradation and high emissions. However, various policies and programs may be able to shift the incentives to drive reductions in deforestation and forest degradation.** Commodity prices (such as for coal and palm oil), although exogenous, are a strong driving factor that can impact the incentives and instruments needed to change behavior. On the other hand, the “costs” of pollution, social losses, and high emissions are often unaccounted for. Fiscal policies can be used to remove or reduce distortions but are not discussed in this report.<sup>60</sup> The economic incentives driving local land use practices in Indonesia encompass wages and employment; cash payments; access to the means of subsistence, such as fishing or harvesting forest products; access to credit and savings; and access to the means of production, including land, labor, and finance. Economic incentives also include access to training, scholarships, and skills development. To adjust economic incentives, a range of tools are available (some of which are explored in depth in chapter 6 on Instruments) to internalize or compensate the opportunity costs of resource use or extraction; to recognize the economic value of ecosystem services; and to invest in conservation, energy transition, and sustainable landscape management. Expanded use of policies and financing tools to shift the economic incentives (box 5.2) could complement and help further reduce deforestation<sup>61</sup> and mangrove degradation, including mobilizing resources to close the US\$5.56 billion financing gap to achieve Indonesia’s emission reduction target in the land use and forestry sector by 2030 (MoEF 2022).

**Several mechanisms to change the economic incentives fall in the category of “payments for ecosystem services” (PES), including results-based payments, carbon offset credits, and ecological fiscal transfers.** A range of PES aims to shift the incentives in natural resource management by compensating actors for the opportunity costs of short-term land conversion – forgone jobs, harvests, or private profits – or by financing investments to develop sustainable alternatives, including viable and sustainable local livelihoods (box 5.2). PES address market-driven degradation of natural resources or the costs of harmful externalities (such as health issues or pollution) by channeling funding or support to the people or organizations whose decisions determine land use outcomes. Some PES schemes to channel financing to incentivize national, subnational, and local actors to invest in environmental protection or climate mitigation in Indonesia have proven successful in reducing deforestation. Through compensating opportunity costs, economic incentive schemes help to reconcile global, national, and local interests in sustainably managing resources.

<sup>60</sup> World Bank analysis recommends that Indonesia continue to shift fiscal policy to disincentivize emissions, strengthen the financial and private sector enabling environment for green investments, and continue energy pricing and subsidy reform by phasing out coal subsidies and phasing in carbon pricing (World Bank. 2023a).

<sup>61</sup> Four provinces in Kalimantan continue to have increased deforestation rates. In 2020 the combined rate for the 4 provinces in Kalimantan alone increased to 372.8 kha tree cover loss, and 121 kha primary forest cover loss. According to Yayasan Madani Berkelanjutan (2019), this total included an average of 137,000 ha of deforestation in areas under moratorium (indicative map) between 2012 and 2018. Indonesia’s deforestation was second highest in the world throughout 2010-2015 (FAO 2015).

**BOX 5.2 Payments for Ecosystem Services**

In Indonesia, the value of ecosystem services provided by forest and marine resources is vast. Forests and peatlands provide critical ecosystem services, including carbon sequestration, water supply regulation, air purification, and biodiversity protection. In Sumatra and Kalimantan alone, the value of peat-based carbon sequestration is estimated at US\$130 million annually<sup>a</sup> and the annual value of biodiversity is estimated at US\$1 billion<sup>b</sup>. Forests also generate livelihood, cultural, and social benefits for local communities living in and around them. Although the level of forest reliance varies, forest resources remain vital to the survival of many rural communities. Removal and degradation pose the stark risk of increased poverty. Indonesia's mangrove forests alone provide valuable ecosystem services that contribute to human wellbeing equivalent to an average of US\$15,000/ha/year, and up to nearly US\$50,000/ha/year<sup>c</sup>. Payments for ecosystem services aim to recognize these values (and costs), which are not otherwise factored into commodity and labor prices. Putting a value on ecosystem services and/or a price on GHG emissions (or other pollutants) can reduce demand for destructive production systems, promote investment in more sustainable livelihoods, and/or help local actors to reconcile short-term opportunity costs for converting or exploiting resources with long-term benefits.

PES instruments that aim to directly change the incentives for local communities include:

- **Ecological fiscal transfers (EFTs).** Fiscal transfers to subnational authorities to reward performance in achieving ecological indicators and to compensate opportunity costs of land conservation. Brazil, China, India, France, and Portugal all use EFTs of some type to finance or reward/fine environmental protection. Some indicators considered include forest density, water quality, and biodiversity. Indonesia already implements EFTs across different scales (2 provinces, 15 districts, and 1 city) that have led to qualitative improvements related to planning and budgeting processes,<sup>d</sup> though allocations and incentives at local levels are relatively small. These are explored further in chapter 6.
- **Results-based payments (RBPs).** Incentives or payments received based on verified and/or certified greenhouse gas emission reduction and other validated noncarbon benefits (World Bank 2017). Results-based payments in Indonesia are used primarily to incentivize reduced emissions from FOLU sectors and agriculture, including the pipeline Emission Reduction Program in Jambi province, and the Jurisdictional Reducing Emissions from Deforestation and Forest Degradation (REDD+) program in East Kalimantan. These are explored further in chapter 6.
- **Carbon trading.** Selling carbon offsets in voluntary carbon markets. Indonesia already has the world's largest carbon offset project sold to voluntary carbon markets. The Katingan-Mentaya project by PT Rimba Raya is located in Central Kalimantan. It protects one of the largest intact peat swamp forest areas in Southeast Asia and will protect and restore 149,800 ha of peatland ecosystem. This peat swamp encompasses an ecosystem restoration project that, over 60 years (2010-70), will prevent the release of an average of 7,451,846 tons of GHG emission reductions annually, making it the world's largest forest-based avoided emissions project.<sup>e</sup> The project also is expected to reduce poverty and improve quality of life for surrounding communities, and to stabilize and improve biodiversity.
- **Ecotourism fees.** Ecotourism schemes directly compensate service providers, namely, national park offices and community cooperatives. They are relatively simple, with low transaction costs. From 2016 to 2018, ecotourism from the forestry sector in Indonesia contributed over US\$10 million annually, largely based on fee collection from tourists at park gates. While the monetary contribution of ecotourism is still less than that from production forest, ecotourism holds promise for expansion. Expanding revenue from tourism fees to share with communities could provide local groups a direct stake in industry growth, alongside opportunities for jobs and incomes.

- **Payments to local communities, or “local PES.”** This variety of PES refers to direct payments to individuals or communities for services that enhance ecosystem values, such as conserving forests and biodiversity or protecting watersheds. The main difference between this type of scheme and RBPs is related to scale and implementation. Larger RBPs may aim to shift the incentive for local governments or actors over a larger area and based on outcomes. Local PES are focused on individuals or communities located near an environmental resource or ecosystem (service provider) and an NGO, government, or private actor willing to pay for continued ecosystem function (service receiver). Payments are intended to compensate recipients for choices, time, or labor that enable ecosystems to function and generate benefits.

There is significant scope to improve Indonesia’s PES systems by testing and scaling more efficient and effective systems for channeling benefits to communities.

Source: Authors’ review and synthesis.

Notes:

a World Bank estimate based on reports from *Wealth Accounting and the Valuation of Ecosystem Services (WAVES)*, 2019. [Link](#).

b Peat accounts from WAVES 2019 using SEEA methodology. [Link](#).

c Depending on the type and location of mangrove forest (World Bank 2022)

d See this [link](#).

e See this [link](#).

**The effectiveness of various PES mechanisms to shift the incentives often depends on the extent to which the incentive they aim to provide is viewed as intended from the bottom up, and whether the cost-benefit calculus works out for local people.** PES instruments channel funds to communities and other local actors to push the macro incentives down to the local level. Communities, companies, governments, and other stakeholder groups are incentivized to reduce emissions and protect key resources by sustainably managing land and natural resources, adopting clean energy sources, and engaging in other low-carbon approaches and technologies. Disadvantaged groups, such as women and youth, and marginalized communities, such as *adat* groups, are important contributors. Depending on the size and type of payments, PES schemes may pay individuals or communities to conserve forests, monitor water sources, or otherwise provide sustainable landscape management, and/or compensate them for choices, time, or labor that enable ecosystems to function and generate benefits. Other schemes may have more catalytic or instrumental goals. Paying local people or communities for sustainable landscape management can generate buy-in, promote local participation and empowerment, build trust, and encourage a shift in local actions, even when the payments do not fully compensate opportunity costs. This approach has a long history, both internationally and in Indonesia.

*Paying local people or communities for sustainable landscape management can generate buy-in, promote local participation and empowerment, build trust, and encourage a shift in local actions, even when the payments do not fully compensate opportunity costs.*



**The regulatory environment is the second main basket of incentives, which shapes the “space” for community actions to take place, hence influencing outcomes.**

From high-level targets which are embedded in local regulations, to local budget and auditing processes, allocations and training systems for extension workers, and recognizing and protecting land and property rights, the legal system and how it is enforced locally shape the resources and options available to communities, and frame what they see as possible. In general, local actors can move only as far as the regulatory context allows. Although not all regulations are perfectly followed (such as where informal governance structures and illicit practice are commonplace), case studies conducted across Indonesia show that the regulatory framework and its enforcement remain critical factors that shape attitudes and actions on the management of natural resources.

*Although not all regulations are perfectly followed ..., case studies conducted across Indonesia show that the regulatory framework and its enforcement remain critical factors that shape attitudes and actions on the management of natural resources.*

**At a high level, the Gol has put in place regulatory commitments to pursue a low-carbon transition, including an enhanced NDC submitted to the United Nations Framework Convention on Climate Change (UNFCCC).**

The country recently submitted an enhanced NDC target of emissions reduced by 31.89 percent without external support and by 43.2 percent with external support relative to business as usual. This target builds on numerous national regulations and policies, including Law 17/2004 on the Ratification of the Kyoto Protocol to the UNFCCC and Law 16/2016 on the Ratification of Paris Agreement. Furthermore, in 2011 the government developed the National Action Plan on Green House Gasses (GHG) emission reduction (RAN GRK) (Presidential Regulation 61/2011). This regulation sets out mitigation plans including the activities, locations, GHG emission reduction targets, and the institutions responsible for the emission reduction target in agriculture, forestry and peat land, energy and transportation, industry, and waste management sectors. RAK GRK also emphasizes the important role of provincial governments' GHG emission reduction and highlights the needs to stimulate community and private sector participation, particularly in the energy sector and Social Forestry initiatives. This emphasis was followed by the development of a provincial Regional Action Plan on GHG Emission Reduction (RAD GRK 2018), which serves as a guideline for subnational actors to develop their programs related to GHG emission in close coordination with the provincial planning agencies (BAPPEDA). Indonesia also launched a national adaptation plan, the *Rencana Aksi Nasional Adaptasi Perubahan Iklim* (RAN-API) in 2014, which provides a guidance to support the National Medium Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional/ RPJMN*) and highlights the importance of paying attention to the gender and vulnerable groups, ecosystem and landscape-based approaches, and financial mechanisms in climate adaptation.

**However, given Indonesia's decentralized governance structure, the regulatory space related to local climate action is characterized (and complicated) by the combination of these national laws and policies.**

For example, the rules governing the use of village budgets are set both by the Ministry of Villages (for funds allocated by the Ministry of Finance through direct fiscal transfers), and by district governments (for funds allocated from district revenues). Similarly, slightly different rules apply to marine protected areas that are managed nationally versus those under subnational management. In addition to the content of various regulations, the proliferation of regulations and changes in regulations and authorities between agencies and levels of government negatively impacts local actions and perceptions.

**Frequent changes to decentralization regulations often lead to unclear division of authorities across levels of governments, which negatively affect the responses of local community and private sector actors.**

The initial enactment of decentralization policies (Law 22/1999 and Law 25/1999) delegates significant decision-making authorities to districts and municipalities. However, the revised decentralization law (Law 23/2014) transfers back significant authorities, including those related to climate actions, to the national government agencies and some to the provincial governments. Under Law 32/2004 on decentralization, district governments were given the rights and responsibilities to issue concessions and licenses for renewable energy. However, in the revised regulation (Law 23/2014, revised with Law 23/2015), which took effect in 2017, this authority was transferred back to the provincial government. These regulatory changes often have become sources of confusion at the subnational levels, hindering the ability of subnational governments and local actors to take on new initiatives and policies to address climate challenges.

*...regulatory changes often have become sources of confusion at the subnational levels, hindering the ability of subnational governments and local actors to take on new initiatives and policies to address climate challenges.*

### **BOX 5.3** Regulatory Space for and Constraints to Local Action

A review of regulations and literature on the regulatory environment for local climate action (appendix E) highlights that the Indonesian government has taken a range of actions to improve the incentives for sustainable local resource management to align the incentives with national climate targets. For example:

- **National commitments to locally led action.** Launched in 2014, the national adaptation plan (*Rencana Aksi Nasional Adaptasi Perubahan Iklim/RAN-API*) recognizes that climate change adaptation requires local approaches, acknowledges the critical roles of provincial and local governments in planning and implementing climate adaptation initiatives, and highlights the importance of including of women and vulnerable groups.
- **Sectoral programs to incentivize local mitigation and adaptation.** In the FOLU sector, the Ministry of Environment and Forestry introduced MoEF Regulation 11/2016 on Climate Village Program (*Program Kampung Iklim/Proklam*), which encourages community and stakeholders' participation in climate adaptation and mitigation at the village level. The program stipulates several activities including low-emission agricultural production and flood mitigation technologies.
- **District-led "green" development.** In Siak District, Riau Province, the district government has strived to achieve the green development vision and apply sustainability principles in natural resources management and economic development. The district stipulated the Siak District Decree 22/2018 on Green Siak, which includes provisions related to sustainable resources management and economic development. The district also implemented a pro-environmental budgeting policy known as ecological fiscal transfer (*Transfer Anggaran Kabupaten Berbasis Ekologi/TAKE*). The policy integrates ecological indicators (green village index) to incentivize village governments in pursuing sustainable development.<sup>a</sup>
- **Village-level incentives.** The 2014 introduction of the village law significantly increased village governments' autonomy to plan and manage village-level development and affairs. The GoI has already introduced some reforms to local budgeting and planning to promote spending on environmentally relevant activities.<sup>b</sup> Environmental resilience is 1 of the 3 components of the

Village Development Index (*Indeks Desa Membangun/IDM*). Environmental targets are further mainstreamed at the local level through the extended Sustainable Village Development Index (*Indeks Desa Membangun Plus/IDM+*).<sup>c</sup> In Jayapura district, the district government has modified the existing method of Village Fund Allocation (*Alokasi Dana Desa/ADD*) to include an incentive allocation within which a small percentage is reserved for ecological indicators. The ecological indicator is based on the IDM. Villages that score high in IDM will receive higher allocations as a reward for performance.

However, several contradictory regulations constrain local communities' ability to undertake effective climate actions. For example:

- **The Village Fund is increasingly earmarked for specific, central-government-mandated allocations.** In 2022, 68 percent of village budgets were earmarked to be used for prescribed uses (including COVID recovery, social protection schemes, and food security). The vast remainder of the budgets are spent on unavoidable operating and administrative costs, leaving almost no remaining discretionary funds,<sup>d</sup> and limited scope for village governments to budget for other activities, including local climate actions.
- **Some centrally led programs are insufficiently integrated with decentralized authorities.** For example, the *Proklim* program provides useful guidance (including a list of adaptation and mitigation activities suitable for villages to implement) and a good incentive for communities (recognition by the Minister). However, the initiative is not integrated in village budgeting and planning and does not receive much funding. Consequently, *Proklim* struggles to allocate support to the most strategic sites and lacks systematic access to the platforms that communities use to discuss and plan actions (such as village development planning meetings).
- **The coal sector lacks a regulatory framework with the goal of incentivizing a sustainable transition.** Post-mining social policy is the responsibility of coal-mining companies and is limited in scope. On the other hand, public policies to address the social impacts of transition are spread across various ministries, but at the local level, are not well coordinated around transition sites. For example, the Ministry of Energy and Mineral Resources' *Pengembangan dan Pemberdayaan Masyarakat (PPM)* is responsible for overseeing community development programs operated by coal-mining companies. The Ministry of Manpower is responsible for vocational training programs (although Vocational Training Centers are managed by local governments). The Ministry of Women's Empowerment and Child Protection has a social entrepreneurship program (ProKUS) for poor and vulnerable families, which collaborates with local women's empowerment networks such as the Association for Women in Small Business Assistance, Women-Headed Household Empowerment Program, and Migrant Care. A coordinated, government-led response in transition sites requires better harmonization between national policies and subnational operational capacity.

Source: Authors based on regulatory review (appendix E).

Notes:

a Indicators are unique across districts because they are linked to each district's own plan as stipulated in RPJMD. For example, in North Kalimantan Province, the indicators include fire control, development of urban open spaces, water resources protection, waste management, and air pollution prevention.

b See Sutiyono and others 2018.

c See Mecca and others 2020.

d The earmarked percentage of village fund priority allocations is stipulated in Government Regulation regarding The Detail of State Revenue and Spending (APBN) Allocation in the relevant year in which the prioritized categories of activity are informed by MoV Regulation regarding Village Fund Priority Allocation in the relevant years.

**Economic, social, and regulatory incentives are interactive and can have unintended consequences when they place contradictory pressures on local communities – often to the detriment of regulatory compliance.**

A failure to reconcile market-led or social incentives that contradict formal rules and regulations can undermine success and put vulnerable communities at risk. One example is the “passive resistance” of forest dwelling communities that has plagued forest management authorities for decades (Scott 1985; Peluso 1994). For example, foresters across Java, Kalimantan and Sumatra have struggled to control illegal logging, as compliance with logging bans was undermined by the high prices for teak timber and few other profitable livelihoods options. As a result, some communities engage in acts of false compliance or feigned ignorance as they try to balance the need to keep the peace with improving livelihoods (Peluso 1994). In addition, stories abound of compromised officials caught allowing or assisting illegal logging practices because they were afraid of the villagers, while some officials claim to have been “seduced by evil spirits” (Peluso 1994). Currently, Kerinci Seblat National Park faces continued encroachment of smallholder farming inside park boundaries. This encroachment was exacerbated during the COVID-19 pandemic despite the illegality of clearing land or farming inside the national park.<sup>62</sup> Local authorities say there is little they can do to prevent this encroachment, with powers of enforcement and monitoring splintered across multiple, under-resourced agencies. On the ground, a different reality emerges in which some local residents blame “outsiders” for the encroachment. Other stakeholders speak of the caution that park rangers have in approaching communities who conduct illegal activities for fear of either violent retaliation or, more generously, a feeling that it is wrong to deprive farmers of their meager livelihoods.

*Economic, social, and regulatory incentives are interactive and can have unintended consequences when they place contradictory pressures on local communities – often to the detriment of regulatory compliance.*

**Finally, in addition to economic and regulatory incentives, social and cultural influences are a major driver of local perspectives and choices.** The influence of local leaders (formal, informal, religious, heads of families); levels of trust in outsiders and the government (often linked with past experiences); existence and functionality of collective action and learning fora (such as farmer groups); and cultural norms around gender, inclusion, and environmental management shapes what communities see as appropriate and desirable. Local social and cultural norms and political economy factors (What will my neighbors think? What does my local politician expect?) are filters through which other incentives are understood. In addition, some communities’ deep cultural values and their attachments to the environment and local practices are highly influential in the choices they make to change or retain a livelihood or resource management focus. Strategies implemented need to be compatible with such values (Steenbergena 2017). Similarly, in many communities, strong traditional values around reciprocity and strong family networks are key drivers of behavior and can put pressure on family finances, bureaucratic management processes, and allocations of local government resources (Tidey 2022).

<sup>62</sup> Authors analysis of a background study based on a household survey conducted in 2022 in Jambi.



**BOX 5.4** Changing Incentives in Papua

The balance among various social, economic, and regulatory incentives is dynamic and shifts over time. In Papua, decades of external development influences have seen a change in local attitudes on forest management, with obvious implications for emissions from land use change and deforestation. Over time, increasing reliance on (and preference for) imported food has driven up the importance to Papuans of incomes and savings. This change in preferences has gone hand in hand with changes to production systems driven by private investment.

Traditionally, people were reliant on swidden agriculture, with only very small private landholdings. Today, production systems on the island are shifting due to increasing urbanization; more opportunities to engage in commodity production and trade; government policies that promote greater food production; and changing dietary preferences to become more intensive, commercialized, and more heavily focused on monoculture. For example, between 2009 and 2017, plantation areas in West Papua grew by 82 percent from 29,783 ha to 54,097 ha.<sup>a</sup> Despite unsuitable growing conditions, national policies incentivizing rice production have resulted in conversion of forests to paddy fields in Papua. Such constraints on local productivity mean that imported food items are still cheaper than those produced locally. This basket of regulatory, social, and economic incentives clearly is suboptimal. Studies point to increasing nutritional deficiencies, unsustainable conversion of forests, and inequitable social outcomes.

*Source: Authors based on qualitative study (appendix B).*

*Note: a See this [link](#).*

## 5.2 Effective Interventions to Address Incentives and Tradeoffs

**Building on past experiences, Indonesia has made strong progress embedding improved incentives in its subnational systems, particularly the use of PES schemes and promotion of sustainable livelihoods programs.** For example, the Government of Indonesia plans to take a new approach to large-scale mangrove forest rehabilitation (box 5.6). Similarly, the Emission Reduction Program in East Kalimantan province, Indonesia's pioneer jurisdictional REDD+ program, provides payments for verified emission reductions as an economic incentive, and plans to channel that incentive to community groups focused on sustainable forestry, fire management, and sustainable agriculture and fishing. In addition, multiple subnational governments have implemented some form of EFT (see chapter 6).

**Re-balancing competing incentives is critical to drive sustained behavior change but is challenged by vested interested in maintaining the status quo.** To date, suboptimal outcomes often are driven by political economy factors including historical grievances/low trust between communities and state, disproportionate influence of private sector actors within local political processes, and mismatches between the size and timing of economic incentives and communities' needs. In some cases, short-term interests of local communities or businesses are divorced from broader climate and sustainability goals, such as when strong commodity prices drive further conversion of forests to oil palm plantations or deepen local interests in maintaining coal revenues. In other cases, even where positive alternatives are viable and being promoted, there are challenges in implementation because of competing incentives among groups. For example, PES programs sometimes do not reach intended beneficiaries if payments channeling systems are designed to serve local elites, and struggle to reach remote communities; or if tourism revenues are not accessible to those responsible for destructive behaviors, such as poaching or logging. Market failures, governance gaps, and trust deficits often create a vicious spiral, making it hard to reverse course and meaningfully engage local groups.

**Both Indonesian and global experience suggest lessons on how to influence and shift local incentives toward environmentally, socially, and economically sustainable development.** Indonesia can build on its strong foundations, namely, strong global support, influential local environmental activism networks, and robust national platforms for local development in the form of the village law and other decentralized governance and planning and budgeting systems. A proliferation of reports from across the globe holds lessons learned from successes and failures. Moreover, Indonesia’s own experiences including PES schemes, livelihoods and social forestry programs, and subnational management reforms also offer key insights. Some of these are summarized below.

### *Engage Local Communities to Realign Collective Incentives*

**Addressing conflicting interests within communities requires discussion, deliberation, and delicate handling of local power dynamics – all key features of well-designed community empowerment programs.** Evidence from livelihoods and conservation programs in Indonesia points to the need to address challenging economic and social dynamics already driving community behavior to change this behavior. For example, companies and NGOs willing to support small scale shrimp pond owners to upgrade their infrastructure or equipment to more environmentally sustainable methods of farming often get bogged down in local tensions over land tenure, debt, and access to common property resources. Negotiating these dynamics is complex and time consuming and is undermined by a lack of resources and trained facilitators allocated to laying this groundwork.

**Skilled community facilitators can work with communities to promote and protect the interests of groups who are *already* aligned with desired outcomes.** These initiatives most often include the poor and marginalized, communities dependent for their livelihoods on well-managed and biodiverse rich forests and marine environments, and those who directly benefit from ecosystems services, such as coastal protection afforded by mangrove forests.

**Inversely, *not* working with communities and local stakeholders can undermine impacts.** For example, a recent study (Stacey and others 2021) of coastal livelihoods projects in Indonesia highlighted that a common mistake has been a “lack of participatory engagement, and failures to take account of local power relations and institutions or generate understanding and acceptance of the perceived need to conserve and/or manage the target resource.” As a result, projects can fail to effect lasting behavior change, miss spillover effects of certain interventions into other areas, or overlook opportunities to diversify income and pool risk among different stakeholders who could be identified locally.

### *Understand and Address the Trade-offs for the Poorest*

**Realigning the incentives requires asking “Realigning them for whom?”** Current resource management outcomes are a product of people acting in their interests. Realigning the incentives is possible not only by changing the types and volume of resources available but also by making sure that they meet the needs of the people who face the toughest tradeoffs. Often, the short-term economic trade-offs driving land use change are sharpest for the very poorest. In other words, greater support to the poorest from within their communities may be required to limit destructive behavior in favor of higher returns from conservation efforts over the longer term. For example, if they are included in livelihoods initiatives appropriate to them, people converting forested land for aquaculture or using harmful small-scale fishing techniques such as dynamite, can be supported to find more sustainable ways to fish, farm, and earn.

**Marginalized groups often are excluded from programs and policies designed to change local economic incentives by promoting sustainable livelihoods, to the detriment of those programs.**

Excluding the most marginalized (by design or unintentionally) is a regular source of the failure of conservation and alternative livelihoods programs. Studies of alternative livelihoods programs have shown that exclusion of vulnerable groups is relatively common and erodes desired conservation impacts (Stacey and others 2021; Wright and others 2016).<sup>63</sup> Often, poor people do not have the time required to attend community meetings or training. More generally, women are often excluded from “community” discussions, especially on natural resource management. The poorest within communities may struggle to participate in livelihoods programs because they already are indebted to more powerful people in their village (Stacey and others 2021).<sup>64</sup> For example, sustainable fishing and aquaculture enterprises are sometimes willing to provide fishing gear, training, and support to fishers to help them fish or farm using more sustainable methods, and to fetch higher sale prices. However, they report that many fishers and aqua-culturalists remain indebted to other buyers who are powerful in their village so continue using destructive or unsustainable methods because they have no other options.

**BOX 5.5 Fire Risk Mitigation Initiatives in Siju village, South Sumatra**

Using fire to clear land in Siju village in South Sumatra is a decades old practice. Community members in Siju cleared lands to cultivate rice and other crops using the *sonor* system, a system that involves cutting and burning plants in a forest or woodland. The nutrient-rich layer of ash that is left behind made the soil fertile and temporarily eliminated weed and pest species. This system gained great acceptance within the community after a large fire outbreak in 1991, which was followed by an extraordinarily bountiful harvest, entrenching the idea that the use of fire to clear land had a positive impact on crops and soil fertility. As one community member stated:

*Because of the fires, the land became very fertile. The community made use of it by planting rice. With the fertile peat soil, everyone in the village enjoyed a very bountiful harvest. We recorded maximum yields that year. [18-FS-06]*

However, this entrenched wisdom conflicts with today’s conditions and with official policy. Following massive fire outbreaks in Kalimantan, Sumatra, and elsewhere in Indonesia in recent decades (including large fires in 1997, 2015, and 2019), the Gol intensified its program to address fire risks and to protect natural forests, particularly peatlands. Since 2015, using fire to clear land has been prohibited.

Even prior to the prohibition, villagers were realizing that the *sonor* system was having increasingly detrimental effects on the community. The growing population density in the area meant areas of habitation were located closer to the areas in which the *sonor* system formerly was practiced, with greater risk to human life from smoke and uncontrolled fire.

<sup>63</sup> Projects that failed tended not to understand the social contexts in which they were situated, including gender dynamics, resource and land-tenure systems, and the desires of local producers. Not understanding includes lack of participatory engagement and failures to consider local power relations and institutions or generate understanding and acceptance of the perceived need to conserve and/or manage the target resource (Stacey and others 2021; Wright and others 2016).

<sup>64</sup> Limited livelihood mobility due to indebtedness in *punggawa-sawi* (patron-client) relationships is common in Indonesia, especially in fishing communities (Stacey and others 2020).

In 2015, in support of the prohibition on the use of fire to clear land, several Fire Care Community Groups (*Kelompok Masyarakat Peduli Api*, or KMPA) were established in the district of Banyuasin and elsewhere, including in Siju, to engage communities in fire control and risk mitigation measures. In Siju, Village Funds were used to provide a training course for the KMPA members, after which they were expected to take up responsibilities for fire management and to practice “alternative” sustainable livelihoods that did not rely on extensive clearing of peatlands.

The effectiveness of KMPA in Siju has been mixed. Initiatives to promote livelihoods that did not rely on intensive farming in peatlands were largely unsuccessful. Examples were a fish farming business in which most of the fish died because of the acidity of the local water, and a goat-rearing program that failed because of a lack of grazing material and local knowledge of goat rearing. For their part, the village heads and other village-level administrators tended toward passivity and minimal compliance with directives that did not provide clear material benefits to them or their constituents.

In summary, regulatory shifts and a loosened grip of historical traditions have driven a broad consensus that things should change. Nevertheless, the short-term profitability of clearing peatlands and lack of knowledge and skill of economically viable alternatives drive an uneasy equilibrium in which locals feel they have few reliable alternatives, and continue to pursue short-term economic interests, despite them being at odds with long-term aspirations to manage resources legally and sustainably.

*Source: Authors based on qualitative study (appendix B).*

### *Reduce Regulatory Barriers to Participation and Action*

**Overly complicated processes create incentives to take shortcuts, cause bottlenecks which contribute to delays or put people off taking action.** Sometimes, regulatory systems create practical barriers to access by create a high burden of paperwork (such as filling in forms or templates) or slowing down approvals (such as local livelihoods projects, which must be signed off at multiple levels before they can be implemented). When supporting small-scale local action, operational experience points to the benefits of using simple templates and forms (and only where absolutely needed), and of devolving approvals to the lowest possible level, to avoid administrative delays and ensure approvals are made by those with the most understanding of context.

**In addition, it is important to avoid legal or procedural barriers to participation and eligibility.** Often eligibility for participation or payments is based on land tenure and property rights, access to a bank account, and/or being formally registered with a group or organization. These administrative processes are not always necessary and obstruct some who rely on customary or community-based land rights, cannot legally document land ownership, or cannot access banking or administrative services. For example, some cash-for-work programs to support mangrove rehabilitation have inadvertently excluded women from participating as the payments systems for wage workers rely on bank transfers with no option for cash payments. Many women in targets areas do not have individual access to bank accounts, which precludes them from registering as workers.

*some cash-for-work programs to support mangrove rehabilitation have inadvertently excluded women from participating as the payments systems for wage workers rely on bank transfers with no option for cash payments.*



### Follow the Money

**Doing cost-benefit analyses both in program design and with affected communities and other stakeholders can guide the scope and type of interventions needed to directly address the economic interests of target groups** (Ferraro and Kiss 2002; Stacey and others 2021; Linkie and others 2008). Performing cost-benefit analyses for subgroups is not always easy. However, these analyses are critical to understand the rationales that actually drive behavior and to identify the blend of economic and noneconomic incentives that will be needed to create viable alternatives and to shift behavior over time.

*Benefits from improvements to natural resource management may be slow and low disbursing and may span years, whereas the trade-offs for the poor are more immediate and seasonal.*

**Incentive mechanism(s) and affirmative measures will need to account – literally – for the trade-offs between short-term changes to livelihoods and supporting longer-term conservation efforts.** The benefits derived from improvements to natural resource management activities are known and outweigh the costs of further degradation.<sup>65</sup> However, they may be slow and low disbursing and may span years, whereas the trade-offs for the poor are more immediate and seasonal. To catalyze action, focusing on the groups most vulnerable to expected changes and on those who need to see a material shift in their daily or weekly livelihoods basket to responsibly change behaviors is required. Such analysis will help to target early interventions and clarify how to channel economic incentives effectively and reliably over time. For example, payments for ecosystems services schemes often need to consider advance payments to incentivize behavior change and build trust, even before the impacts of conservation/rehabilitation activities are evident.

**In undertaking cost-benefit analysis, practitioners can work closely with communities.** For example, a 2017 study in East Kalimantan identified the practical costs and benefits of mangrove rehabilitation by assessing how much households within target restoration areas were willing to pay for restoration efforts in their villages. Mangroves have been exploited systematically in Indonesia since 1800, especially for the development of brackish water shrimp aquaculture (*tambak*) and for timber harvesting (Ilman and others 2016)<sup>66</sup>. The results of the study showed that over 80 percent of respondents considered the benefits of mangroves (such as the ability to harvest mud crabs, gain protection from tidal and storm surges, and see increases in lucrative breeding grounds for local fish and shrimp species) were essential for their livelihoods and expressed willingness to pay for mangrove restoration, and to take responsibility for maintenance. As a result of this assessment, it was concluded that restoration plans were viable, and useful indicators of community-buy in were able to be incorporated into the design of follow-on programming (Susilo and others 2017).

<sup>65</sup> For example, forests and peatlands in Indonesia provide critical ecosystem services, including carbon sequestration, water supply regulation, air purification, and climate resilience. In Sumatra and Kalimantan alone, the value of peat-based carbon sequestration is estimated at approximately US\$130 million annually, whereas the annual value of biodiversity is estimated at US\$1 billion (World Bank 2021a).

<sup>66</sup> Over the next two decades, failure to deal with the current low productivity of shrimp aquaculture in many parts of Indonesia may drive shrimp producers to clear an estimated 600,000 ha more mangroves to make way for shrimp farms. However, with improvements in brackish water aquaculture productivity, prohibiting palm oil concessions from using mangroves, and maintaining other mangrove use pressures at moderate levels, the net loss of mangroves in the next 2 decades could be reduced to approximately 23,000 ha.

### *Adopt Combinations of Incentives to Rebalance Interests over Time*

**Interventions need to manage trade-offs between short-term interests in over-exploitation of natural resources with medium-term climate change mitigation *and* long-term adaptation.** Combinations of economic incentives, from cash for work programs, payments for ecosystem services, social protection systems, and insurance, and lending schemes, can be combined to align the short-term needs of locals with the longer-term financing capacities of the Gol and carbon finance markets. Seasonal patterns often determine daily wage rates, average household incomes, and business cashflow, whereas subsistence needs prioritize drive prioritization of short-term economic gains. Addressing short-versus-long-term cost-benefit gaps is critical.

**Various compensation or support schemes – including payments for ecosystem services programs – that do not pay enough or that pay only for a short period, risk failure.** They may not contribute to real shifts in economic incentives and may undermine trust in government or support for PES programs. Priority should be given to payments that are distributed faithfully and provide compensation and/or capacity building over long time horizons so that they are able to support sustained behavioral changes or investments, rather than temporary shifts. An example of a solution could be to design PES schemes to close the gap between payments conditioned on performance over the medium term and the immediate needs and incentives facing communities. Rather than one-off payments for performance, multiple instruments could be used to ensure that payments are fair and continuous.

**Lessons also show that, when trying to encourage communities to participate in local climate actions, providing visible and sustainable benefits for communities at an early stage improves outcomes** (Madera and others 2007). Global lessons from FOLU and energy sector projects show that investments in early phase benefits and “no regrets” actions yield real, permanent, and visible improvements in well-being. In the case of PES schemes, these benefits will persist even if benefits from large-scale pay-for-performance or ecosystem services schemes take longer to materialize. In addition, early-stage investments can build trust and generate greater buy-in from local communities. For example, evidence from mangrove rehabilitation programs in Indonesia suggests that when activities to promote sustainable local livelihoods (such as technical assistance to improve mud crab or shrimp farming) are initiated before rehabilitation and conservation activities, communities are more willing to participate in rehabilitation, understanding that their livelihoods interests are being supported by the intervention, rather than only being restricted by conservation activities.

### *Adopt Both “Carrots” and “Sticks” to Promote Livelihoods Transitions*

**A combination of economic and regulatory tools can realign competing incentives in critical landscapes to limit harmful behaviors while incentivizing local investment in sustainable alternatives.** Particularly, when community livelihoods are at stake, such as when community members are at risk of losing jobs during coal transitions, or engaging in destructive fishing or logging activities, it is important to create incentives for local populations to invest their time and money in more sustainable alternatives, while strengthening enforcement of environmental protections, such as protected areas or environmental standards. Secure land tenure and water rights and rights to use and access trees and forests provide strong incentives for individual farmers, households, and communities to invest in improved land and water management. In parallel, appropriate pricing regimes and regulatory frameworks encourage

sustainable use of scarce resources. These actions provide a supportive framework to incentivize and guide livelihoods investments, while strong regulatory frameworks limiting unsustainable activities (such as logging, poaching, or establishing no take fishing zones) constrain the extent to which local populations can over exploit fragile ecosystems (World Bank 2023).

**An example from Brazil shows how market-led deforestation was addressed through a combination of “carrots” (subsidies and development support) and “sticks” (stronger enforcement of conversation zones).** The interventions were designed to align the profit-maximizing interests of the private sector with the welfare of local communities and the mandates of local government. In particular, the “Produce, Conserve, Include” model in Mato Grosso state channeled financing and support to companies, local government agencies, and local communities to maximize private sector profits from intensive agriculture, rather than continued extensification, which was driving deforestation of the Amazon rainforest. Participants received support to upgrade farm technologies and invest in capital requirements, while local communities benefitted from skills training, jobs, and improved access to education and services. Combined with effective management of forest boundaries and protection of indigenous communities' rights and knowledge, the state of Mato Grosso achieved a strong balance of high productivity and job creation, significantly reduced deforestation, and improved social outcomes for local forest-dependent communities. This balance of strong enforcement of ecosystem management rules, the right market incentives, and the protection and promotion of rights and identities is hard – but possible – to achieve.

**Globally, and in Indonesia, examples abound of “alternative livelihoods” and conservation programs that failed to achieve their goals at least partly because they were using only carrots or only sticks, but not both.** For example, alternative livelihoods programs that lend support to communities to incentivize sustainable business activities can find that, in the absence of adequate enforcement efforts or environmental safeguards, these programs become “additional” rather than “alternative” livelihoods. Similarly, conservation activities may struggle to achieve high rates of enforcement or compliance if local communities are cut off from their most lucrative livelihood activities, rather than supported into viable alternatives (chapter 3). For example, providing significant support to improve services, access to skills training, and investing in local areas development can provide incentives to stay in coal-dependent areas and support transition. In contrast if people do not see material evidence of positive alternative livelihoods options for them and their children, that perception could prompt potentially harmful outmigration.

**In summary, while communities have the capacity to take collective actions to address climate risks and drive low emissions transitions, incentivizing sustainable local climate action remains challenging.** Projects tend to be short term, whereas long-run political and social trends endure. Sweeping regulations and high-level PES schemes are difficult to tailor to a variety of local contexts and needs and interests of different groups within and between communities. Many attempts to shift the incentives have unintended consequences, while others are thwarted by sudden shifts in weather patterns or commodity prices. For this reason, a combination of short-and long-term initiatives spanning social, regulatory and economic spheres are often needed to triangulate sustained shifts in perspective and behavior. Attempts to correct market failures through PES schemes and other economic instruments should carefully assess the distributional impacts of their programs and build in safeguards and learning to adapt as needed. Some of these instruments are explored further in the next chapter, with a focus on specific guidelines for design and implementation.

**BOX 5.6 Spotlight on Mangrove Forest Ecosystems**

Mangrove rehabilitation in Indonesia has a mixed history. Many large-scale efforts to replant degraded mangrove areas have failed to deliver the intended results of sustainably rehabilitating mangrove forests and improving the well-being of surrounding communities.<sup>a</sup> The reasons for this are known. First, many previously forested areas have been converted to aquaculture or agriculture and are still in use by communities. Finding secure and suitable sites in which rehabilitation is likely to succeed can be difficult. Consequently, some agencies undertake rehabilitation campaigns in areas not ecologically suitable for forest regrowth. Secondly, the institutional incentives of responsible agencies – including high pressure to disburse and deliver against targets – counter the need for relatively complex and site-specific investments in both institutional and biophysical aspects of rehabilitation. Frequently, single-species planting campaigns dominate spending, despite other (often less expensive) rehabilitation methods being better suited to local conditions.<sup>b</sup>

Nevertheless, small-scale, largely NGO-driven efforts have shown that community-based mangrove rehabilitation can succeed. Many cases of rehabilitation efforts have used community-based approaches to achieve effective mangrove forest rehabilitation: high-quality mangrove forests that survive beyond the first few months or years after initial investments. Community-based approaches also are better suited to address complex issues of land tenure and land use, as local facilitators can work with communities over time to identify the sites, species, and other economic and ecological conditions (tidal patterns, seasonal factors, livelihoods activities) that need to be considered and managed.<sup>c</sup>

The Peatland and Mangrove Restoration Agency (*Badan Restorasi Gambut dan Mangrove Republik Indonesia*) and KLHK plans to combine a range of interventions to change the economic and regulatory incentives that have been drivers of mangrove forest degradation in the past, including establishing strong mangrove management institutions within subnational governments, supporting sustainable local livelihoods in biodiversity-positive value chains, and promoting the enabling environment to capture revenues from carbon markets for “blue carbon.” They plan to work with local populations to map drivers of mangrove loss, explore options to allocate land for rehabilitation, mobilize community labor to undertake physical rehabilitation work, monitor mangrove forest health, and invest in mangrove-friendly sustainable livelihoods.

One challenge facing the GoI is how to operationalize delivery systems capable of allocating increased funds (including a \$400m World Bank financed project) to high-quality rehabilitation approaches at scale, while maintaining enough flexibility within the systems to address site-specific conditions and contextual variations. Indonesia’s history of community-driven development offers models for how to develop scalable models for community-based planning, but these need to be adapted to specific ecosystems and social contexts in different geographies.

Source: Authors’ summary.

Notes:

a Sasmito and others 2022

b Sasmito and others 2022

c Community-based approaches result in (1) longer term funding and maintenance of local rehabilitation efforts, (2) greater acceptance by local populations of protective legislation, (3) higher levels of public support, (4) greater diversity of mangroves species being rehabilitated, (5) much larger spatial scale of mangrove restoration, and (6) the presence of additional measures to reduce wave action in highly eroded areas (Damastuti and others 2002; Brown 2017).





## CHAPTER 6

# INSTRUMENTS TO SUPPORT TRANSITION PLANNING AND IMPLEMENTATION



Indonesia's climate response will need to work effectively across scales. A combination of reforms and investments in national policies, decentralized spatial management, and bottom-up community actions is needed.



Existing policies and programs could be strengthened and scaled to promote more sustainable, inclusive, and effective outcomes. High-quality data, a suite of national commitments, and existing decentralized platforms for community-led local development provide strong foundations to support transition planning and implementation.



The following instruments are prioritized to be strengthened and scaled:

- Community empowerment programs and the Village Law will continue to be key pillars of Indonesia's development trajectory and are ready-made vehicles to promote local climate action.
- Planning and coordination roles of local governments, which are responsible for planning, service delivery, enforcement of laws and regulations, and technical assistance, will need to be strengthened.
- Results-based carbon finance will continue to be a critical instrument to incentivize mitigation, especially in forested landscapes.
- Community support mechanisms, local economic development schemes, and stakeholder engagement platforms will be key instruments to mitigate the social and distributional impacts of coal transition and reduce communities' dependence on coal.

**Promoting local climate action requires ensuring that communities are aware of climate risks and opportunities, willing to take action, and able to act effectively.** Chapter 6 focuses on policy and program instruments that promote the capability of local communities to take local climate action. These instruments include providing the resources, technical assistance, and coordination platforms that they need to identify, plan, and deliver local adaptation and mitigation actions. To some degree, the “instruments” discussed in this chapter also are appropriate to improve awareness and shift the incentives. All three pillars are interdependent. Building on the conclusions of Section I, chapter 6 focuses on select instruments that can accommodate the diversity of climate risks and opportunities across Indonesia, and are scalable.

**Indonesia has started implementing a mix of policies, including regulatory instruments, sectoral policies, and place-based policies to manage transitions.** High-quality data, a suite of national commitments, and effective decentralized platforms for community-led local development provide very strong foundations. However, Indonesia's systems could be strengthened to drive more, and more effective, local climate actions. An inclusive climate response will need to work effectively across scales—to ensure that national policies, decentralized spatial management, and bottom-up community actions complement one another.

*An inclusive climate response will need to work effectively across scales—to ensure that national policies, decentralized spatial management, and bottom-up community actions complement one another.*

**First, community empowerment programs and the Village Law will continue to be key pillars of Indonesia's development journey and are ready-made vehicles to promote local climate action.**

Indonesia's 75,000+ village governments spend over US\$8bn per year on local development. The Village Law reaches 176 million people in Indonesia, 117 million of whom live in rural areas, and constitute 70 percent of the country's poor. Thanks to the introduction of the Village Law and the *Dana Desa* (Village Fund) intergovernmental transfer mechanism, village governments have been able to allocate resources for locally identified development needs (although, in recent years, the space for discretionary spending has been curtailed substantially). Local climate actions that could be implemented at the village level are cross sectoral, ranging from specific mitigation actions such as forest rehabilitation to adaptation measures such as strengthening infrastructure and diversifying livelihoods. Village fiscal transfers can fund this diverse basket of local activities, which can be incentivized through payments for ecosystems services or ecological fiscal transfers. However, village planning and budgeting systems are not yet optimized to promote climate-smart development. The Village Law is a vehicle that could incorporate stronger community planning and support instruments in implementation, including integrating climate risks into planning and budgeting, strengthening technical assistance and training on climate-smart infrastructure standards and adaptation activities, and improving monitoring of climate-related expenditures and results. Section 6.1 explores how to optimize Indonesia's village governments to drive local climate action.

**Second, effective local action linked to national policy goals is dependent on the supportive and regulatory role of local governments.**

Local government support is especially critical in protected areas and fragile ecosystems, for which effective cross-sectoral approaches are needed to drive more sustainable and inclusive outcomes. Indonesia's decentralized governments play a significant role in planning and implementing local development. Implementing national policies, as well as quality oversight and coordination based on specific conditions within landscapes, is handled by subnational agencies. Initiatives to mitigate climate change (such as investing in low-emissions livelihoods), require site-specific adaptations; feasibility assessments based on conditions bigger than any one community, such as environmental carrying capacity and market conditions; and tailored technical assistance. Initiatives to drive adaptation will require stronger local risk assessments and responsiveness to local needs. Village governments have their development budgets approved (and influenced) by districts and depend on the coordination of local services and programs to meet village development objectives. District governments play a central role in designing and overseeing the use of local resources for development, including spatial plans and district and village development budgets. *Kecamatans* (subdistricts) could play a stronger role in bridging villages with districts and coordinating local services.

Local climate action will require local governments to develop capacity in the key functions needed for effective environmental management, including spatial planning and service delivery. Section 6.2 gives an overview of some of the climate vulnerability-related capacity gaps of subnational governments and future areas of focus to improve coordination and delivery.

**Third, results-based carbon finance instruments will continue to incentivize mitigation, especially in forested landscapes.** The GoI already has made noteworthy progress in piloting and testing instruments to channel climate finance to communities and implement jurisdictional approaches to climate transitions. Examples are REDD+ in East Kalimantan and a jurisdictional approach to lowering emissions across the agriculture and FOLU sectors in Jambi. However, results-based carbon finance programs have downsides. They have been slow to launch, carry significant transaction costs, and have yet to demonstrate success in operationalizing benefits-sharing systems. More pipeline projects are being developed in the forest, blue carbon, and energy sectors (such as coal mine transitions). The options and pricing for carbon finance and carbon trading also are growing. This growth necessitates (a) more robust and scalable systems for financing, verifying, and achieving jurisdictional emission reductions and (b) stronger associated benefits-sharing systems. Section 6.3 outlines how Indonesia could improve and scale instruments to channel climate finance to local communities.

**Finally, community support, local economic development, and stakeholder engagement will be essential for mitigating the social and distributional impacts of coal transition and reducing communities' dependence on coal.** While coal transition plans are far from advanced, upstream planning and community engagement cannot start too early. Inclusive and meaningful engagement of communities in coal transition is the first and crucial step to help prepare for potential community-wide social impacts, earn the trust of local communities, and to deliver direct investments in sustainable economic development to reduce reliance on coal, including by providing viable alternative services, jobs, and social support. In affected areas, empowering vulnerable groups will be key to ensure that the process is legitimate and fair and generates equitable outcomes. Section 6.4 outlines community outreach and development programming that could lay the foundations for a just transition in coal dependent regions.

## 6.1 Optimizing Village Budgeting and Planning for Climate Actions

**Indonesia's national community-driven development programs, and their subsequent evolution into the Village Law, have demonstrated the effectiveness of this versatile national tool for channeling resources directly to local communities.** In 2014 the Government of Indonesia passed an ambitious Village Law, which significantly increased the autonomy of some 75,000 village governments. Since its enactment, the Village Law has been a key instrument to deliver Indonesia's public services (Hartojo and others 2022). Village Governments are elected, administrative staff, and technical staff are appointed to support them; and villages are guaranteed annual budgets of approximately IDR 1.6 billion (over US\$67,000) each year (2022 figures) for village development. The major portions of these budgets are used to construct small-scale infrastructure and promote local economic development that is aligned with 5-year village plans (World Bank 2021c). Regulations mandate a consultative process (*musyawarah*) for planning and budgeting of village resources. Village budgets come primarily from three main sources: direct allocations from the central MoF, allocations from District governments, and own-source revenues (table 6.1). The Village Law embodied an expansive commitment to village empowerment. When it was passed, the Law deepened village democracy and participatory processes and provided greater economic resources to villages with greater village autonomy over the use of these resources.

**TABLE 6.1** Description of Village Revenue Sources

VILLAGE REVENUE SOURCE	DESCRIPTION
Transfer Revenue	Revenue from intergovernmental transfers.
<i>Dana Desa</i> (DD) <sup>a</sup>	<i>Dana Desa</i> ("Village Fund") refers to the funds transferred to villages from the central government budget. The Village Law states that this transfer should be 10% of, and in addition to, the transfers to the regions (Village Law, Article 72).
<i>Alokasi Dana Desa</i> (ADD)	<i>Alokasi Dana Desa</i> ("village allocation fund") is a block grant transfer from the district government to village governments. Districts are required to allocate 10% of balancing funds, excluding earmarked funds (such as <i>Dana Alokasi Khusus</i> , or DAK), to villages.
Regional Tax Revenue Sharing and Regional Retribution (BH-PDRD)	BH-PDRD refers to the local taxes and levies shared between districts and villages. Under the Village Law, districts must transfer at least 10% of district taxes and levies to villages.
Financial Assistance ( <i>Bankeu</i> )	Financial Assistance constitutes transfers to villages from central, provincial, and/or district governments that may be ad hoc or based on local regulations; and is additional to DD, ADD, and BH-PDRD.
Village Own-Source Revenue (PADes)	Village Own-Source Revenue is generated directly by the village, including returns from village assets, investments, and community contributions. Village assets revenue includes rent from village land and revenue from village-owned enterprises ( <i>BumDes</i> ).
Other Revenue	Other Revenue includes grants and contributions given to villages by third parties, including NGOs, private sector, and other contributors.

Source: World Bank 2021c.

Note: The *Dana Desa* allocation formula includes (a) basic allocation (65%) distributed equally to all villages; (b) affirmative allocation (1%) given to lagging and extremely lagging villages; (c) performance allocation (3%) for top performing 10% of villages in each district; (d) formula allocation (31%) based on population (10%), poverty rate (40%), village area (20%), and accessibility (30%).

World Bank 2021c.

**The Village Law provides a national vehicle for promoting local climate action by channeling resources and technical support directly to communities to address local risks.** As a platform for coordination, planning, and financing, it is responsive to emerging challenges (such as the COVID-19 pandemic and national drive to reduce stunting) and can accommodate the diversity of community needs through discretionary budgeting and planning processes. With their discretionary funds, villages are expected to address specific local priorities and challenges. Climate adaptation and mitigation activities can take many forms and span a range of sectoral priorities, many of which can – in theory – be financed through village budgets. Climate-smart priorities might include construction of enabling infrastructure (such as roads and markets) and retrofitting existing infrastructure in response to disaster risks (such as raising houses or school buildings in flood-prone areas, reinforcing roofing to withstand cyclones, or upgrading drinking water supply systems). Other local priorities could be funding for forest conservation groups or implementation and monitoring of forest rehabilitation.

**However, some issues in the implementation of Village Law prevent villages from undertaking climate-smart planning, budgeting, and action in practice.**

Some implementation issues are not specific to climate change and will have broader positive impacts if addressed, while others are specific to climate-relevant investments in natural resource management and disaster mitigation. The main obstacles are the increasing earmarking of funds by the central government, procedural limitations in planning and budgeting systems, limited scope of technical assistance to inform village investments, and highly variable quality of village governance. Village budgets are constrained by completing local priorities, political pressures, and barriers within the systems to allocating funds to climate adaptation activities (such as multiyear activities or infrastructure upgrades). In addition, village planning and budgeting regulations allow for conservation and reforestation activities to be financed, but do not directly incentivize them (Watts and others 2019).

*Climate adaptations, being rooted in highly specific landscape and socioeconomic vulnerabilities, require more tailored and advanced technical support to villages.*

**Village fund allocations, training for local administration, and TA for communities are not yet structured to accommodate vulnerability to climate risks, nor the costs of necessary local mitigation and adaptation.** For example, there are limited options to track climate-relevant spending and results through the Village Financial Management System/*Sistem Keuangan Desa* (SISKEUDES), as compared to detailed tracking of various local infrastructure investments (such as different budget categories for construction and maintenance of different types of village roads). Community-based planning and budgeting mechanisms were originally designed to deliver fairly consistent services and infrastructure (sometimes using modular designs and allocated using simple formulas). However, the nature of climate adaptations, being rooted in highly specific landscape and socioeconomic vulnerabilities, often requires more tailored and advanced technical support.

**Moreover, although the institutional foundations for mobilizing local climate responses are strong, the quality of village governance is mixed, which complicates policy solutions** (World Bank 2023c). Specifically, some governments are more inclusive and consultative than others, and there is variation in basic capacities to lead planning and budgeting processes in the intended ways. In some cases, village administrations are highly competent and run very professional local government offices, while others have low literacy and struggle to complete basic task such as filling out the annual budget templates without help (World Bank 2021c).

**Promoting more and more effective local climate action through village governments is dependent on four key factors.** They are: (a) the flexibility, simplicity, and reliability of village budgeting allocation and planning systems; (b) the degree to which village leaders practice transparent and inclusive governance; (c) the quality and targeting of TA and facilitated planning processes for village populations; and (d) aligning incentives for resource mobilization with land use planning and zoning. Improved guidelines, systems, and training for local governments on climate-smart village planning and budgeting are required. The following reform priorities elaborate options for the Gol to strengthen current systems.



### Greater Local Autonomy over Resources and Decisions

**Prior to the COVID-19 pandemic, if village actors saw sustainable management of natural resources as aligned with their interests, they had the resources and mandates to allocate local budgets to these priorities.** Although the proportion of spending on climate change adaptation in the allocation of village funds is not easy to identify (box 6.1), the law provides space for it (Watts and others 2019; Naim and Hindmarsh 2019).<sup>67</sup> During the COVID-19 pandemic, the autonomy of village leaders to control their own village budgets was greatly constrained because the majority of village budgets were earmarked to address emergency needs.<sup>68</sup> After the pandemic, the Village Fund has been substantially earmarked, leaving limited space for village governments to allocate budget for other spending, including that related to climate change or adaptation. For example, in 2022 the earmarked allocation of villages included food security (20 percent), COVID recovery (8 percent), other priority allocations (32 percent), and direct transfer (40 percent)—for a total of 100 percent. While the pandemic was the proximate cause of this major loss of control, it built on trends that had been observed even before the health emergency, with a report on the World Bank’s Sentinel Villages project observing in 2017 that the “open menu” approach envisaged by the Village Law was already under pressure, given that “Central and district level agencies increasingly issue their own priority lists to guide the use of D[ana] D[esa], with these priority lists being frequently revised and subject to change” (World Bank 2020d, 50).

**Greater local autonomy is needed to enable tailored solutions that use local knowledge, are consistent with local perspectives and traditions, and can accommodate various interests and stakeholders flexibly.** A reduction of the proportion of Village Funds earmarked by the central government for different activities will create some space for the village government and local communities to facilitate a more bottom-up approach for developing village government plans that will address local needs.

### Support More Inclusive Village Budgeting and Planning Processes

**Participation and ownership of local climate actions are contingent on local planning and budgeting processes being inclusive and giving meaningful decision-making powers to local communities.** To date, the broad-based participation of community members in decisions around prioritizing the Village Fund allocations has been constrained. Most of the decisions are made by a select group of leaders or the head of the village alone (World Bank 2023).<sup>69</sup> Moreover, participation in formal village *musyawarah*, especially at the village rather than *dusun* level, is typically heavily male-dominated, often because those invited to attend are village officials, organization leaders, and recognized community leaders (*tokoh*

<sup>67</sup> Before 2020, village budgets could be allocated to a wide-ranging, non-exhaustive list of activities, as recorded in the village Chart of Accounts. These include (but are not limited to) administration of the village government, education, health, public works, village spatial planning, forestry and the environment, tourism, fisheries, agriculture, livestock, MSMEs (micro, small, and medium enterprise), trade and industry, and disaster response. (Watts and others 2019; see also Naim and Hindmarsh 2019).

<sup>68</sup> Presidential Regulation no. 104 of 2021 determined that each village had to make set allocations of village funds to designated COVID relief measures, namely, 40 percent for direct cash assistance (*bantuan langsung tunai*) for poor families economically affected by the pandemic, 20 percent for food security programs, and 8 percent for direct COVID response (article 5(4)). In at least some cases, district governments (*kabupaten*) had been equally prescriptive in designating allowable usage of ADD (district allocated village funds).

<sup>69</sup> In some locations, village consultative meetings are highly constrained affairs, with participants limited to a narrow range of village elites who often are linked by family or other ties to the village head, and often with limited recordkeeping or other forms of transparency. (World Bank. 2023c)

*masyarakat*) most of whom are men (World Bank 2023).<sup>70</sup> The extent to which different community members have a voice in decision-making both on village plans and around natural resource use remains variable (Myers and others 2016; Sahide and Giessen 2015; Thuy and others 2013). Increased attention by the Gol to implementation of village planning processes – which the law mandates must be broadly consultative – would improve development outcomes across the board and could strengthen the role of communities in local climate action.

**Indonesian experience shows that one of the most effective ways to improve participation and transparency of local governance processes is through partnerships with NGOs and civil society groups.** In the environmental space, experienced NGOs already support activities such as participatory livelihoods planning and local climate risks assessments and have developed tools and techniques to include the poorest and most marginalized groups. In addition, local women’s empowerment chapters, religious groups, and schools offer ready-made platforms to raise awareness and facilitate engagement. In some villages, functioning women’s networks provide opportunities to build and showcase women’s leadership. In recent case studies across Indonesia, research showed that various women’s networks such as the Family Welfare Empowerment movement, *posyandu* (Integrated Healthcare Center), religious groups, and female farmers’ groups, functioned as active and visible means of social networking among women served as forums for the expression and organization of women’s collective interests (World Bank 2023c).

### *Strengthened Support for Climate-Smart Planning and Implementation*

**The Gol has already introduced some reforms to promote prioritization of environmentally relevant activities, which could be expanded.** Between 2019 and 2022, driven by a coalition of civil society organizations led by The Asia Foundation, 18 subnational governments formally adopted ecological fiscal transfer policies.<sup>71</sup> For example, in Jayapura district, the district government has modified the existing method of Village Fund Allocation (*Alokasi Dana Desa*, or ADD) to include an incentive allocation within which a small percentage is reserved for ecological indicators, consistent with the Village Development Index (*Indeks Desa Membangun* or IDM). The use of this transfer is not earmarked and is within the villages’ discretion. More broadly, environmental resilience is 1 of the 3 components of the IDM. Environmental targets are further mainstreamed at the local level through the extended Sustainable Village Development Index (*Indeks Desa Membangun Plus*, or IDM+) (Mecca and others 2020). Villages that score high in IDM will receive higher allocations as a reward for performance.

**However, additional support is needed to strengthen the planning and implementation systems.** There are notable differences between the planning and delivery mechanisms for basic social services and infrastructure—toward which majority of Village Law expenditure is channelled—and climate mitigation activities related to productivity and resource management. These differences include:

- a. Diversity of climate impacts and adaptation options, compared to the relatively standardized national services and infrastructure that characterize most national-scale community-driven development and social protection programs.

<sup>70</sup> There are usually very few women participants at these meetings except for representatives of the Family Welfare Improvement Movement, and female village officials (when they exist). In most villages, therefore, these formal participatory processes are almost exclusively a male space. (World Bank. 2023c).

<sup>71</sup> See this [link](#).

- b. Technological requirements of many adaptation methods, which include testing and applying emerging technologies, as opposed to rolling out modular designs.
- c. Limited control of communities on the drivers of their increased vulnerability to climate change, and the need for local and bottom-up programs to be coordinated with a range of other, effectively implemented programs (such as delivery of agricultural extension services).
- d. Necessity for reliable multiyear investments, such as mangrove rehabilitation, which requires continuous monitoring and maintenance for at least five years (multiyear projects are not eligible to be allocated in village budgets at this stage).

**Experience from climate-smart community development projects demonstrate the potential to scale up effective models through the Village Law.** For example, PNPM Green (World Bank 2011) was a 2011 pilot project attached to what was then called PNPM Rural, the government's national community empowerment program. PNPM Green integrated environmental issues in community-led planning, implementation, and monitoring processes. It delivered technical assistance (such as environmental education and other NGO support) to help communities make informed decisions on how to effectively invest block grant funds. The program was successful in raising incomes, savings, and productivity in targeted areas. It also generated significant benefits related to restoring and enhancing natural resources and improving ecosystem services (World Bank 2012). Key lessons for scale included (a) the necessity to ensure that local TA or providers of materials, such as agricultural extension workers, mangrove rehabilitation experts, or engineers, were available to support communities; and (b) that robust village spatial plans needed to be prepared to ensure strong targeting and viability of interventions (Watts and others 2019; Rambe and Johnsen 2012). In addition, PNPM Green had its strongest social acceptance where community investments were directly related to livelihood priorities of individuals or communities, indicating the importance of participatory processes which involve the wider community and identify these priorities. Examples of community projects included micro hydro power schemes and mangrove planting, which protect and enhance natural assets and directly contribute to rural livelihoods.

**There are several options to improve climate smart technical assistance to villages, many of which are already being explored by the Ministry of Villages, Development of Disadvantaged Regions and Transmigration (MoV), and Ministry of Home Affairs (MoHA).** Currently, more than 37,000 facilitators are deployed by the MoV to support implementation of the Village Law, including staff responsible for administration, engineering, and community empowerment. However, these facilitators are not yet trained to support climate-smart planning nor to advise on which potential adaptation and mitigation activities should be prioritized. Technical assistance and training for village governments and village facilitators could incorporate modules on climate-smart planning and provide facilitators with information on climate vulnerability and climate policies. Local service providers, such as engineers or agricultural extension workers, could be trained on local adaptation options, such as reinforcing local infrastructure or responding to the risks of increased crop disease.

**Programs such as the BNPB's model for providing a roster of trained technical advice on disaster risk reduction could be replicated and scaled up to other sectors.** The BNPB trains and certifies groups of local technical facilitators across the country who are available for hire by villages. The profiles of trained and certified local experts are publicly available online<sup>72</sup>, giving village governments the option to directly

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<sup>72</sup> See this [link](#).

call upon the support needed. To date, thousands of these local experts have been trained and certified. However, the BNPB report gaps in coverage in some areas where availability of skilled trainees is lower, but whose populations are particularly vulnerable to climate risks and disasters (such as fires, floods, storms). These areas include Eastern regions of Papua, Nusa Tenggara Timur, and Maluku. Ideally, BNPB would like to have at least two local experts available for hire in each village who have been trained on the greatest risks or issues in that area. The KLHK's *ProKlim* program offers similar potential focus on emission reduction activities and more sustainable landscape management.

### ***Strengthened Support for Climate-Smart Budgeting and Expenditure Management***

**Enhancing flexibility, simplicity, and reliability of village budgeting and expenditure management systems can be catalysts for effective action generally, and particularly on climate adaptation and mitigation.** Village budgeting and financial reporting systems could be strengthened by integrating provisions to ensure that they are climate responsive. Currently, village governments need to classify and report items based on different budget codes (account code and sector code), which are developed and approved by city/district governments. The extent to which the budget codes could cover various topics, including those related to climate issues, will depend on the capacity and creativity of local governments to interpret local needs, identify and develop subcodes, and place them in the right budget categories. In some instances, local governments have been able to integrate budget codes that could cover climate actions. For example, in the city of Sungai Penuh, Jambi Province, its regional regulation provides detailed account codes for a variety of sub-activities and leaves 10 codes undefined to accommodate future unplanned activities.<sup>73</sup> The codes also include several environmental conservation activities. However, such initiatives are ad hoc. The broader trend is that villages often do not have the confidence to add new spending initiatives for fear that they will be rejected by higher levels of government.

**Creating clear budget codes for Village Fund spending on climate-related activities will enable village governments and communities to plan and allocate budget for climate action.** Moreover, updating the budget nomenclature to include climate-related activities also will support improved expenditure monitoring and analysis, giving the central government better information on spending patterns and gaps.

#### **BOX 6.1 “Climate Smart” Village Expenditure**

The availability of village financial data provides the government with a unique opportunity for evidence-based policymaking, targeted support to villages, and performance-based incentives to villages and districts. As of 2019, with the adoption of the SISKEUDES (Village Financial Management) application, the Government of Indonesia has access to an unprecedented level of village financial information, including the activities villages are prioritizing in their plans, village expenditures, and village revenues. An analysis of village budget expenditures using Village Potential Statistics (*Statistic Potensi Desa*, or PODES) data from 2019, in combination with climate vulnerability data and 2018 village budget data from SISKEUDES for over 35,000 villages, assessed the extent to which existing allocations of village funds are “climate smart.”

<sup>73</sup> Sungai Penuh Mayor Regulation No. 13/ 2019 regarding Village Financial Management. Article 19 Point 3 of the regulation states: “The Regional Government may add activities that are not listed in the list as referred to in paragraph (1) by assigning codes 90 to 99.” This regulation is supported by Home Affairs MR No. 20/ 2028 regarding Village Financial Management. The Annex states: “Additional Activities [refer to undefined code 90-99] are determined by the District/City” and “activities should be named based on village needs under the category of ‘development,’ ‘rehabilitation,’ ‘enhancement,’ or ‘strengthening.’”

First, 57 percent of village expenditures were in potentially climate-smart categories addressing villages' exposure, sensitivity and/or adaptive capacity through investments in infrastructure, agriculture, forestry and environment, disaster preparedness and response, economic development, capacity building and cultural development, and health and education. Within this group, villages with "poor" mangrove quality spend, on average, a substantially higher percentage of their non-administrative budget on forestry and environment-related line items. Similarly, provinces and districts on the front lines of climate transitions spend proportionately more of their village budgets on activities related to forestry and the environment – namely, villages in Maluku, North Maluku, NTT, Gorontalo, and East Kalimantan.

Second, villages tended to spend on activities that plug gaps in basic services and enhance economic development. For example, villages whose main income is agriculture spend a greater percentage of expenditures on farm road maintenance, presumably to support access to markets. Villages whose main water source is unimproved spend a greater fraction of expenditures on village water source construction and maintenance. These patterns point to the need to ensure that future incentive instruments to promote more spending on environmental management do not crowd out important and much needed investments in basic services and infrastructure that build adaptive capacity. More generally, the top five line items nationwide are related to roads and bridges. Both can be climate-smart depending on whether climate projections and risks are factored into how they are designed and constructed and the extent to which they may address vulnerabilities, such as by improving access to key services or markets.

The analysis demonstrated that updates to village budgeting formats are needed to effectively monitor climate smart village budgeting. Line items in the village charts of accounts are not structured in a way that is amenable to precise tracking of spending on climate adaptation or mitigation. Spending to address climate change falls across sectors and ranges from investments in adaptive infrastructure—such as strengthening school buildings to withstand storms or floods or improving water storage—to mitigation actions such as supporting social forestry schemes or restoring mangroves forests. Current budget categories do not differentiate among activities that may contribute to climate change vulnerability (such as building infrastructure within flood prone zones) and those that respond to climate risks (such as repairing flood damaged infrastructure), or prevent further disasters, or lower emissions. This constrained capacity of budget categories makes it difficult to know which villages are already undertaking local climate actions and how.

With improved data and analysis of financial and nonfinancial data, the government will be able to better monitor and assess the impact of village funds on national development and climate change objectives. To track future spending on local climate action more effectively, Gol can update the nomenclature and budget line-item options in the village chart of accounts and utilize vulnerability profiles when undertaking budget analysis. For example, routine analysis of budgets could include comparisons of key climate risks facing villages with investments in local climate action to address these risks.

*Source: Analysis of village budget allocations from 2018 accessed through SISKEUDES, cross-referenced with PODES data and village vulnerability data.*

*Note: The expenditure figures presented in this box are calculated only among the villages for which expenditure data and PODES exists: a total of 36,241 villages of the 85,820 for which PODES data exists.*



## 6.2 Improving Subnational Support to Local Climate Action

**Effective climate policy in Indonesia is intimately bound up with reinforcing and clarifying the roles of local government.**

Increasingly, local governments in Indonesia play a significant role in planning and implementing multisectoral, landscape-based approaches. In theory, local governance institutions and structures can shape and manage trade-offs and improve the enabling environment for landscape management investments. Local governments bridge national and local initiatives (vertical coordination) and bring together different sectors/ministries (horizontal coordination). They coordinate and provide critical technical assistance and resources to local communities, allocate and approve village budgets and plans, and sometimes provide direct support to community groups and businesses.

*... local governments in Indonesia play a significant role in planning and implementing multisectoral, landscape-based approaches.*

**However, subnational governments face many competing interests and capacity constraints, and support to environmental protection and sustainable economic development is not always prioritized.**

While this report did not conduct a thorough assessment of capacity gaps, several areas appear to warrant further attention if local governments are to fulfil the support and coordination functions needed to promote community resilience and incentivize local climate action.

**First, at all levels of government, spatial/landscape and sectoral planning needs to be further strengthened.** In addition, local authorities sometimes overlap and are poorly coordinated, limiting the potential for coherent support for local actions. Second, local governments have critical capacity constraints, especially in poorer areas, related to key functions of landscape management, which undermine sustainable development and environmental outcomes. Third, financial incentives continue to indirectly drive suboptimal environmental outcomes. Stronger incentives are required to drive stronger subnational environmental management. Finally, involvement of local communities is fragmented and inefficient. Partnerships with civil society and NGOs are limited in scope, despite partnerships being a key vehicle for effective communication and outreach.

**To ensure effective implementation through interactive authorities, improved district and subdistrict coordination – including clarifying mandates and functions – is needed.** Currently, provincial responsibilities are not well linked to local resource management systems. District and village governments have limited or no forest rights or responsibilities (beyond Village Forest/*hutan desa* schemes). Moreover, these local governments receive few incentives from the central government to ensure forest protection or conservation.<sup>74</sup> In addition, and as mentioned in chapter 5, regulatory changes have often become sources of confusion at the subnational levels, which hinders subnational governments from taking on new initiatives and policies to address climate challenges.

<sup>74</sup> Since 2014, forest- and environment-related responsibility falls under provincial governments' domain. Recentralization of forest management as stipulated under Law No. 23 of 2014 on Regional Government, in which district governments have authority to manage only Forest Parks further limits their ability to manage Forest Areas.

**Each level and sector of government could be better coordinated around landscape management goals.** Villages, *kecamatan*, districts, sectoral ministries, and forest and marine protection bodies have authorities and roles that interact to achieve desired outcomes. The intentions and actions of these bodies sometimes overlap. For example, administrative units, such as villages (within *kecamatan*/subdistricts and districts), overlap with Forest Management Units (FMUs) and protected areas (national parks and other conservation areas), which are managed by MoEF. In Papua province, for instance, 9 percent of villages are located inside conservation forests and 41 percent inside protection and production forests. Only 50 percent of villages are outside forest zones. As a result, planning documents prepared by national parks or FMUs cover the same land areas that are covered under village and district planning processes (USAID 2018b, p13). These challenges to coordination of land management and administration contribute to weak governance and uncertainty over tenurial arrangements, and drive ecosystem degradation.

**However, even within the existing institutional set-up, important financial and capacity gaps need to be addressed.** Local governments (*kabupaten*, *kecamatan*) are and will continue to drive environmental and social outcomes, but their staff often have limited organizational capacity, especially on issues such as local environmental management. Issues such as interjurisdictional disputes, incomplete understanding of options (especially market opportunities), staff awareness and skills, and limited performance tracking persist. There is limited sharing of best practices across *kabupaten*, and very limited resources for *kecamatan*. Alongside training, there is a need for deeper support to improve management systems. Service delivery, technical assistance, and planning systems need to be strengthened to provide village governments and populations with the knowledge, resources, and expertise needed to successfully combat climate change. Concurrently, improved financing instruments can incentivize mitigation actions and/or provide necessary resources to villages to invest in adaptation.

**Persistent gaps in access to and quality of services undermine climate resilience.** In particular, districts play a critical role in building resilience to natural disasters and climate change through improved district infrastructure and health and social assistance. However, despite major improvements, large gaps in access to, and quality of, services delivered by subnational governments persist. Consequently, the cost of replacing or restoring public infrastructure is likely to increase with climate change, thus placing a significant burden on public expenditure. Even within familiar sectors, such as rural infrastructure, capacity constraints are apparent: districts manage 80 percent of the road network, but over 40 percent are poorly maintained (World Bank 2020e). Geographic disparities in capacity of governments and quality of services persist, with poorer and more remote areas (particularly in Papua, Maluku, and West Kalimantan) seeing the lowest access to services.

**A key capacity gap pertains to spatial planning.** Multisectoral approaches require coordination of various agencies around the specific challenges, opportunities, and tradeoffs in a particular landscape. In specific sites, such as future REDD+ program areas, upstream and downstream planning and investments are needed to ensure that (a) local impacts are understood and addressed and (b) local communities are supported to benefit from transitions. In key protected areas – including forest conservation zones and marine protected areas – robust assessments of carrying capacity, economic opportunities, and social risks are needed so that they can be incorporated in local spatial and investment plans. However, at the local level, spatial planning is its own “sector.” The spatial planning agency operates independently from sectoral agencies, and the subnational planning agencies (BAPPEDA) lack visibility on spatial plans. Climate-smart spatial planning is needed in urban as much as in rural areas, especially to improve flood

resilience. An example is to update spatial plans based on remapping flood-prone zones with climate-sensitive hydrological predictions (World Bank 2023a).

**In addition, more robust investment planning and appraisal are needed to improve quality of spending.** Many local authorities do not have robust spatial assessments of environmental and economic opportunities and risks. Consequently, they rarely are able to judge where and to what they should allocate additional resources. The effectiveness of subnational infrastructure spending is thwarted by the lack of robust project appraisal and selection and by inefficiently small projects. Central public financial management regulations do not set standards for project appraisal and selection, even for large infrastructure investments. In addition, local authorities are often hamstrung by national regulations, campaign promises, or other social pressures so often make investment decisions based on political priorities, the RPJMD, and funding availability. Because they decide without conducting economic analyses or institutionalizing project selection criteria, they undermine allocative efficiency.<sup>75</sup> Approximately 38 percent of surveyed Dinas officials in districts responded that they do not conduct economic analysis as part of project feasibility studies.<sup>76</sup> Most projects lack medium-term cost projections, putting their maintenance at risk.<sup>77</sup> Projects also appear inefficiently small, exacerbating transaction costs and limiting competition in procurement.<sup>78</sup>

**Local economic development planning should be guided by assessments of opportunities to increase productivity and jobs for local communities from sustainable value chains.** Selection of value chains to be supported should consider climate resilience goals and local livelihoods benefits over time. For example, some “alternative” livelihood activities, such as seaweed farming, provide a slow, steady income in markets that can accommodate many entrepreneurs. Other alternative livelihoods, such as rural retail services, provide a steady and relatively high income for only a few entrepreneurs per village.

*some “alternative” livelihood activities, such as seaweed farming, provide a slow, steady income in markets that can accommodate many entrepreneurs.*

**Increased financing and improved fiscal instruments could promote sustainable land use practices at the local level by empowering local governments to embrace their coordination and delivery roles.** Incorporating environmental incentives linked to national climate and development goals in existing fiscal transfer instruments could enhance quality and targeting of spending on local development and services. In addition, increasing allocations to cover shortfalls, particularly those related to adaptation activities, will be critical to manage the poverty and social impacts of decarbonization.

<sup>75</sup> For example, Lamongan district scored D+ on PI-11 on public investment management.

<sup>76</sup> In a survey, 33 percent (40 of 120 respondents) from Dinas PUPR (Public Works department), Dinas Kesehatan (Health department) and Dinas Pendidikan (Education department) indicated that they conduct feasibility studies for projects above Rp 1.5 billion before the projects are budgeted. In the follow-up question of whether the Dinas used economic analysis in conducting a feasibility study, 37.5 percent (15 of 40 respondents) answered not at all. Thirty-five percent indicated that they had used economic analysis in all feasibility studies, and 27 percent indicated that they had used economic analysis only partially in some of the feasibility studies.

<sup>77</sup> Until 2020, annual planning and budgeting documents provided for a single-year perspective.

<sup>78</sup> Fragmented procurement processes could exacerbate transaction costs, limiting competition for optimal value-for-money. For example, in 2015 in the city of Bandung, the median size of construction procurement carried out by public works was IDR 192 million (US\$12,000).

**BOX 6.2 Papua: Climate Battleground**

The combination of short-term economic pressures to convert land, weak governance, and historical patterns of social exclusion put Papuans on the front lines of climate change. Papua stands out as one of Indonesia's greatest environmental treasures as well as one of its toughest development challenges. Papua is one of the largest remaining rainforest areas in the world and hosts rich marine and coral reef ecosystems. It houses almost two-thirds of Indonesia's remaining primary and secondary forests. It also is one of the world's most critical areas for conservation due to its high levels of ecosystem diversity. However, disparities in development are extreme, and political unrest and social exclusion continue to undermine institutions. Papua's rate of poverty remains the highest in the country, and poverty reduction still lags other provinces (through there has been some convergence), and human capital outcomes are significantly lower in Papua (educational attainment is the lowest in the country). In 2022, children in Papua were more than twice as likely to be stunted as a result of acute nutrition deficits (nearly 35 percent of children under age 5 compared to the Jakarta and Bali at 14.8 and 8 percent respectively)<sup>a</sup>.

Land use change and associated deforestation are increasing as Papua has emerged as a new frontier for economic development, threatening the area's wildlife and habitats, which are critical carbon sinks. Coastal degradation and overfishing also threaten Papua's marine resources. Insecure land rights disenfranchise local people, most of whom live in areas that formally overlap with designated forest areas. With local identities and traditions strongly linked to natural resources, Papuans are particularly vulnerable to changes in land use, access to resources, and tenurial conflicts.

Going forward, for development initiatives to be effective, conservation and resilience-building in Papua must address the challenges of social fragmentation and exclusion. Lessons from past programming point to the necessity for national programs to be tailored to the vulnerabilities facing communities in Papua, and to the drivers of resilience found within communities, including protecting the rights and cultural identities of Papuans in the face of external interests.

West Papua Province has made a start. This province is one of the world's most biodiverse regions with its aquatic and terrestrial ecosystem, including wetlands<sup>b</sup> On March 21, 2019, the Provincial Parliament in Manokwari stipulated a Special Provincial Regulation 10/2019 on Sustainable Development in West Papua Province<sup>c</sup> that declares West Papua as a Conservation Province, the first of its kind in the country. The declaration puts sustainability at the heart of the province's development planning. Among the objectives is to maintain forest cover at 70 percent (Article 4) and maintain 50 percent of coastal and marine area space for protected areas (Article 24). The declaration also emphasizes the importance of multistakeholder cooperation including with community and private sector in implementing climate mitigation and adaptation.

The recent division of Papua Province into four smaller provinces may have implications for climate policy implementation, since a larger number of provincial governments will need to develop integrated and coherent plans for adaptation and resilience building.

*Source: Authors based on qualitative research (appendix B).*

Notes:

*a World Bank 2023b*

*b The province is situated in the center of the Coral Triangle and is home to nearly 2,000 species of fish, 75% of the world's hard corals, 20,000-25,000 species of vascular plants, more than 5,000 herpetofauna species, and 718 bird species, 65 of which are endemic.*

*c The regulation also covers West Papua's general policy toward the following 18 issues: (a) commitment to pursue sustainable development in West Papua Province; (b) spatial planning; (c) biodiversity conservation and area management; (d) green economy development; (e) rehabilitation and restoration [of the natural environment]; (f) environmental sanitation; (g) authority and responsibility of local governments; (h) community participation; (i) monitoring and evaluation; (j) research, development, and innovation; (k) education and public awareness [about sustainability]; (l) institutional arrangements; (m) inter-regional collaborations; (n) provision of assistance and supervision; (o) reporting (p) financing; (q) investigation; and (r) sanction and penalty.*

**Some mechanisms exist but need to be expanded.** The Regional Incentive Fund (*Dana Insentif Daerah*, or DID), introduced by MoF and MOEF, rewards subnational governments with rising scores in the Environmental Quality Index (*Indeks Kualitas Lingkungan Hidup*). Because DID includes other indicators such as public service delivery, citizens' welfare, and waste management, the environmental component accounts for barely 4 percent of total disbursements. In 2022 only 25 of 541 subnational governments were eligible to receive environmental DID.<sup>79</sup> In addition, the Environment Protection Fund (*Dana Perlindungan Lingkungan*, or DPL) was introduced to reward provincial governments for environmental protection efforts that promote positive externalities. However, this fund has not yet been implemented (German Cooperation 2021). The proposed DPL payments would depend on the size of forest and sea area under protection. Redistribution consideration prioritized regions with low revenue (or lost opportunity) from hosting protected forest areas. However, to date, the specific design remains unclear. Possible resolutions include a single grant or two distinct DPL grants, one linked to environmental performance and the other to proportion of protected areas.

**Future options include adding payment metrics to the Regional Incentive Fund (*Dana Insentif Daerah*) for the completion and enforcement of district spatial plans (*Rencana Tata Ruang Wilayah*, or RTRW), increasing financing for adaptation and mitigation “hotspots,” including through carbon finance** (see next section). Districts could better support local climate action through conditional block grants, performance-based grants within DAK (so districts can top-up the existing village allocation funds), and/or competitive windows. From the national level, international results-based payments could be channeled through BPD LH, especially through a streamlined BPD LH funding window that aggregates donor contributions and provides ongoing and simplified results-based support to provinces.

**Finally, local government platforms for community and stakeholder engagement can be strengthened, providing more citizen voice in development processes.** Doing so can boost buy-in and sustainability (box 6.3). Involving communities in implementation also lowers costs and improves sustainability and effectiveness. Institutionalizing deliberative processes, platforms for participation in planning and decision-making, and grievance redress and feedback systems can promote collective learning and experimentation. These mechanisms also can increase trust in government, strengthen democracy, and enhance the legitimacy of public decisions. Currently, involvement of local communities is fragmented. Training on and delivery of community engagement and communications is sparse, and fora for community participation in decision-making are limited in number and scope.

**In summary, local governments, particularly districts, coordinate and provide critical technical assistance and resources to local communities to promote local climate action but are limited by institutional capacity and financing gaps.** District administrations have a critical role in setting and delivering on local climate and development priorities and are the main vehicle through which national policies will be achieved. However, their capacity to lead the complex and site-specific assessments and planning processes required to respond to local climate risks could be strengthened, as could their ability to include a broad base of stakeholders in development processes. Furthermore, political economy factors tend to drive higher emissions, while undermining efforts to improve coordination.

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<sup>79</sup> 2022 PowerPoint Slides. Jakarta, Indonesia: Indonesia Budget Center.



**BOX 6.3 Citizen Engagement in Landscape Management**

The social sustainability of a low-emissions economic transition will depend on a broad base of support by Indonesians. Democratizing policy processes and improving citizen engagement in local and national conversations and decision-making can raise awareness of the options and create a political environment more conducive to reforms that will benefit the most vulnerable. Building buy-in from the bottom up through effective communications with the communities most affected is important. Targeted communications not only will give the interested parties a voice in policy direction but also will avoid affected communities becoming resistant to changes that they perceive not to be in their interests.

Widespread participation in ecosystem management is key – across all sectors. For example, co-management of marine protected areas – meaning governance arrangements that meaningfully involve local communities – is shown to lead to stronger fisheries outcomes.<sup>a</sup> Expanding customary marine tenure could further facilitate localized approaches. Terrestrial environments are experiencing similar trends. Multiple studies point to the importance of community engagement and participation to support the efficacy and sustainability of resource management initiatives. Coordination across sectors, carrying capacity assessments, and regional zoning and rules for the private sector are examples of functions that need to be tailored to local needs and that communities do not have power over but should be consulted on.

Enhancing the role of women and marginalized groups in natural resource management is vital. Women’s empowerment, leadership, and decision-making in climate action correlate with better governance and conservation outcomes.<sup>b</sup> Involving *adat* communities and traditional leaders in local governance is important to identify and protect local customs and livelihoods and to ensure that the rights of local communities are protected as conservation initiatives take root.

A variety of modalities are possible to engage citizen engagement in sustainable landscape management. These include (a) partnerships with civil society, such as through grant windows for innovation and advocacy (NGOs often are more cost effective and better positioned to help communities, as in adapting traditional (*adat*) systems, or advocating for fair access to services and social programs); (b) citizen assemblies in which participants from a broad spectrum of society are convened to discuss and debate key issues and make recommendations to central and local governments; (c) district dialogues and exchanges, such as thematic discussions, cross-district exchanges, and facilitating multistakeholder fora at the district level on key issues of coordination and planning and budgeting systems.

Source: Authors.

Note:

<sup>a</sup> Fidler and others 2022.

<sup>b</sup> Deininger and others 2023.

## 6.3 Providing Access to Climate Finance

**Indonesia has legally recognized economic instruments for sustainable landscape management.**

Government Regulation no. 46/2017 on Environmental Economic Instruments enables Gol to use available economic instruments to plan, finance, and incentivize environmental action. For example, it allows payments for ecosystem services from peatland, protected forest, and other biogeography. Presidential Regulation no. 98/2021 on Economic Valuation of Carbon further introduces at least four market-based instruments to price carbon, including carbon trading, carbon offsets, carbon levies, and results-based payments. Meanwhile, Government Regulation no. 12/2014 on Type and Rates of Non-Tax Revenue (*Penerimaan Negara Bukan Pajak*), as well as MoEF Regulation no. 8 Year 2019 on Ecotourism in Conservation Forests enable MoEF to collect nontax revenue including ecotourism fees for national parks.

**PES schemes, including results-based carbon finance, will continue to be a valuable set of instruments to finance climate mitigation agendas, especially in forested landscapes** (chapter 5). The options and pricing for both “blue” and “green” carbon finance and carbon trading are growing. This growth necessitates more robust and scalable systems to finance, verify, and achieve jurisdictional emission reductions. Critical components of these programs are their community-facing outreach and benefits-sharing mechanisms.

**Globally, successful implementation of results-based carbon finance instruments, and payments for ecosystems services more generally, is plagued by challenges to ensure that payments reach the right people, at the right time, in the right way to shift their incentives.** Barriers to the successful implementation of inclusive PES can be both administrative and social. They include unclear tenure, poorly designed incentive structures, high transaction costs, weak investment planning, and burdensome systems to supply finance and technical support to communities. Furthermore, even when streamlined systems for attracting and channeling sufficient funds to the local level can be built, community-centered investment plans attuned to local conditions and needs are required. Regarding carbon offset programs, the nature of the voluntary carbon trading system and contested and evolving global systems to certify and monitor legitimate offsets can create risks of leakage. These leakages have resulted in various harms, from “greenwashing” to human rights abuses, such as forest-dwelling communities being removed from their lands so they could be certified as conservation areas to attract payments.

**The Indonesian experience is not immune from these global challenges.** An emission reduction program in East Kalimantan province has launched successfully but work remains for full operationalization of the subnational coordination mechanisms and benefits-sharing schemes. This and other experiences highlight the need for robust and efficient operational tools for engaging communities and channeling payments.

**There is significant scope to improve Indonesia’s systems to channel benefits from carbon payments to communities.** Well-designed, inclusive emission reductions programs give marginalized communities and disadvantaged groups a platform for increased community involvement to address the drivers of carbon emissions and reverse trends over time. In Indonesia, opportunities could be explored to streamline and strengthen payments systems to lower transaction costs and limit capture of funds, including linking PES systems to Indonesia’s existing fiscal transfers systems.

**Second, mechanisms are needed to ensure that strong safeguards are in place and communities are meaningfully involved in improving their livelihoods and well-being.** Improving social safeguard instruments to make them more robust and consistent not only would protect against human rights violations, but also, at least to some extent, would lower the administrative burden of developing bespoke systems for different instruments or provinces.

**Third, improving communications and outreach instruments will enhance participation, effectiveness, and legitimacy.** By informing all groups of the payments and benefits on offer (and the conditions to access payments), and facilitating decision-making, outreach programs and engagement platforms enhance the quality of participation in PES. A combination of local and national NGOs and local governments currently support communications, outreach, and safeguards functions but are poorly coordinated and often end up competing for the limited attention of some communities and neglecting others.

**A key instrument in many PES schemes for providing access to finance to communities is benefits sharing plans (BSPs).** The BSPs provide the legal and institutional architecture that channels climate finance to local stakeholders. The following key lessons from both international and Indonesian experiences can inform future efforts to design these instruments to best serve affected communities and strengthen the effectiveness of climate finance programs by driving sustainable local climate action.

1. **Set clear objectives focused on priority beneficiary groups.** Setting clear objectives and priorities for PES systems will help to avoid the familiar challenges of payments being spread too thin to have a real impact. PES often require a range of actions – from improvements to governance of forest boundaries, protection of rights, and investment in low-emissions livelihoods to improved services and community empowerment. PES payments could arrive as lump sum payments made only a few times in the emission reduction process. Careful prioritization in how to use them is needed. Benefits-sharing plans should articulate how emission reductions payments will be complemented by other funding sources and other actions to achieve overall emission reductions objectives. Programs should focus on eligible uses of funds and criteria for eligible beneficiaries that align with the overall goals of the program.
  
2. **Set up streamlined and scalable payment systems.** Systems to deliver payments, services, and TA should prioritize efficiency, inclusion, and impact. The following principles apply:
  - a. *Focus on upstream planning and legal agreements*, to avoid confusion and disagreement later, which cause delays and undermine trust. To avoid funds shortages or implementation shortcuts, plans should include all the implementation activities. They include Free, Prior, and Informed Consent (FPIC), communications, and monitoring.
  - b. *When possible, leverage existing systems, such as fiscal transfers systems, established community development programs, or existing stakeholder coordination fora.* Using existing systems will increase efficiency and sustainability while strengthening, rather than fragmenting, existing institutions. Existing systems often are easier to top-up (especially if payments are delayed) and sometimes easier to scale. Indonesia’s Village Law offers a ready vehicle to enhance and scale the implementation of PES schemes (chapter 5).
  - c. *Avoid high transaction costs and elite capture by limiting layers of contracting.* Contracting can be simplified by using existing fiscal transfer systems and local service provision agencies. In this way, systems will be sustainable, can easily be topped up by national or district government resources if needed in case of delayed emission reductions payments, and will build capacity within existing systems over time (rather than using project-dependent systems, which are inactive between payments).
  - d. *Devolve decisions and resources to local communities and institutions as simply and effectively as possible.* Leveraging the knowledge and capacities of local communities will improve efficiency, build their ownership and trust, and avoid wasting money on activities that are not needed at the local level.
  
3. **Invest early and continuously in robust safeguards and stakeholder engagement.**
  - a. *Safeguards:* Strong safeguards instruments and engagement mechanisms to ensure that communities are meaningfully involved should be established early and continued. Strengthening social safeguard instruments to make them more robust and consistent not only would protect against human rights violations but also would lower the administrative burden, at least to some extent, of developing systems for different instruments or provinces.

- b. *Citizen Engagement*: Global experiences from PES point to the benefits and necessity of stakeholder participation to drive sustainable results and reach emissions targets. Failure to involve stakeholders can result in low trust, discrimination, communications that do not reach people, and even protests or resistance to proposed reforms. Moreover, failing to consult the people impacted by initiatives can mean that unforeseen legal and regulatory barriers – to eligibility, participation, and receipt of funds – go unnoticed until it is too late. PES programs should include a financed communications plan with meaningful outreach to relevant interest groups. Outreach could include communications campaigns, consultation events, and regular platforms for discussion and grievance redress. These communications should inform all groups of the payments and benefits on offer (and the conditions to access payments) and facilitate decision making, thus enhancing the quality of participation in PES.

**TABLE 6.3 Design Options for Benefits-Sharing Plans (BSPs)**

<b>Context and Objectives</b>		
In a strong governance environment, in which risks of local activities causing further degradation are low, more beneficiary discretion on resources is appropriate. To limit waste on overheads, transfer funds with minimal conditions.	For communities who need to be rewarded and supported to continue effective forest/resource management, payments focus on providing tangible basic goods, such as improved schools and clean water.	Where confidence is low that other complementary activities and funding sources will directly address drivers of deforestation and degradation, payments target activities that will directly address deforestation risks.
<b>BSP Design (examples)</b>		
Use existing social protection, direct cash payments, or fiscal transfer systems, supported by communications and monitoring.	Adopt a community block grants model with a menu of eligible public goods projects that provide widespread benefits to target groups.	Finance specific, non-discretionary activities to enhance low-emissions practices and livelihoods, through existing agencies (government or NGO).
<b>Pros</b>		
Low transaction costs by using existing direct-to-beneficiary funds transfer systems, no expensive facilitation or planning, and no overheads. Simplicity: Only one contract for communications to manage. Easily topped up, replicated in other jurisdictions, and adjusted based on needs. Flexible and government-owned system.	Enables more targeted channeling of benefits to specific beneficiary groups, such as <i>adat</i> groups, farmer groups, and private sector (unlike option 1). Avoids involving multiple agencies in coordinating activities. Ideally, uses only one layer of subcontracting/ delegation.	Targets a complementary basket of key activities needed to drive lower emissions.
<b>Cons</b>		
Risk of not directly addressing drivers of forest loss if communities are not included in decision-making on use of funds. Requires confidence in forest governance so that ER Payments are not used to finance activities inconsistent with targets.	Risks being fragmented and temporary. What happens between payments?	Higher management and overhead costs. Many activities require sustained, multiyear financing so it might be difficult to identify activities suitable for financing through emission reduction payments.

Source: Authors.

**Finally, and perhaps most important, BSPs and community support programs should be designed to meet the needs of those most affected.** When weighing the factors outlined above (such as identifying existing systems to build on, setting eligibility criteria, and deciding on options to channel finance), the context-specific needs and vulnerabilities of local communities should inform decisions, as should the potential to strengthen the social institutions that best serve those at risk of exclusion or harm. Table 6.3 outlines examples of options for how to design BSPs based on their main goals and some options to channel payments to beneficiary groups.

## 6.4 Building Community Mechanisms for Coal Transition

**Understanding and responding to social and distributional impacts are critical for a just transition in the coal sector.** To meet emerging development needs and promote local economic diversification and development, key instruments include upstream social and economic assessments in potential transition sites; stakeholder engagement platforms to facilitate dialogue and transition planning among relevant stakeholders; and community support mechanisms to directly finance locally led initiatives through the transition period. Understanding and responding will require early planning because the emergence of new economic sectors can take several years, if not decades. In addition, regionally specific approaches are needed that are attuned to the local economic opportunities beyond coal but that do not deepen dependence on other high-emissions activities in FOLU and agriculture sectors.

**Before facilitating meaningful dialogue or delivering region-specific programs that will support a just transition plan, it is necessary to clearly understand the social distributional impacts of a coal phaseout and to identify sources of vulnerability and resilience within communities.** Early strategic upstream socioeconomic assessments can include and consult a broad base of stakeholders to understand their needs and fears and to involve them in the program design. Social and environmental impact assessments will be needed generally and for initiatives to repurpose specific physical sites. Upstream assessments would identify the emerging needs of local communities (such as those related to re-skilling, alternative livelihoods, or supportive infrastructure to promote economic diversification) and the options in various transition sites (such as for site-repurposing and maintaining the delivery of basic services).

**Inclusive and meaningful engagement of communities in coal transition is often the first step to help them understand the potential community-wide social impacts, earn their trust, and ensure that they can partake in the transition.** In affected areas, planning for low carbon economic diversification through robust stakeholder engagement mechanisms (including for coal companies, local governments, communities, and coal workers) and facilitating local adaptation and social resilience through inclusive transition planning will be essential. Effective multistakeholder engagement from national to community levels and empowering vulnerable groups will be key to ensure that the process is legitimate and fair and generates equitable outcomes. For example, coal transition can provide opportunities to reconcile past injustices. Reconciliation can be achieved if the intervention is carried out by addressing gender bias and exclusion, provides technical capacity support for affected communities, and ensures that women and affected communities can have a voice in the transition planning. As a result of coal mining, some mining communities have experienced health and human rights risks, which disproportionately affect low-income and marginalized communities. These communities may see opportunities to transition to safer and more environmentally friendly livelihoods. A just transition potentially addresses the health and environmental impacts of coal mining and burning.



**Local platforms for community-building can also promote advocacy for community rights and demands for a just coal transition.** For example, in East Kalimantan, the Santan River Festival facilitates engagement among local governments (district and village), coal companies, and communities. Santan village is surrounded by coal mining, which has seriously polluted the river that they depend on for clean water and livelihoods. Young, educated grassroots activists from the village have advocated for improvement of the polluted watershed ecosystem through the Festival Sungai Santan, or Santan River Festival. This annual event initially focused on addressing pollution in the river but is now a broader platform for advocacy for local communities. The festival has received support from religious organizations and exposure in national media, which have boosted its legitimacy and standing (appendix D).

**In addition, the transition from coal-related jobs and value chains toward other livelihoods, such as renewable energy, could generate new job opportunities that positively impact the workforce of coal-dependent communities.** The transition could both provide new opportunities for communities who historically have relied on coal mining and extractive industries and directly address unemployment. The transition requires investing in job training programs and ensuring that these new jobs are accessible to workers who had been employed in the coal industry.

**In terms of response, several existing initiatives demonstrate the potential for social initiatives to build resilience in coal-dependent communities in East Kalimantan and South Sumatra.** For example, the Community Empowerment Program (*Pengembangan dan Pemberdayaan Masyarakat*, or PPM) (box 6.4) was introduced by the Ministry of Mineral Resources and implemented by mining companies in East Kalimantan and in South Sumatra. PPM programs are the responsibility of the mining companies to involve a broad cross-section of the population in local development programs. PPM has improved resilience for some groups, such as small enterprises run by women and youth groups. The program provides multistakeholder platforms that could be further leveraged to build trust and foster collaboration around longer-term coal transition planning.

*The Santan River Festival initially focused on addressing pollution in the river but is now a broader platform for advocacy for local communities.*

**However, not all provinces have developed a PPM blueprint.** For instance, of all the provinces on Sumatra Island, only South Sumatra has one. In a recent consultation, respondents expressed a range of views on PPM. One private sector respondent saw it as providing certainty and a legal basis for a company to spend a percentage of its profits on the local community. Another from a research organization praised the support provided by PPM for local small and medium enterprises but cautioned that PPM should not replace the national government's responsibility to improve people's welfare.

**While transition planning in Indonesia is still in its infancy, upstream assessments, stakeholder engagement platforms, and social and local economic development programs in coal-dependent regions are important instruments to lay the groundwork for a just transition.** Advance planning is essential to proactively address local needs before the coal phaseout begins. Advance planning would enable stakeholders to engage in constructive dialogue and transition planning to manage the anticipated social risks and impacts that the transition process will bring. In Indonesia, energy, FOLU, and agriculture transitions are being prioritized. In parallel, local economic development programming that takes a holistic approach to landscape management can reduce the risks of interdependence of local livelihoods with high emissions sectors.

**BOX 6.4** Community Development and Empowerment Fund in the Coal Communities

*Pengembangan dan Pemberdayaan Masyarakat (PPM)* is a program of the Indonesia MEMR tasked with developing and empowering communities that surround mining areas. The goals of PPM are to improve the quality of life for communities around mining areas, reduce the social and environmental impacts of mining, and promote sustainable development in mining areas. The program funds projects identified by the local community. The program funds a variety of community-based development projects, including infrastructure, education, and health care. PPM is implemented in partnership with local governments, mining companies, and NGOs.

Those holding permits to explore for or produce coal are required to prepare a masterplan (*rencana induk*) for PPM programs, based on the PPM blueprint stipulated by the governor of each coal-mining province. A master plan should contain plans for PPM programs from production to post-mining and therefore could be used to prepare the local community for the transition to close coal mines. The latest update of the regulation states that MEMR will establish guidelines for implementing PPM. However, the update does not clarify how the ministry and subnational governments will oversee such programs. Nevertheless, PPM carries potential to promote locally owned, community-based development activities in mining areas.

Source: MEMR Regulation No. 41/ 2016, MEMR Regulation No. 25/ 2018.

# SECTION IV.

# MOVING TOWARD SUSTAINABLE AND INCLUSIVE TRANSITIONS IN INDONESIA

**Indonesia's climate response will need to work effectively across scales to address vulnerability and implement inclusive decarbonization policies.** A combination of reforms and investments in national policies, decentralized spatial management, and bottom-up community actions is needed. Stronger systems are necessary to access and channel climate finance and to more effectively utilize existing fiscal transfers to deliver on climate and development goals, particularly Indonesia's enhanced NDC targets in the FOLU and agriculture and energy sectors. In addition, effective bottom-up action will require scalable tools to disseminate information, facilitate consultations, and promote locally led solutions. Planning and consultation will need to address the most pressing issues experienced by communities and financing needs to drive tailored approaches based on expected impacts, past experiences, and current vulnerabilities.

**Indonesia has solid foundations to support achieving its climate targets, but for inclusive and sustainable climate response, these foundations need to be strengthened and better coordinated.** This final section provides selective recommendations to inspire a set of policy reforms and actions with a view to improving the effectiveness of existing systems and strengthening the scale, effectiveness, sustainability, and inclusivity of investments in climate adaptation, mitigation, and transition planning.







## CHAPTER 7

# RECOMMENDATIONS FOR SUSTAINABLE AND INCLUSIVE CLIMATE ACTION



Indonesia has solid foundations for a sustainable and inclusive climate action. Complementary policy reforms and actions can strengthen these systems to build social resilience and align community incentives with national-level climate and development goals.



The vast majority of targeted emission reductions will come from the FOLU and energy sectors. Improving the management of these sectors, which operate in a complex web of overlapping national and subnational authorities, will be essential.



Effective climate action will require strong political leadership from above, and effective subnational implementation systems from below. There are important roles for national and subnational governments, donors, civil society, and communities to play.

**The recommendations of this report are intended to inspire policy reforms and actions to strengthen sustainable and inclusive local climate action.** The recommendations articulate a selective (not comprehensive) list of actions based on the analysis discussed in this report. These recommendations include a combination of specific reforms, priorities for institutional capacity development, and general suggestions for policy implementation. They are intended to be complementary, cover key sectors (FOLU and energy) in which the transitions will be most profound, and be consistent with the guiding “information, incentives, instruments” framework of this report, to guide effective local climate action. A more comprehensive list of recommendations on Indonesia’s overall climate response and decarbonization efforts is available elsewhere (World Bank 2023a).

## 7.1 Recommendations

**The recommendations below are organized based on the challenges identified in this report, and the various actions needed to address them across levels of government.** Indonesia’s decentralized governance system has a strong bearing on the design and execution of climate-related policies and actions. However, it is important to note that these recommendations are interdependent and will require a measure of top-down support. Recommendations to strengthen national policies focus on the core policy-making and standard-setting roles of sectoral ministries and the national agendas that need stronger support and oversight to drive effective subnational implementation. Recommendations for subnational governments focus on the functions and capacities that provincial, district, and sub-district



governments need to achieve more inclusive and effective outcomes. Village-level recommendations are focused on improving the quality of governance and spending by village governments aligned with the Gol’s climate and development policy objectives.<sup>80</sup> Priorities include reforms to the Village Law to improve local planning, budgeting, and governance; and increased funding and technical assistance to address key capacity gaps within communities to drive effective climate action. Partnerships with nongovernmental organizations and private companies are emphasized as they are essential to strengthen the demand side of local governance.

**TABLE 7.1** Recommendations for National, Sub-National, and Village Governments

ACTION AREAS	RECOMMENDATIONS
<p><b>Closing gaps in information on climate risks and opportunities, and how these risks will affect local communities.</b></p>	<p><b>Improve public access to data and analysis on vulnerability to climate change.</b> Data on the risks of a changing climate and the sensitivity of local communities to various risks will provide useful resources to aid local planning and action.</p> <ul style="list-style-type: none"> <li>• Upgrade the SIDIK, inaRISK<sup>81</sup> or other similar databases. These databases can incorporate climate vulnerability data that address a broader range of socioeconomic indicators, climate risk projections, and analysis of “risk profiles”. The updated databases with improved capabilities then can be made publicly accessible.</li> <li>• Commission gender-specific research in areas most prone to disaster impacts and vulnerable to climate transitions. Understanding the differentiated abilities of women and men to adapt to climate risks and participate in transition initiatives will be critical to effective policy implementation and to continuing to address lagging women’s labor force participation.</li> <li>• Increase support for environmental campaigns within schools, religious organizations, and youth movements. Educational campaigns and youth movements are common effective entry points to increase public awareness and to enhance the capacity of local communities to engage on environmental issues and policies over the longer term. Increased support for partnerships with civil society is likely to improve communities’ capacity to engage in government-led dialogues and processes.</li> </ul>
<p><b>Information on the value and future values of critical ecosystems.</b></p>	<p><b>Develop and disseminate more and more detailed climate-smart cost-benefit assessments to inform economic development policies and programs, including benefits-sharing plans and alternative livelihoods programs.</b> Analysis of the options, costs, and impacts of a range of adaptation and resilience-building activities will help to prioritize the funding gaps and areas that need the most support.</p> <ul style="list-style-type: none"> <li>• Site-specific analyses in these priority locations should factor in the local, short-term costs and the benefits driving investment and land-use decisions, and the long-term costs and benefits of protection/restoration/repurposing.</li> <li>• The analyses should ensure that the social dimensions (such as the gender-based differences in who bears costs and who stands to benefit) are included, and that noneconomic costs and benefits (such as impacts on identity, rights, and ancestral lands) are acknowledged.</li> </ul>

<sup>80</sup> “Climate expenditure” is not a specific budget line but can be a wide-ranging set of investments in disaster resilience, livelihoods, and natural resource management (NRM) tailored to local contexts.

<sup>81</sup> inaRISK is a disaster vulnerability mapping dashboard hosted by the BNPB since 2016. It is available [here](#).

TABLE 7.1 *continued*

ACTION AREAS	RECOMMENDATIONS
<p><b>Expanding operational platforms for community and stakeholder engagement.</b></p>	<p><b>Strengthen national dialogue on inclusive climate transitions.</b> High-level support to citizen engagement and coal transition planning will improve accountability and transparency and strengthen policy design.</p> <ul style="list-style-type: none"> <li>• Finance and organize inclusive community dialogues and decision-making processes. Bring together relevant public, private, and associative stakeholders (civil society, unions, local and national government and agencies, and the private sector) to debate climate analytics and facts to inform the overall strategy and particular policies – especially around decarbonization.</li> <li>• Require and institutionalize deliberative processes in key decisions and planning processes related to climate policy and spending, including the revision of spatial plans and management of conservation and mining areas. National regulations should stipulate transparent and consultative processes that must be undertaken by national and subnational resource management bodies, including mining companies, conservation agencies, forestry companies, and carbon finance projects.</li> </ul> <p><b>Strengthen subnational dialogue on inclusive low-carbon transitions.</b></p> <ul style="list-style-type: none"> <li>• Continue strengthening multistakeholder collaboration fora to enhance participatory management of protected areas and critical ecosystems, such as marine protected areas. Conservation and land management agencies and local governments should require and institutionalize deliberative processes for key decisions and planning processes.</li> <li>• Ensure allocation of sufficient and reliable financing for stakeholder engagement. Institutionalization requires funding and capacity. Ensure that budgets for consultations and operational costs of reaching remote areas are included in planning and that focal points in the civil service are identified and trained in inclusive engagement and communication skills.</li> <li>• Involve communities in monitoring and learning to increase social accountability and improve policy implementation. Community-based monitoring of forest and marine protected areas management, local budgets and projects, and coal transition planning and implementation will make policies more inclusive and reduce leakage from corruption or inefficiencies.</li> </ul>
<p><b>Improving efficiency, transparency, and scalability in carbon finance instruments.</b></p>	<p><b>Strengthen bottom-up accountability mechanisms for climate finance.</b></p> <ul style="list-style-type: none"> <li>• Improve “green accountability” mechanisms to track climate finance attached to BPLDH to enhance transparency and accountability. Standards for results-based payments and other PES schemes should be developed to streamline and strengthen the required monitoring and strengthen accountability. Accountability tools should provide data to the public on how payments are used and what proportion of payments reach the intended community beneficiaries.</li> <li>• Strengthen the regulatory and institutional framework for environmental and social risk management, particularly around resettlement, labor market policies, and stakeholder engagement. Strengthening this framework would help leverage the social impact of climate finance, as well as potentially expand access to climate finance.</li> </ul>

**TABLE 7.1** *continued*

ACTION AREAS	RECOMMENDATIONS
	<p><b>Strengthen and streamline PES implementation (especially results-based payments)</b></p> <ul style="list-style-type: none"> <li>• <i>Ensure that benefit-sharing plans clearly articulate the role of the ER Payments as part of broader landscape/jurisdictional management plans.</i> BSPs should delineate clearly where their scope and goals fit within the broader planning and financing ecosystem needed to achieve sustainable ERs. Programs should articulate how ER payments will be complemented by other funding sources and other actions to achieve overall objectives.</li> <li>• <i>Ensure that PES programs have adequately detailed operational plans and institutional arrangements (including for channelling payments) prior to legal agreements being signed.</i> Such requirements will avoid delays and reduce opportunities for elite capture of resources after payments agreements are signed but before implementation details are finalized.</li> <li>• <i>Standardize and simplify key community-facing aspects of the programs, including stakeholder engagement and subnational financing.</i> Standardization includes setting standard templates and minimum requirements for procurement, contracting, and workplans. Standardizing and simplifying also will reduce the pressure on subnational agencies to coordinate even more than normal and to produce operating procedures and allocation formulas from scratch in each program.</li> <li>• <i>Develop robust and consistent social safeguard instruments and standards that can be applied across ER programs, which include FPIC standards.</i> These social safeguards not only would protect against harm but also would lower the administrative burden of developing bespoke systems for different performance-based financing instruments.</li> </ul>
<p><b>Expanding options for partnerships with civil society and non-government actors.</b></p>	<p><b>Improve regulatory frameworks for partnerships with civil society.</b> Civil society partnerships will be critical to improve local capacity for climate action and to innovation for and implementation of emission reduction and adaptation programs.</p> <ul style="list-style-type: none"> <li>• Develop guidelines that include key rules and quality standards for how partnerships with civil society are managed, building on BPDHL’s existing certification system.</li> <li>• Standards should include maximum overheads and staff costs (to reduce harmful competition among NGOs), and financing windows for the private sector (such as cost-sharing or match funding mechanisms for private sector partnerships).</li> <li>• Reforms of audit and contracting systems will be needed to expand the willingness of NGOs to work with government while ensuring sufficient accountability for funds channeled through NGOs.</li> </ul>

TABLE 7.1 *continued*

ACTION AREAS	RECOMMENDATIONS
<p><b>Initiating transition planning in coal-dependent regions.</b></p>	<p><b>Initiate just coal transition planning in coal-dependent regions and transition sites.</b></p> <ul style="list-style-type: none"> <li>• Starting with regions that have a high dependence on coal, where production is anticipated to decline, conduct upstream socioeconomic assessments up to five years before transition to facilitate transition to viable alternative livelihoods and local development activities.</li> <li>• Assessments could include community consultations; local working groups on “just transition,” which includes a range of local stakeholders; mapping local economic opportunities; implementing environmental impact assessments (EIAs); and developing site-specific strategies within the working groups.</li> <li>• Build on the impact assessments to identify local development goals and prepare community development programs to address them. Such programs would leverage existing community and village-level platforms. Programs could provide additional block grants or transfers for community-identified needs. Communities themselves can help target social welfare schemes and identify those most at risk.</li> </ul> <p><b>Broker private sector partnerships to enhance local economic development in coal-dependent regions and transition sites.</b></p> <ul style="list-style-type: none"> <li>• Identify private sector “champions” willing to invest, such as a university willing to establish a new campus in the area, or another manufacturing or renewable energy company that might repurpose existing facilities. In some cases, private sector partnerships may facilitate managed labor migration.</li> </ul>
<p><b>Improving spatial and sectoral planning.</b></p>	<p><b>Improve provincial, district, and city spatial planning in fragile ecosystems.</b></p> <ul style="list-style-type: none"> <li>• Conduct robust assessments of carrying capacity, economic opportunities, and social risks including forest conservation zones and marine protected areas and incorporate them in local spatial and investment plans.</li> <li>• In protected areas, local authorities can ensure that monitoring and enforcement capacities are focused on the biophysical resources most at risk, while coordinating with development agencies to support surrounding communities (carrot and stick approach).</li> <li>• Such assessments also will inform financing strategies for landscape and protected areas management, highlighting the investment needs to promote sustainable local economic development.</li> <li>• Integrate analysis on sensitivity to climate impacts into spatial plans and protected area management plans, particularly in urban areas that face increased flood risks and rural areas facing water shortages and agricultural disruptions. Integrating analysis includes mapping exposure to climate risks and the sensitivity of existing and future social and economic development trends, and prioritizing investments accordingly.</li> <li>• Incorporate data on socioeconomic outcomes and social marginalization in spatial planning. Overlaying data on climate risks with information on poverty levels; issues of insecure housing and land tenure; and basic data on access to basic service, finance, and rural road access will help target investments in the most vulnerable groups.</li> </ul>

**TABLE 7.1** *continued*

ACTION AREAS	RECOMMENDATIONS
<p><b>Strengthening local government in key functions needed for effective environmental management.</b></p>	<p><b>Build the capacity of district governments to manage critical aspects of sustainable landscapes, including spatial planning, community engagement, and service delivery.</b></p> <ul style="list-style-type: none"> <li>• Identify critical resource or human capital gaps required to effectively drive local economic transition and build resilience. Based on national policy objectives and spatial plans, identify critical gaps in the capacity of district and provincial government extensions and outreach workers and technical staff to address climate adaptation and mitigation issues that affect the poorest and most vulnerable.</li> <li>• Build the capacity of subnational governments for climate-smart planning and public financial management. Training should focus on the key functions needed to inform high-quality spatial plans (see above), project selection and appraisal, and coordination and monitoring.</li> </ul>
<p><b>Aligning subnational fiscal incentives for low-carbon economic transition.</b></p>	<p><b>Expand the use of performance incentives for locally led climate action.</b></p> <ul style="list-style-type: none"> <li>• Support broader voluntary subnational EFTs, including sustainability-based performance indicators for subnational governments through the Ministry of Home Affairs, facilitated by the Ministry of Finance.</li> <li>• Districts review and approve the use of the ADD (Village Fund Allocation/ Alokasi Dana Desa) funds by villages. Providing villages with the tools, data, and knowledge to understand the localized allocation and investment for climate adaptation and mitigation at the community level will improve their ability to guide climate-smart investments, including navigating processes or rules related to EFTs as they are introduced.</li> <li>• Expand use of EFTs in vulnerable geographies. The latter include remote rural areas and dense urban areas with the lowest capacity to adapt to disasters and high exposure to climate risks; areas most at risk of forest loss or coral reef degradation; and areas facing some of the highest transition costs due to a high dependence on carbon-heavy industries, including coal-mining sites.</li> <li>• Expand use of environmental fiscal transfers by increasing allocations of DAK and Village Funds to address the risks and costs of transitions. Options include incorporating results-based payments in DAK (topping up the existing village allocation funds), and providing conditional finance to villages through DAK, such as through competitive windows, incentivized funds, and payment for performance. Design of these mechanisms should aim to better support viable local climate actions, as in enabling multiyear investments for green projects such as mangrove rehabilitation or fire management.</li> </ul>



**TABLE 7.1** *continued*

ACTION AREAS	RECOMMENDATIONS
<p><b>Optimizing village planning and budgeting systems to promote climate smart development.</b></p>	<p><b>Promote more inclusive and climate smart village planning.</b></p> <ul style="list-style-type: none"> <li>• Build the capacity of village populations to participate in environmental protection and economic development programs and village planning and budgeting processes. The most effective mechanism is likely to be through partnerships with civil society and the private sector that can work directly with community interest groups (such as farmers, women, and youth). Support would include participatory local planning, introducing improved skills and technologies into communities, and empowering marginalized groups.</li> <li>• Develop improved training and outreach instruments for village governments and village facilitators to promote climate-smart planning and action in villages. Develop and roll out “climate smart” planning guidelines for village governments and community groups.</li> <li>• Ensure that, during the development of 5-year plans, village planning and budgeting processes include participatory climate vulnerability assessments within villages. Assessment findings can be integrated in subproject operations and maintenance costs. These costs could include mandatory slope stability assessments, community-wide drainage plans/assessments in flood- and landslide-prone areas, or local assessments of tidal erosion.</li> <li>• Training on climate risks and integrating climate vulnerability analysis in village planning. These actions can leverage national databases to assess the specific vulnerabilities of their villages (such as increased risk of floods or fires).</li> </ul> <hr/> <p><b>Implement reforms to promote climate smart budgeting and expenditure monitoring.</b></p> <ul style="list-style-type: none"> <li>• Revise the annual Village Fund priority guideline, issued annually by MoV to guide village budgeting, to be based on analytics and data, such as vulnerability maps, and be less prescriptive. Reducing the proportion of Village Fund budget earmarked for specific activities will provide the flexibility needed for the village government and local communities to address local development and climate needs.</li> <li>• Update the village Chart of Accounts and Village Law nomenclature to provide clearer budget codes for spending on climate adaptation and mitigation activities. Updates should provide clarity to local governments on plausible investment options and support stronger expenditure monitoring. Improved expenditure analysis of village budgets will provide local and national policymakers with accurate information on spending priorities and gaps vis-a-vis national and local climate actions plans.</li> </ul>

**TABLE 7.1** *continued*

ACTION AREAS	RECOMMENDATIONS
<p><b>Increasing consistent provision of technical assistance to villages.</b></p>	<p><b>Strengthen sectoral technical assistance to village through links with village and district government planning and budgeting mechanisms.</b> Consolidate and scale existing climate adaptation and mitigation initiatives (including of BNPB and KLHK) through village development institutions to provide more specialized technical assistance to villages for local mitigation and adaptation activities.</p> <ul style="list-style-type: none"> <li>• Strengthen the capacity, and increase the allocation of, rural extension experts to the areas that face the most severe impacts of water availability, disaster exposure, and dependence on agriculture.</li> <li>• Develop and improve training on climate resilience for village administrators and facilitators. This training could include rolling out national training through learning management systems in the Ministry of Home Affairs (MoHA) and Ministry of Villages (MoV), peer-to-peer exchange, and partnerships with civil society.</li> <li>• Scale up <i>Proklim</i> by (a) clarifying and assessing eligible activities to be financed at the village level; (b) developing or improving basic standards and guidelines on which local officials and service providers are trained (such as for hazard-resilient infrastructure and forest rehabilitation); and (c) developing scalable facilitation and training modules to build the capacity of local communities, administrators (including village governments), and service providers (including facilitators and engineers) to support local planning and implementation.</li> <li>• Develop and roll out climate-smart standards to improve the resilience of local infrastructure investments. Examples of resilient infrastructure are well-covers to prevent material impacts from floods and tides, road and building materials able to withstand predicted changes in temperature or rainfall, and specifications to build resilience to storms and tidal surges (such as for jetties and landing sites). Features such as reinforced roofing or elevated structures and deeper foundations can be specified, especially for public facilities such as schools and health posts.</li> </ul>

Source: Authors.

## 7.2 Concluding Remarks

**This report has illustrated that climate change impacts are not distributed uniformly across Indonesia. Poor and vulnerable groups often bear the brunt of climate impacts.** In addition to climate and environmental risks, socioeconomic factors including poverty, gender-based and ethnic discrimination, and dependence on natural resources for livelihoods tend to amplify households’ sensitivity to climate risks and reduce their ability to adapt to changing circumstances.

**One key to addressing the social dimensions of climate change in Indonesia is building social resilience—the collective ability of communities to withstand, recover from, and organize in order to benefit from transitions.** Doing so requires strong governance as well as cohesion within local communities and other institutions, and between communities and agencies of government. In addition to addressing the underlying structural drivers of poverty, inequality, and vulnerability, policies and programs should empower traditionally disadvantaged groups and local communities to improve

the ways in which they relate to one another, organize themselves, and work together. Indonesia's community-based institutions, social networks, educational institutions, and traditional and religious groups and leaders are key sources of strength to build resilience to climate impacts.

**The GoI has made bold steps toward inclusive reforms and has strong foundations on which to build.**

The Climate Resilience Development Policy Nationally Determined Contributions and the National Long-Term Plan 2020-2024 (RPJMN) provide a roadmap. Concurrently, a range of sectoral programs aim to promote local action. Examples are ProKlim (*Program Kampung Iklim*), (the Ministry of Environment and Forestry's program to incentivize local climate adaptation); the Resilient Coastal Zone Development Program (Ministry of Marine Affairs and Fisheries' equivalent); and Climate Field Schools (led by the Indonesian Agency for Meteorology, Climatology and Geophysics). The BNPB's Community-Based Disaster Risk Management stands out as an example of a program that promotes targeted local action.

**The GoI is investing in a range of green finance and ecosystem protection initiatives to promote a more conducive environment for local farmers and businesses to invest in sustainable livelihoods.**

Moreover, the government is developing mechanisms to enhance access to "blue carbon" finance. Examples include large-scale mangrove forest rehabilitation and community livelihoods programs, improvements to marine protected area management, and results-based payments programs to promote emissions reduction in East Kalimantan and Jambi provinces.

**However, GoI faces the challenge of piloting and scaling initiatives *while* building strong public support over time for the trade-offs inherent in a transition to a low-emissions development model.**

Driving forward a rapid low carbon transition while addressing the inequality and vulnerability of marginalized groups will require strong operational management and significant political capital. Long-term economic and social reforms are required to reverse vested short-term economic and political interests. Building buy-in from the bottom up through communicating effectively with the communities most affected and building credibility by making early commitments are essential.

**Reforming environmental management to achieve sustainable development goals is a complex undertaking and a political economy challenge.**

Degradation of land and forest and marine resources is not simply the result of the unsustainable activities of small landholders, population growth, or technological inadequacies. Environmental degradation emerges from a complex set of biophysical, social, economic, and political processes at local, national, and global scales (Osborne and others 2021).

**The majority of targeted emission reductions in Indonesia will come from two sectors: forests and land use, and coal.**

Improving management of land and resources in these sectors is complicated by entrenched private sector interests, imperfect carbon markets, and a complex web of overlapping authorities at local levels. The marginalization of various social groups and the increased vulnerability of excluded groups is a product of these systems. There are strong vested interests by local and national actors in maintaining the status quo and particularly complex spatial governance issues to contend with in forest management.

*Building buy-in from the bottom up through communicating effectively with the communities most affected is essential.*

**This report has outlined a framework to promote local climate action that will support Indonesia's social and economic resilience to climate change and its emission reduction plans – but the headwinds are significant.** For example, proposed reforms to the Village Law require political will and inter-ministerial coordination and are subject to countervailing political pressures to weaken the accountability of village leaders. Improved management of jurisdictional results-based payment programs and other initiatives to improve the management of critical ecosystems, including forests and coral reefs, requires a combination of measures to change the incentives at the local level: a mix of carrots and sticks in the form of enforcement, financing, and technical assistance. Enforcement agencies at the local level contend with long-run historical contestation of forest boundaries, land rights, and access to common property resources, and the significant pressure of commodity-driven private sector interests. On the other side, responsible authorities have limited experience and funds, and local political economic factors remain challenging. For these reasons, this report focuses on the need for simple, scalable, national systems combined with strong support through local governments in key ecosystems. Citizen engagement platforms that give a voice to marginalized groups must be embedded within these systems.

**To deliver on its climate and development goals, Indonesia requires ambitious domestic leadership and significant global support.**

The Gol is rapidly rising to the challenge of climate change, making significant commitments to reduce emissions, and promoting numerous initiatives to drive adaptation and mitigation. The Government's Long-Term Strategy for Low Carbon and Climate Resilience 2050<sup>82</sup> emphasizes the need for a high level of political commitment, enhanced coordination and synergy among line ministries, and effective engagement of non-state actors, including civil society and think tanks, in order to succeed

in this ambitious economic transition. Looking forward, Indonesia's highly networked population has the potential to be an engine for change - if local communities can be given the right resources and support accompanied by transparent and accountable delivery systems. There is significant potential to strengthen one of the country's most critical tools for poverty reduction – its village development program – which will be critical to scale investments to the level needed. In the past, when facing challenging policy questions, including energy subsidy reform and decentralization, Indonesia's government did not shy away from taking bold steps to secure its own long-term interests. It will surely rise to the challenge of addressing the social dimensions of climate change.

*Indonesia's highly networked population has the potential to be an engine for change - if local communities can be given the right resources and support.*

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<sup>82</sup> The Strategy can be downloaded at this [link](#).

# APPENDICES





## APPENDIX A

# CLIMATE VULNERABILITY PROFILES

**The village-level climate vulnerability dataset analyzed in this research is a comprehensive set of variables on climate change vulnerability in Indonesia.**<sup>83</sup> The analysis builds on a novel, spatially explicit, village-level dataset of climate change vulnerabilities. The analysis is constructed from a combination of publicly available spatial datasets that provide information on local exposures, sensitivities, and adaptive capacities related to climate change, as well as proprietary village-level data (*Statistik Potensi Desa*, or PODES 2018) which is a census of all villages provided by the Central Bureau of Statistics (*Badan Pusat Statistik*, or BPS).<sup>84</sup> The analysis comprises variables with information on (1) past, present, and predicted (2018-2100) changes in temperature and precipitation; (2) recent climate hazards and natural disasters; (3) past and present changes in population; (4) past and present land cover change; (5) current infrastructure development of electrification and transportation; (6) current information on majority village livelihoods, natural resource use, and market access; and (7) current information on village development indicators, including majority household sanitation, water source, and fuel type. Appendix A lists the variable names, descriptions, and corresponding vulnerability categories with the data sources and how the original data were treated to develop the variables used in this research.

**Village-level vulnerability profiles are generated based on a combination of statistical techniques and machine learning algorithms.** First, the researchers reduce the number of variables using principal component analysis (PCA) to generate a new set of variables that capture the greatest amount of variance within the dataset. The researchers run a separate mixed PCA for each vulnerability characteristic to reduce the number of variables representing exposure ( $n=20$ ), sensitivity ( $n=27$ ), and adaptive capacity ( $n=14$ ). Within each vulnerability characteristic, the researchers select the five principal components that represent the greatest variation in the data. The researchers limit their selection to 5 variables within each vulnerability characteristic for a total of 15 variables on which to perform hierarchical cluster analysis, a machine learning algorithm that is most effective on datasets for  $2^m = n$  variables (where  $m$  = the number of variables the algorithm clusters, and  $n$  = the number of observations for each variable). When running

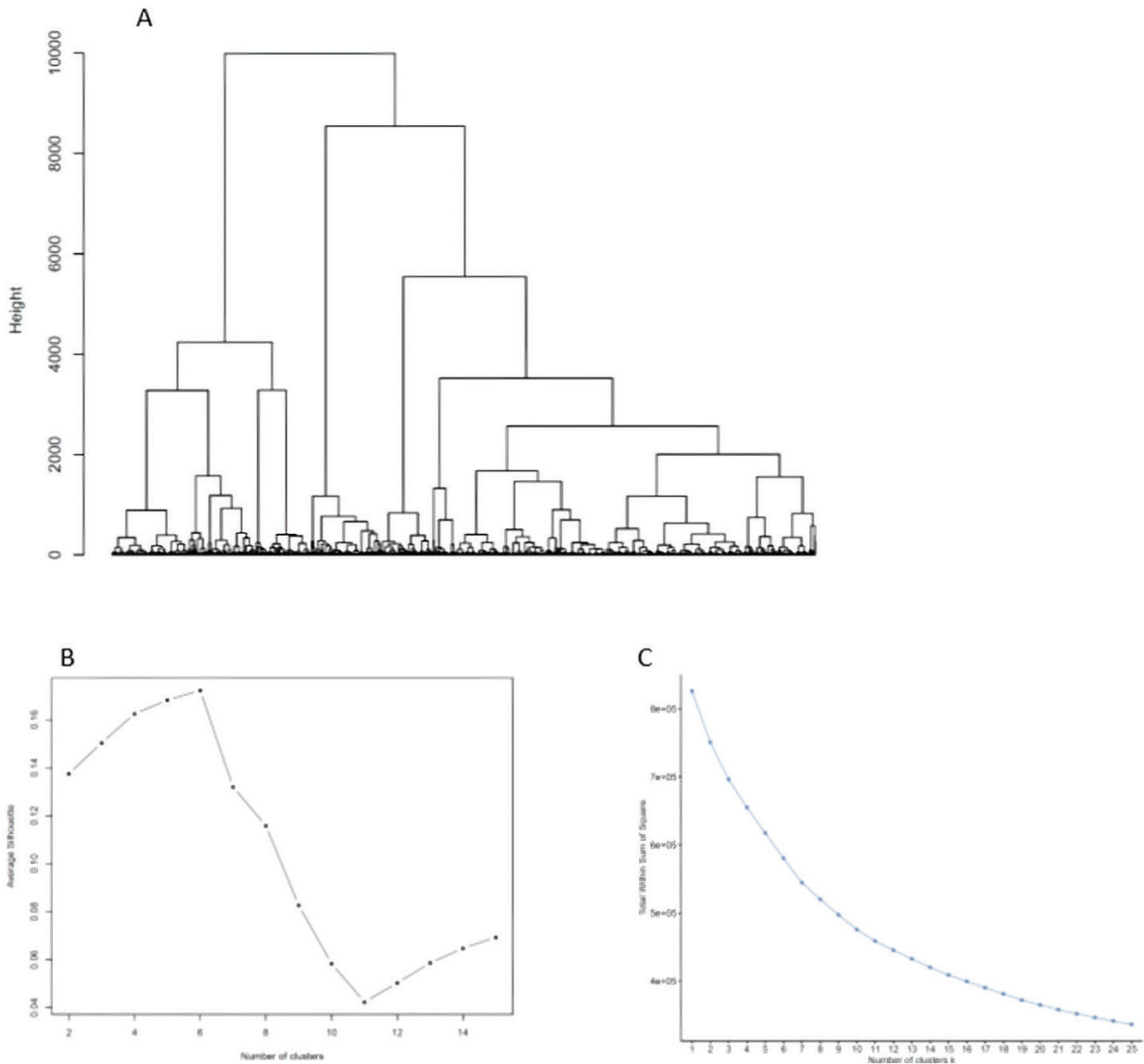
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<sup>83</sup> Other datasets combine variables on exposure, sensitivity, and adaptive capacity. This dataset draws from a variety of validated scientific research projects. They include downscaled climate projections and remotely sensed land cover data from the United States National Aeronautics and Space Administration (NASA); and social, institutional, and economic data from the Statistics Indonesia (*Badan Pusat Statistik*, or BPS). Although it is the most ambitious effort to compile climate change vulnerability data in Indonesia, this dataset remains limited in historical scope and comparatively limited information on the location and diversity of local livelihoods, institutions, and poverty. Nonetheless, this dataset is one of the best examples of how climatic, land cover, and village-level socioeconomic and institutional data can represent local climate vulnerabilities.

<sup>84</sup> Since the data come from publicly available spatial data and regularly collected proprietary data, the vulnerability clusters and profiles can be updated as new information becomes available.

the hierarchical agglomerative clustering, the researchers weight the principal components by the amount of variance they explain within each vulnerability characteristic. The researchers then calculate the distance matrix using Euclidean distance and use Ward's linkage algorithm when generating clusters.

**FIGURE A1.** Climate Vulnerability Clusters



Source: Based on analysis of village-level climate vulnerability dataset.

Note: Dendrogram (A), silhouette plot (B), and elbow plot (C) used to determine appropriate cluster sizes. These plots illustrate different measurements useful in identifying how differences among clusters change depending on the number of clusters into which observations (that is, villages) are sorted. The researchers used the plots in addition to maps of different cluster sizes to determine the appropriate number of clusters per subregion.

**Villages with similar vulnerability profiles are grouped into clusters to make the maps simple and easy to use while retaining key differentiators.** The researchers performed separate cluster analyses within six subregions because differences within these subregions are of more interest than the similarities across them. A total of 61 clusters were identified across the 6 major subregions of Indonesia: Sumatra, Java, Kalimantan, Bali/West Nusa Tenggara (Nusa Tenggara Barat, or NTB)/East Nusa Tenggara (Nusa Tenggara Timur, or NTT), Sulawesi, and Maluku/Papua.<sup>85</sup> Within these six subregions, villages with similar climate change vulnerabilities share similar topographic, ecological, infrastructural, and livelihood qualities. The researchers selected the appropriate number of vulnerability clusters within each subregion using elbow plots, silhouette plots, and dendrograms (figure A1), and applying domain knowledge.<sup>86</sup>

**Climate vulnerability profiles were developed based on summary statistics for each cluster.** For each cluster, the researchers provide spatial visualization, relevant summary statistics, and a written profile that describes different vulnerabilities to climate change. Box A1 shows how Cluster 7 in the Maluku/Papua subregion is defined by inland and highland villages. By 2100, Cluster 7 is projected to face high increases in maximum monthly temperature and comparatively large reductions in annual precipitation.

**Select field testing has demonstrated that the profiles generated by the machine learning algorithm are largely accurate.** Initial research on the climate vulnerability clusters and profiles sought to validate findings with village heads (*kepala desa*) of selected villages across Indonesia (figure A3). Interview transcripts were developed for 13 villages (appendix B). However, due to research disruptions associated with the onset of COVID-19, only five village heads were interviewed for their feedback on the cluster vulnerability profiles. The interviews indicated that the profiles were largely, although not entirely, accurate. Village heads validated general climatic findings concerning temperature and precipitation changes. In one example, climate hazard identification in the vulnerability profile was incorrect. The village head of Sidenre reported that his village did not have any access to the coast although it was in a cluster described as primarily defined by exposure to rising sea levels and flooding as well as decreasing fish yields. In another example, the village head of Lalonaha said that hazards identified in the vulnerability profile were correct, but that the profile did not identify the pressing problem of a lack of market access for coffee producers who, due to changes wrought by the 2015 floods, previously had pursued paddy agriculture. More work on validating, refining, and improving the climate change vulnerability profiles could be useful to extend and expand this research.

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<sup>85</sup> These subregions broadly represent different demographic patterns, development trajectories, climatic patterns, and ecological zones of Indonesia.

<sup>86</sup> After selecting three possible alternatives for different cluster sizes, the researchers examined maps and summary statistics that describe where and what the different numbers of vulnerability clusters represent. The researchers selected the most appropriate number of clusters for each subregion. Decision criteria were focused on identifying clusters that were regular enough to be useful, but not so detailed as to be arbitrarily different. Therefore, the number of clusters is a compromise between providing climate vulnerability information that would be too general (as with too few clusters) or too specific (as with too many clusters).

**TABLE A1.** List of Variable Names, Descriptions, and the Characteristic of Vulnerability That They Represent

VARIABLE NAME	DESCRIPTION	VULNERABILITY CHARACTERISTIC
temp18_mn	Mean monthly temperature in 2018 (K)	Exposure
temp18_sd	Standard deviation of monthly temperature in 2018	Exposure
tempchg1802_mn	Mean monthly temperature difference between 2018 and 2002 (K)	Exposure
tempchg1802_sd	Standard deviation of monthly temperature difference between 2018 and 2002	Exposure
tempmax5018_mn	Mean difference in monthly maximum temperature between 2018 and projected temperature for 2050 (K)	Exposure
tempmax5018_sd	Standard deviation of monthly maximum temperature difference between 2018 and projected temperature for 2050	Exposure
tempmax10018_mn	Mean difference in monthly maximum temperature between 2018 and projected temperature for 2100 (K)	Exposure
tempmax10018_sd	Standard deviation of monthly maximum temperature difference between 2018 and projected temperature for 2100	Exposure
pre18_mn	Mean monthly precipitation in 2018 (m/day)	Exposure
pre18_sd	Standard deviation of monthly precipitation in 2018	Exposure
prechg1802_mn	Mean monthly difference in precipitation between 2018 and 2002 (m/day)	Exposure
prechg1802_sd	Standard deviation of monthly difference in precipitation between 2018 and 2002	Exposure
pre5018_mn	Mean monthly difference in precipitation between 2018 and predicted precipitation for 2050 (m/day)	Exposure
pre5018_sd	Standard deviation of monthly difference in precipitation between 2018 and predicted precipitation for 2050	Exposure
pre10018_mn	Mean monthly difference in precipitation between 2018 and predicted precipitation for 2100 (m/day)	Exposure
pre10018_sd	Standard deviation of monthly difference in precipitation between 2018 and predicted precipitation for 2100	Exposure
lc18_water	Land covered by water or permanent wetlands within village boundary (km <sup>2</sup> )	Sensitivity
lc18_forest	Land covered in evergreen (needle and broadleaf), deciduous (needle and broadleaf), or mixed forest within village boundary (km <sup>2</sup> )	Sensitivity

**TABLE A.1** *continued*

VARIABLE NAME	DESCRIPTION	VULNERABILITY CHARACTERISTIC
lc18_grasslands	Land covered in shrublands (open and closed), savannahs (woody and non-woody), and grasslands within village boundary (km <sup>2</sup> )	Sensitivity
lc18_croplands	Land covered in croplands and cropland/natural vegetation mosaic within village boundary (km <sup>2</sup> )	Sensitivity
lc18_urban	Land covered by urban or built environment (km <sup>2</sup> )	Sensitivity
lc18_other	Land covered by barren/open land or snow/ice (km <sup>2</sup> )	Sensitivity
lc1802_water	Difference in land covered by water or permanent wetlands within village boundary from 2002 to 2018 (km <sup>2</sup> )	Sensitivity
lc1802_forest	Difference in land covered in evergreen (needle and broadleaf), deciduous (needle and broadleaf), or mixed forest within village boundary from 2002 to 2018 (km <sup>2</sup> )	Sensitivity
lc1802_grasslands	Difference in land covered in shrublands (open and closed), savannahs (woody and non-woody), and grasslands within village boundary from 2002 to 2018 (km <sup>2</sup> )	Sensitivity
lc1802_croplands	Difference in land covered in croplands and cropland/natural vegetation mosaic within village boundary from 2002 to 2018 (km <sup>2</sup> )	Sensitivity
lc1802_urban	Difference in land covered by urban or built environment from 2002 to 2018 (km <sup>2</sup> )	Sensitivity
lc1802_other	Difference in land covered by barren/open land or snow/ice from 2002 to 2018 (km <sup>2</sup> )	Sensitivity
pop18	Population in 2018	Sensitivity
popchg1802	Difference in population, 2018 to 2002	Sensitivity
slope	Average slope of the village	Sensitivity
topog	Village Head report of whether village is flat or not	Sensitivity
topcst	Presence of seacoast	Sensitivity
seause	Summative index of different uses of the sea	Adaptive capacity
mngrvs	Presence and condition of mangroves in village	Sensitivity
fordep	Dependence of village on forest resources	Sensitivity
incagr	Main source of income for the majority of people in the village is agriculture or mining	Sensitivity
incman	Main source of income for the majority of people in the village is manufacturing	Sensitivity
incsrv	Main source of income for the majority of people in the village is the service industry or other	Sensitivity



TABLE A.1 *continued*

VARIABLE NAME	DESCRIPTION	VULNERABILITY CHARACTERISTIC
majcrp	Main source of agricultural income for majority of agricultural households is food crop or livestock	Sensitivity
natwtr	Summative index of different freshwater sources	Adaptive capacity
busall	Sum of industrial clusters, types of micro-industries, and village services	Adaptive capacity
prpelc	Proportion of households without electricity	Adaptive capacity
mnfuel	Main fuel source for the majority of people in the village is collected (= not purchased)	Adaptive capacity
mnsani	Main sanitation method (toilet type) for the majority of people in the village is unimproved	Adaptive capacity
mnwatr	Main drinking water source for the majority of people in the village is improved	Adaptive capacity
hltsrv	Summative index of all health care centers in village	Adaptive capacity
edcsv	Summative diversity index of all schools in a village	Adaptive capacity
sckttl	Total number of individuals in village seriously ill from select treatable illnesses	Sensitivity
dthttl	Total number of deaths in village from select treatable illnesses	Sensitivity
lngdiv	Everyday language diversity within the village	Adaptive capacity
mnrddv	Main road development indicator	Adaptive capacity
crmttl	Summative index of different crimes reported in the last year	Adaptive capacity
vilast	Summative index of village administrative assets	Adaptive capacity
natdis	Summative index of presence/absence of natural disasters	Exposure
natevt	Total number of natural disaster events from the past 3 years (2015-2017)	Exposure
clmdis	Summative index of presence/absence of climate disasters	Exposure
clmevt	Total number of landslide events in village from 2015, 2016, and 2017	Exposure
disdth	Total deaths from natural and climate disasters in village from 2015, 2016, 2017	Sensitivity
proinf	Summative index of protective infrastructure	Adaptive capacity
nutpov	Total number of people who suffer from malnutrition and total number of poverty cards issued in 2017	Sensitivity

**TABLE A2. Data Sources and Variable Coding Information for Vulnerability Profiles**

VARIABLE NAME	DATA FORMAT	DATA AND PROCESSING SUMMARY
FID	Integer	Unique row ID
IDDESA	10-digit integer	10-digit village ID used by RoI
temp18_mn	Numeric	Calculated from monthly average temperature in 2018 (ERA5)
temp18_sd	Numeric	Calculated from monthly average temperature in 2018 (ERA5)
tempchg1802_mn	Numeric	Calculated from monthly average temperature in 2002 and 2018 (ERA5)
tempchg1802_sd	Numeric	Calculated from monthly average temperature in 2002 and 2018 (ERA5)
tempmax5018_mn	Numeric	Calculated from monthly average maximum temperature in 2018 (ERA5) and predicted monthly average maximum temperature in 2050 (NEX-DCP30)
tempmax5018_sd	Numeric	Calculated from monthly average maximum temperature in 2018 (ERA5) and predicted monthly average maximum temperature in 2050 (NEX-DCP30)
tempmax10018_mn	Numeric	Calculated from monthly average maximum temperature in 2018 (ERA5) and predicted monthly average maximum temperature in 2100 (NEX-DCP30)
tempmax10018_sd	Numeric	Calculated from monthly average maximum temperature in 2018 (ERA5) and predicted monthly average maximum temperature in 2100 (NEX-DCP30)
pre18_mn	Numeric	Calculated from monthly average precipitation in 2018 (ERA5)
pre18_sd	Numeric	Calculated from monthly average precipitation in 2018 (ERA5)
prechg1802_mn	Numeric	Calculated from monthly average precipitation in 2002 and 2018 (ERA5)
prechg1802_sd	Numeric	Calculated from monthly average precipitation in 2002 and 2018 (ERA5)

TABLE A.2 *continued*

VARIABLE NAME		DATA FORMAT	DATA AND PROCESSING SUMMARY
pre5018_mn	Numeric		Calculated from monthly average precipitation in 2018 (ERA5) and 2050 (NEX-DCP30). Values from 2050 were converted from kg/(m <sup>2</sup> *s) to m/day (*86.4) to be consistent with present/past precipitation data
pre5018_sd	Numeric		Calculated from monthly average precipitation in 2018 (ERA5) and 2050 (NEX-DCP30). Values from 2050 were converted from kg/(m <sup>2</sup> *s) to m/day (*86.4) to be consistent with present/past precipitation data
pre10018_mn	Numeric		Calculated from monthly average precipitation in 2018 (ERA5) and 2050 (NEX-DCP30). Values from 2100 were converted from kg/(m <sup>2</sup> *s) to m/day (*86.4) to be consistent with present/past precipitation data
pre10018_sd	Numeric		Calculated from monthly average precipitation in 2018 (ERA5) and 2050 (NEX-DCP30). Values from 2100 were converted from kg/(m <sup>2</sup> *s) to m/day (*86.4) to be consistent with present/past precipitation data
lc18_water	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc18_forest	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc18_grasslands	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc18_croplands	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc18_urban	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc18_other	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc1802_water	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc1802_forest	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)
lc1802_grasslands	Numeric		Converted from 500x500 m resolution (NASA-MODIS Terra)

**TABLE A.2** *continued*

VARIABLE NAME	DATA FORMAT	DATA AND PROCESSING SUMMARY
lc1802_croplands	Numeric	Converted from 500x500 m resolution (NASA-MODIS Terra)
lc1802_urban	Numeric	Converted from 500x500 m resolution (NASA-MODIS Terra)
lc1802_other	Numeric	Converted from 500x500 m resolution (NASA-MODIS Terra)
pop18	Numeric	Total population within the village boundary (WorldPop)
popchg1802	Numeric	Total population difference in the village boundary (WorldPop)
slope	Numeric	Average slope within the village boundary, calculated from a digital elevation model
topog	Binary: 1 = Flat; 0 = Peak or valley	Recoded to binary from nominal data in PODES 2018
topcst	Binary: 1 = Seacoast; 0 = No seacoast	Recoded from PODES 2018
seause	Count: Categories of sea uses include fishing, aquaculture, salt ponds, marine tourism, and transportation	Compiled from multiple questions in PODES 2018
mngrvs	Ordinal: 0 = No mangroves; 1 = Poor condition; 2 = Moderate condition; 3 = Good condition	Aggregated two questions and recoded from PODES 2018
fordep	Ordinal: 0 = Not dependent on forest; 1 = Low dependence; 2 = Moderate dependence; 3 = High dependence	Aggregated two questions and recoded from PODES 2018
incagr	Binary: 1 = Main source of income is agriculture or mining; 0 = Main source of income is not agriculture	Recoded from PODES 2018
incman	Binary: 1 = Main source of income is manufacturing; 0 = Main source of income is not manufacturing	Recoded from PODES 2018
incsrv	Binary: 1 = Main source of income is service-based or other; 0 = Main source of income is not service-based or other	Recoded from PODES 2018
majcrp	Binary: 1 = Main source of income for agricultural family is food crops or livestock; 0 = Main source of income is not food crops or livestock	Recoded from PODES 2018

TABLE A.2 *continued*

VARIABLE NAME	DATA FORMAT	DATA AND PROCESSING SUMMARY
natwtr	Count: Types of freshwater sources include rivers, irrigation canals, lake/reservoirs, and water retention basin ( <i>embung</i> )	Compiled from multiple questions in PODES 2018
busall	Count: Industrial clusters include industrial centers, industrial environments, and industrial settlements; Micro-industries include leather goods, wooden goods, metal goods, cloth/woven goods, ceramic/stone goods, rattan/bamboo, food processing, other goods; Village services include store cluster (ten shops or more), market with permanent building, market with semi-permanent building, market without permanent building, minimarket/grocery, shop in permanent building, shop selling food, restaurant, food stall, hotel, and lodging	Compiled from multiple questions in PODES 2018
prpelc	Numeric	Calculated from multiple questions in PODES 2018
mnfuel	Binary: 1 = Main fuel source is collected; 0 = Main fuel source is not collected	Recoded from PODES 2018
mnsani	Binary: 1 = Main sanitation method is unimproved (no latrine or public latrine); 0 = Main sanitation method is improved (shared or private latrine)	Recoded from PODES 2018
mnwatr	Binary: 1 = Main drinking water source is unimproved (river, lake, canal, or other open source); 0 = Main drinking water source is improved (well, plumbing, bottled water)	Recoded from PODES 2018
hltsrv	Count: Health care centers include hospitals, maternity hospitals, community health centers (inpatient), community health centers (no inpatient), auxiliary public health centers, polyclinics, doctor practices, maternity clinics, midwife practice, village health posts, and village maternity centers	Compiled from multiple questions in PODES 2018



**TABLE A.2** *continued*

VARIABLE NAME	DATA FORMAT	DATA AND PROCESSING SUMMARY
edcsrv	Count: Schools include early education (private), kindergartens, elementary schools, middle schools, high schools, vocational high schools, academies and colleges, public special needs elementary, schools, private special needs elementary schools, public special needs middle schools, private special needs middle schools, public special needs high schools, private special needs high schools, <i>pesantren</i> , <i>madrasah</i> , and seminaries	Compiled from multiple questions in PODES 2018
sckttl	Count: Illnesses include vomiting/diarrhea, dengue fever, measles, malaria, SARS, hepatitis e, diphtheria, and other atypical diseases	Compiled from multiple questions in PODES 2018
dthttl	Count: Illnesses include vomiting/diarrhea, dengue fever, measles, malaria, SARS, hepatitis e, diphtheria, and other atypical diseases	Compiled from multiple questions in PODES 2018
lngdiv	Binary: 1 = Different languages are spoken in this village; 0 = Different languages are not spoken in this village	Recoded from PODES 2018
mnrddv	Ordinal: 0 = Road is made of dirt or other without lighting; 1 = Either dirt or other with lighting or asphalt/stone road without lighting; 2 = Asphalt/stone with lighting	Compiled from multiple questions in PODES 2018
crmttl	Count: Crimes include theft, violent theft, fraud/embezzlement, persecution/torture/mistreatment, arson, rape, illegal drug sales, illegal gambling, murder, human trafficking, corruption	Compiled from multiple questions in PODES 2018
vilast	Count: Village assets include village information system, village finance system, village treasury, village building, and village market	Compiled from multiple questions in PODES 2018
natdis	Count: Natural disasters include earthquakes, tsunamis, and volcanic eruptions	Compiled from multiple questions in PODES 2018
natevt	Count: Events include earthquakes, tsunamis, and volcanic eruptions	Compiled from multiple questions in PODES 2018

**TABLE A.2** *continued*

VARIABLE NAME	DATA FORMAT	DATA AND PROCESSING SUMMARY
clmdis	Count: Climate disasters include landslides, floods, tidal waves, tornados, wildfires, and droughts	Compiled from multiple questions in PODES 2018
clmevt	Count: Climate events include landslides, floods, tidal waves, tornados, wildfires, and droughts	Compiled from multiple questions in PODES 2018
disdth	Count: Natural disasters include earthquakes, tsunamis, and volcanic eruptions; Climate disasters include landslides, floods, tidal waves, tornados, wildfires, and droughts	Compiled from multiple questions in PODES 2018
proinf	Count: Types of protective infrastructure include early warning system for natural disasters, presence of safety equipment for disasters, signs for evacuation routes, and location for homeless people (children or adults)	Compiled from multiple questions in PODES 2018
nutpov	Count: Sum of the number of people who suffer from malnutrition and total number of poverty cards issued in 2017	Compiled from multiple questions in PODES 2018

## APPENDIX B

# ETHNOGRAPHIC RESEARCH ON LOCAL GOVERNANCE AND INCENTIVES

This research focused on community leaders and how they influence changes in local livelihoods and resource use and how village government officials navigate conflicting natural resource management incentives. Task 1 was a qualitative study in which respondents were selected based on their roles in specified cases. It inquired (1) How do community leaders influence changes in local livelihoods and resource use (in communities who depend on natural resources for their livelihoods in ecologically fragile areas)? (2) How do village government officials navigate conflicting natural resource management incentives? (3) How do village leaders (government and nongovernment) negotiate with district decision-makers ((*bupatis*, *Bappedas*, and *dinas* (subnational sectoral) offices)) on NRM issues?

These cases were selected to reflect a broad range of contexts in relation to climate change adaptation and natural resource governance.

**TABLE B.1** Summary of Qualitative Case Studies

LOCATION	CONSERVATION AREA	ECOSYSTEM	ACTIVITY	CASE
<b>SOUTH SUMATRA</b>				
Siju, Rambutan, Banyuasin	Padang Sugihan Wildlife Reserve	Peat	Agriculture, animal husbandry	Group was formed in the village by the <i>Manggala Agni</i> (MoEF firefighters) to develop a community to help with fire prevention and mitigation at the village level.
Muara Sungsang, Banyuasin II, Banyuasin	Telang Protected Forest	Mangrove	Agriculture	Community-owned coconut plantation located in the Protected Forest area.
<b>WEST KALIMANTAN</b>				
Popai, Ella Hilir, Melawi	Bukit Baka Bukit Raya National Park	River	Mining	Community conducting artisanal gold mining along the rivers in Melawi district.

**TABLE B.1** *continued*

LOCATION	CONSERVATION AREA	ECOSYSTEM	ACTIVITY	CASE
Manggala, Pinoh Selatan, Melawi	Bukit Penitin Protected Forest	Forest	Agriculture, NTFP	Manggala village was awarded a Village Forest concession by MoEF through the ministry's social forestry program.
<b>CENTRAL SULAWESI</b>				
Toro, Kulawi, Sigi	Lore Lindu National Park	Forest	Agriculture, NTFP	Village with strong customary institution and forest management located within National Park.
Kabalutan, Talatako, Tojo Una Una	Togean Island National Park	Ocean	Fisheries, Tourism	Community conducted destructive fishing practice using bombs and sedatives.
<b>EAST NUSA TENGGARA</b>				
Fatumnasi, Fatumnasi, Timor Tengah Selatan	Mutis Timau Nature Reserve	Forest	Tourism, Agriculture	Proposal to change status of nature reserve triggered strong rejection from community. Situation also blew up in media.
Kiufatu, Kualin, Timor Tengah Selatan	Mutis Timau Nature Reserve	Forest	Agriculture, NTFP	Villagers employ several strategies to adapt to prolonged drought.
<b>WEST PAPUA</b>				
Senopi, Tamberauw	North Tamberauw Mountain Nature Reserve	Forest	Agriculture	Community response to the district government's agropolitan project.
Kebar, Tamberauw	North Tamberauw Mountain Nature Reserve	Forest	Agriculture, animal husbandry	Customary land claims within a district that has 70% conservation area.

Source: Based on *Ethnographic Research on Local Governance and Incentives* carried out by Dala Institute for this report (2022).

The case studies in this research investigated three categories of cases. They were cases in which (1) each village takes a specific direction for its local livelihoods and resource use due to the influence or action of its leader(s); (2) villages are facing conflicting incentives for different types of natural resource management in their areas; (3) villages are facing certain directives from the district government in regard to their natural resource management.

The main data collection method was through interviews held with key informants, on-site observations, and reviewing documentation that supported greater understanding of these case studies. Audiovisuals supported the main data collection. Additionally, data collection used a participatory visual ethnography method through the production of video diaries by key informants.

**TABLE B.2** Summary of Key Stakeholders Selected for Interviews

CATEGORIES	REMARKS	REASONS FOR SELECTION
<b>VILLAGE LEVEL</b>		
Village head	Formally appointed administrative village head	Village heads usually are the gatekeepers to other informants and have general knowledge in what is happening in their villages. They also are the leaders of their villages and are a key focus of the case studies.
Institution leaders	Heads of institutions existing outside of the formal village governments, such as customary leaders or institutions created for program interventions	They are the community leaders that are a focus of the research and have knowledge of the case studies.
Natural resource users	Land-owners or people who use the landscape for their livelihoods	They are the main actors of the case studies.
Commodity intermediaries	Collectors of commodity products in the village	They have an impact on natural resource use and people's livelihoods.
Potentially impacted villagers	Regular villagers who might be impacted differently from others	They may provide different points of view that can confirm or deny the accuracy of the other informants' iterations.
<b>DISTRICT LEVEL</b>		
Conservation area managers	Managers of a conservation area close to the location, such as National Park managers or the government's Natural Conservation agencies	They manage the conservation areas that interact with the case studies.
Ministry of Environment and Forestry regional agencies	MoEF agencies at the regional level, such as <i>Kesatuan Pengelolaan Hutan</i> (KPH) or <i>Dinas Kehutanan</i>	These agencies are the government's managers of forest resources that interact with the communities who also use and manage the forest resources.
Ministry of Agriculture regional agencies	MoA agencies at the regional level, such as <i>Dinas Perkebunan</i> or <i>Dinas Pertanian</i>	These agencies are the government's managers of agricultural activities and usually assist communities in agricultural activities.
Ministry of Tourism and Creative Economy regional agencies	Government tourism agencies at the regional level	They manage tourism activities at the regional level.
Regional government development agencies	Government development agencies at the regional level ( <i>Bappeda</i> )	They usually coordinate budgets and infrastructure building for regional development.



**TABLE B.2** *continued*

CATEGORIES	REMARKS	REASONS FOR SELECTION
Regional government	Other government agencies at the regional level that deal with specific issues, such as disaster management; or officers who represent the regent's or governor's office	These agencies sometimes run intervention programs on specific issues in the villages.
Intervention program managers	Managers of specific intervention programs in the villages, such as restoration programs or fire management	They run the intervention programs in the villages and can inform the specifics of the programs and how the villages respond to the programs.
Commodity-based farmers organizations	Organizations that deal with specific commodities that become the focus of the case studies	As commodity producers, they obtain contextual background on commodity trades and values and information on specific villages.
Researchers	Academics or journalists who have conducted research on the issue	They obtain secondary data on the case studies.

*Source: Based on Ethnographic Research on Local Governance and Incentives carried out by Dala Institute.*

## APPENDIX C

# FACILITATED COMMUNICATION OF CLIMATE VULNERABILITY

To evaluate the relationship between informational materials and facilitation techniques, this research randomly selected participants in 15 villages across Indonesia who represent a diversity of landcover and livelihood types (figure B1). On the total 823 participants, 656 were spread across the 3 treatment groups. The study comprised 522 women and 286 men.<sup>87</sup>

Study sites were selected to represent proximity to forests, peatlands, mangroves, coastal resources, and degraded forests or drained peatlands. In addition, the study sites were chosen to focus on the villages that had been classified as lagging according to the 2018 Indonesian Ministry of Villages development index. Table B1 provides information on village locations, landcover, and livelihoods, as well as on climate-related hazards generated as part of the climate vulnerability profiles.

**FIGURE C.1** Location of Village Study Sites



Source: Dala Institute.

<sup>87</sup> To validate that responses from female participants were not biased by responses by male participants, the design included sampling only women in 4 of the 15 villages.

**TABLE C.1** Selected Villages by Landcover, Livelihood, and Dominant Climate Hazards

PROVINCE, DISTRICT	VILLAGE (MAP NAME)	LANDCOVER AND LIVELIHOOD	DOMINANT CLIMATE HAZARDS
South Sumatra, Banyuasin	Siju	Peatlands, many of which are drained; many oil palm and rubber farmers	Fires, droughts, heat stress
South Sumatra, Banyuasin	Suka Damai	Peatlands, many of which have been drained and farmed since the 1980s; many oil palm and rubber farmers	Fires, droughts, heat stress
South Sumatra, Banyuasin	Sungsang IV (Muara Sungsang)	Mangroves and coastal area; majority coconut farmers	Extreme waves, salinization, degraded fisheries
West Kalimantan, Melawi	Manggala	Timberlands and protected forests with food crop agriculture and use of NTFPs	Floods, fires, landslides
West Kalimantan, Melawi	Popai	<i>Adat</i> village adjacent to a protected forest; dependence on food crop agriculture and NTFPs	Floods, fires, heat stress
West Kalimantan, Melawi	Nanga Siyai	Protected forest and unprotected forest areas; dependence on food crop agriculture and illegal gold mining	Fires, potential water shortages
Central Sulawesi, Sigi	Toro	<i>Adat</i> village adjacent to a protected forest; dependence on food crop agriculture and NTFPs	Fires, landslides
Central Sulawesi, Tojo Una-Una	Kabalutan	Small island in the Sulawesi Sea; dependent on fishing	Sea-level rise, drought, fishery degradation, heat stress
Central Sulawesi, Tojo Una-Una	Wakai	Small island in the Sulawesi Sea adjacent to marine protected area; dependence on fishing	Sea-level rise, drought, fishery degradation, heat stress
East Nusa Tenggara, Timor Tengah Selatan	Fatumnasi	<i>Adat</i> village adjacent to a protected forest; dependence on food crop agriculture and NTFPs	Drought, unpredictable precipitation, heat stress
East Nusa Tenggara, Timor Tengah Selatan	Kiufatu	Coastal village; focused on food crop agriculture and fishing	Drought, water shortages, floods, fires
East Nusa Tenggara, Timor Tengah Selatan	Bena	Village located by coastal protection and conservation area; dependence on food crop agriculture, firewood collection. NTFPs, fishing	Floods, drought, water shortages
West Papua, Tambraw	Senopi	Village located in a conservation district that is primarily forest; dependence on food crop agriculture and NTFPs	Fires, drought, heat stress

**TABLE C.1** *continued*

PROVINCE, DISTRICT	VILLAGE (MAP NAME)	LANDCOVER AND LIVELIHOOD	DOMINANT CLIMATE HAZARDS
West Papua, Tambraw	Kebar (Injai)	Village located in a conservation district that is primarily forest; dependence on food crop agriculture and NTFPs	Fires, drought, heat stress
West Papua, Tambraw	Inam	Village located in a conservation district that is primarily forest; dependence on food crop agriculture and NTFPs	Fires, drought, heat stress

Source: Dala Institute.

**Summary of research process.** The research was designed as an experimental study in which respondents were selected randomly (stratified by gender and age) from 15 villages (see numerical details following table B2 above). Within each village, facilitators selected approximately 50 participants and assigned them to a communication strategy treatment. Both participant selection and treatment assignment were random. Respondents were allocated randomly to 1 of 3 treatment groups (no facilitation, facilitated discussion, and facilitated discussion required to reach consensus), and then to a control group (which included no communication strategy treatment). At the time of selection, facilitators collected responses on a pre-treatment survey that elicited individual responses on demographic information, awareness of climate change, awareness of Village Funds, and preferred Village Fund investment types. To conclude the process, the groups received a post-treatment survey that closely mirrored the pre-treatment survey.

The three treatment groups were given the following treatments:

*Treatment Strategy 1: Video and limited discussion*

A short and entertaining video was screened to show the expected impacts of climate change, followed by the presentation of a localized climate vulnerability profile and a one-hour discussion. The facilitator prompted the group members to consider the potential impacts of climate change on their livelihoods and consider adaptation options. The time allocated for Treatment Group 1 was 60 minutes.

*Treatment Strategy 2: Video, discussion, and voting on Village Fund allocation*

A short and entertaining video was screened to capture the expected impacts of climate change, followed by the presentation of a localized climate vulnerability profile and a one-hour discussion. In this group, the facilitator led a discussion to explain the information and answer the questions. In the discussion, the facilitator prompted group members to discuss and consider the impacts climate changes could have on their livelihoods and to further consider adaptation options. The time allocated to Treatment Group 2 was 75 minutes.

### *Treatment Strategy 3: Video, discussion, and deliberation on Village Fund allocation*

A short and entertaining video was screened to capture the expected impacts of climate change, followed by the presentation of a localized climate vulnerability profile and a one-hour discussion. In this group, the facilitator led a discussion to explain the information and answer questions. The facilitator encouraged group members to consider the impacts that climate change could have on their livelihoods and, further, to consider adaptation options. The facilitator then encouraged the group to reach consensus on adaptation measures for the village. Consensus was not possible in the limited time in all the sessions. However, the conversations moved toward consensus. The time allocated to Treatment Group 3 was 90 minutes.

Following the video, discussion, and deliberation, individuals filled out a post-treatment survey that repeated the questions from the pre-treatment survey. However, for the control group, because its participants did not receive any additional information or facilitation, the researchers assume that their responses did not change.

To analyze the results, the researchers evaluated the impact of treatment strategies on climate change comprehension as well as stated preferences for Village Fund allocation. The researchers evaluated climate change comprehension using binary logistic regression to determine the impact of treatment on selecting the best definition of climate change, as compared to the control group. The researchers then used an ordinal logistic regression model to measure the impact of treatment on changes in selection of the most technically correct definition of climate change. The researchers compared three nested models, each with an increasing number of covariates.

The *Basic Model* regressed selection change between pre- and post-treatment on treatment group. The *Demographic Model* included treatment group as well as demographic covariates, including village, age, sex, education, ethnicity, primary livelihood, and secondary livelihood. The Awareness Model included variables that measure stated awareness of the Village Fund, involvement in Village Fund allocation, and involvement in Village Fund design. The researchers presented all model summaries in appendix B (table B1), and presented on model estimates from Model 3, which was determined to be the best performing model using a Chi-Squared Likelihood Test.

The researchers evaluated changes in the stated preferences for Village Fund allocation using a similar process. The researchers first used binary logistic regression to evaluate the impact of treatment on selecting climate-relevant investment preferences, as compared to the control group. The researchers then used ordinal logistic regression to model the impact of treatment on changes in pre- and post-treatment selection of climate-relevant investment preferences.

For all analyses, the researchers ran multiple models, select which performs best, and evaluate important model assumptions. To analyze climate change comprehension, the researchers used a set of nested models that regresses the outcome of interest first on treatment type (Basic Model), then on treatment type as well as demographic variables (Demographic Model). To analyze Village Fund investment preferences, the researchers ran the Basic Model and the Demographic Model, as well as a model that included stated awareness and involvement in Village Fund procedures (VF Awareness Model). The researchers provided all variable information as well as model output in the supplemental material (appendix B). The researchers evaluated model performance using Likelihood Ratio Tests and



presented estimates from the best performing models in the main text. The researchers assessed all models for multicollinearity using variable inflation factors. For ordinal logistic regression models, the researchers evaluated the assumption of proportionate odds ratios.

**TABLE C.2** Description of Analytic Objective by Model Type

	CLIMATE CHANGE COMPREHENSION	VILLAGE FUND ALLOCATION PREFERENCES (FAMILY)	VILLAGE FUND ALLOCATION PREFERENCES (VILLAGE)
Binary Logistic Regression	Estimates likelihood of selecting the best climate change definition based on treatment group, compared to the control group	Estimates likelihood of including climate-relevant spending within the top three most important investments for a participant's family based on treatment group, compared to the control group	Estimates likelihood of including climate-relevant spending within the top three most important investments for a participant's village based on treatment group, compared to the control group
Ordinal Logistic Regression	Estimates likelihood of changing the selection of the best climate change definition based on treatment group, compared to Treatment 1	Estimates likelihood of including climate-relevant spending within the top three most important investments for a participant's family based on treatment group, compared to Treatment 1	Estimates likelihood of including climate-relevant spending within the top three most important investments for a participant's village based on treatment group, compared to Treatment 1

Source: Dala Institute.

A total of 823 participants completed the pre-treatment survey, of whom 808 had responses that the researchers could analyze. Of the 808 complete responses, 656 individuals participated in one of the treatment strategies. The control and treatment strategy groups varied in average size. The control group was the smallest ( $\bar{x}=10.13$ ), followed by treatment 1 ( $\bar{x}=14.2$ ), treatment 3 ( $\bar{x}=14.3$ ), and treatment 2 ( $\bar{x}=15.3$ ). Our design included sampling *only* women in 4 of the 15 villages to validate that responses from female participants were not biased by responses by male participants. Thus, our study comprised 522 women and 286 men. Figure B2 illustrates participant sex and treatment group distribution by village.

### Summary Findings:

1. *Tailored communication about climate change improves understanding of the causes and risks of climate change.*

The pre-treatment survey showed that most respondents had a limited understanding of what climate change is; some thought the technically correct climate information presented to them were not consistent; and some groups demonstrated more knowledge than others. For example, the people of Toro, Central Sulawesi, even have their own term to describe climate change: *pobalia kadungku uda bo peino eo*, which means “changes in the behavior of rain and sunshine.”

The presentation about climate change delivered in the form of a simple video was well received by participants in all the treatment groups. The respondents related well to the video, with more than two-thirds of respondents saying that the issues raised in the video could be recognized in their villages, too.

*Pre- and post-surveys indicated that video is an effective way to communicate such messages, but that the discussions that took place after the video presentation were key to facilitate greater understanding.* The post-survey showed significant differences in comprehension of the causes and impacts of climate change, with the most significant changes apparent in treatment group 3, who were 55.6 percent more likely than participants in the control group to demonstrate accurate and improved comprehension of climate change. Across participants, after the treatment groups, all had an overall greater awareness of what comprises climate change, and a marked increase in understanding climate change as an overarching pattern and how multi-year events are related to global warming, as well as the linkages to anthropogenic activities.

## 2. Facilitated discussion affects preferences for local development spending.

The research confirmed that climate vulnerability data will inform village spending if it is communicated to villagers in tailored ways.<sup>88</sup> In addition to improving climate change comprehension, discussion and deliberation shifted stated preferences toward Village Fund investments. The presentations about climate change delivered in the form of the simple video were well received by participants in all the treatment groups. However, the discussions that took place after the video presentation were key to facilitate greater understanding, especially toward coming closer to agreements on how to adapt to climate change and how to prioritize village funds. Results were consistent across men and women.

Participants were asked to rank six broad priorities: infrastructure, economic development, social services, natural disaster risk management, environmental priorities, and institution building. Results showed that participants continued to prioritize core development expenditures: rural infrastructure and economic development. However, the groups with more intensive deliberation increased their emphasis on the two categories of spending considered most relevant to the identified risks: disaster preparedness and environmental conservation activities. Participants from Treatment 3 were significantly more likely to include a climate-relevant spending category in their top 3 Village Fund investment priorities. From pre-treatment to post-treatment, relative to the other treatment groups, Treatment 3 participants also were significantly more likely to increase the overall rank of climate risks mitigation/adaptation investments for their villages.<sup>89</sup> Statistically, Treatment 3 participants were 15.9 percent more likely to list climate-relevant spending in their top 3 Village Fund priorities for their families ( $\beta=0.148$ ,  $SE=0.0525$ ), and 12.2 percent more likely to state climate-relevant spending as a top Village fund priority for their villages.

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<sup>88</sup> It is important that the research team did not hold normative views on what villages “should” or “shouldn’t” select in terms of local development budgets because a comprehensive analysis of needs and priorities cutting across sectors was not conducted.

<sup>89</sup> The exercise was a simulation. The results do not reflect what might happen in practice when village budget allocations are outcomes of an array of political economy factors and typically are not decided in participatory or consensus-based fora.

These findings clearly demonstrated increases in the number of participants who prioritized natural disaster risk management and environmental projects, without compromising basic development investments needed in rural areas. Nevertheless, the “core” development issues of infrastructure, economic development, and social services continued to dominate rankings. This is a positive and unsurprising phenomenon considering the importance of these same investments in improving adaptive capacity, and in the relatively low levels of infrastructure and services in many of the treatment villages.<sup>90</sup>

### Detailed Analysis:

Assessing pre-treatment averages for perceptions about climate change demonstrated insignificant differences among group-level averages, as would be expected with randomized participant selection. There is little difference across the three treatment groups in terms of the participants’ concerns with climate change, belief in the intensity of climate change events, views regarding village preparedness for climate change, and the likely impacts of climate change on individual livelihoods. Appendix 1 contains plots that illustrate the similarity in climate change comprehension across treatment groups.

To ascertain climate change comprehension, the researchers evaluated group-level differences in selecting statements that best define climate change. In the post-treatment surveys, all the statements saw an increase in selection, including technically incorrect statements. However, the distribution in increases among treatment groups for a given statement varied. For example, the technically incorrect statement defining climate change as “There is more or less rain than the year before” increased in selection across all treatment groups. However, Treatment 2 participants demonstrated the greatest increase in selecting that incorrect statement between the pre- and post-survey.

For the technically correct information on the “overarching patterns that define weather in a place over several years,” participants in Treatment 3 demonstrated the greatest increase in selection between pre- and post-treatment surveys. The researchers further analyzed pre- and post-treatment selection of this statement since it best reflects comprehension of climate change.

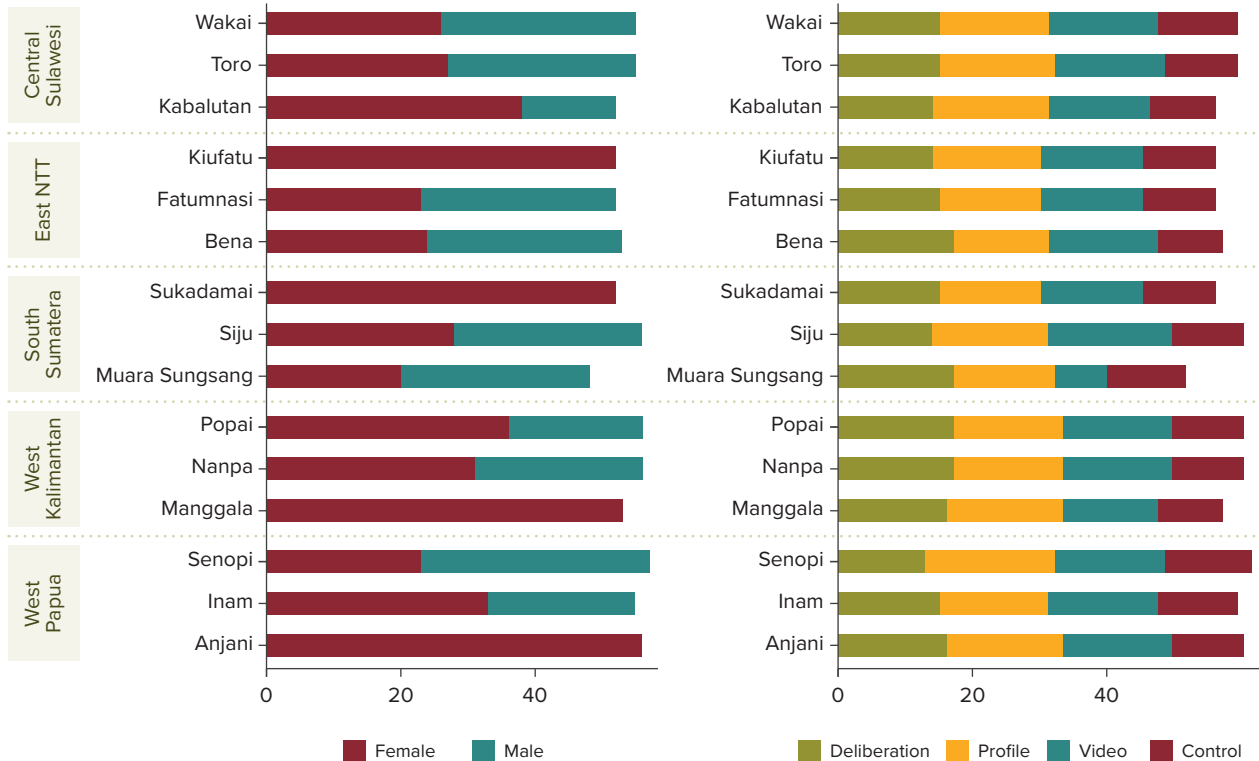
Modeling the impacts of treatment on climate change comprehension reveals significant increases in the likelihood of selecting the best definition of climate change for participants in all treatments. The Demographic Model provided the best fit. It estimated that a participant in Treatment 3 was 55.6 percent more likely to select the best definition of change as compared to the control group ( $\beta=0.442$ ,  $SE=0.05$ ). Participants in Treatment 2 were 35 percent more likely to select the best statement ( $\beta=0.4$ ,  $SE=0.49$ ), followed by participants in Treatment 1, who were 30.7 percent more likely ( $\beta=0.268$ ,  $SE=0.049$ ). All variable inflation factors were below 2, and the Basic and the Demographic Models demonstrated similar significance, magnitude, and direction of coefficients (appendix B).

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<sup>90</sup> The team is not surprised that, in the selected villages in which poverty levels were relatively high and coverage of services and infrastructure relatively low, infrastructure and economic development priorities maintained their positions as critical priorities. Rather, the experiment was designed to test changes in stated preferences based on changes in comprehension of future risks.

Modeling the impact of treatment on changes in climate change comprehension revealed significant increases in the likelihood that, between pre- and post-treatment, a participant in Treatment 3 would change her/his response to select the best definition of climate change. The Demographic Model provided the best fit and estimated that a participant in Treatment 3 was 95.8 percent more likely to have changed her/his response in the post-treatment survey to select the best definition of climate change ( $\beta=0.672$ ,  $SE=0.227$ ). This finding also indicates that participants in Treatment 3 were 95.8 percent less likely to have unselected the best definition of climate change. All variable inflation factors were below 2. The proportionate odds assumption was met; and the Basic and Demographic Models demonstrated similar significance, magnitude, and direction of coefficients (appendix B).

**FIGURE C.2** Participant Sex (A) and Group Allocation (B) by Village, Grouped by Province



Source: Analysis based on Facilitated Communication of Climate Vulnerability carried out by Dala Institute.

Compared to the control group, participants in Treatment 3 were significantly more likely to select climate-relevant spending as a top Village Fund investment priority for their families as well as for their villages. The Demographic Model provided the best fit for evaluating both family and village preferences. Treatment 3 participants were 15.9 percent more likely to list climate-relevant spending as a top Village Fund priority for their families ( $\beta=0.148$ ,  $SE=0.0525$ ). In addition, Treatment 3 participants were 12.2 percent more likely to state climate-relevant spending as a top Village fund priority for their villages ( $\beta=0.115$ ,  $SE=0.0530$ ). All variable inflation factors were below 2; and the Basic and Demographic Models demonstrated similar significance, magnitude, and direction of coefficients (appendix B).

Modeling the impact of treatment on changes in selecting climate-relevant spending as important for a participant's village reveals increases the likelihood that a participant changed to rank climate spending as more important for participants in Treatment 3. Participants in Treatment 3 were 65.1 percent more likely to select 1-unit increases in the rank for climate-relevant spending ( $\beta=0.502$ ,  $SE=.211$ ). However, there were no significant impacts of Treatment 2 or Treatment 3 on changes in ranking climate relevance as a top investment category for the Village Fund. All variable inflation factors were below 2; the proportionate odds assumption was met; and The Basic and Demographic Models demonstrated similar significance, magnitude, and direction of coefficients (appendix B).



## APPENDIX D

# SOCIAL DIMENSIONS OF COAL TRANSITION STUDY

This qualitative study had three high-level objectives: (1) to understand the social impacts of the transition; (2) to understand how to promote community participation in decision-making, including how communities can be supported during the transition and empowered to participate in transition planning; (3) to support the coal transition dialogue among all stakeholders, particularly community groups and the Government of Indonesia.

To obtain an in-depth understanding of the differences and similarities in social dynamics and responses to coal transition, the study team selected two study sites. Field sites were selected to include a collection of indicative and extreme responses to the impact of the coal transition using a maximum variation approach. In this approach, the units are chosen to represent the full range of characteristic interests as well as being based on practical considerations such as the availability of representatives on the ground. South Sumatra and East Kalimantan were selected as the two study sites. South Sumatra and East Kalimantan have the highest coal production on their respective islands but transport their coal using different modes. East Kalimantan uses trucks and boats. Sumatra uses primarily rail and then ships. Other provinces with bigger production histories than Sumatra's all are located in North and South Kalimantan. Approximately 35 percent of East Kalimantan's gross regional domestic product comes from coal and mining, followed by South Kalimantan (17.4 percent), North Kalimantan (17.6 percent) and South Sumatra (7.8 percent).

In East Kalimantan, the study team chose two regencies, East Kutai and Kutai Kartanegara. The Indonesia Database for Policy and Economic Research cites both regencies as having generated 82 percent and 70 percent, respectively, of their total GDP in 2020 from the mining and quarrying sectors. In South Sumatra, the team selected another two regencies: Muara Enim and Lahat. The Indonesia Database for Policy and Economic Research states that, in 2020, these 2 regencies had the highest percentage of GDP in the mining and quarrying sector, 58 percent and 59 percent, respectively. Multiple companies across these 2 provinces and 4 regencies were identified as open to being consulted and participating in this study.

This study collected data from different sources, including surveys and workshops. Three surveys involved the public sector represented by 12 civil society groups, the private sector represented by 14 coal-mining companies, and 100 respondents from the public. In total there were 5 workshops: 2 design workshops at the national level for coal-mining companies and for the public sector including government agencies; 2 subnational workshops in South Sumatra and East Kalimantan that involve provincial and regency governments, and 2 village workshops in South Sumatra and East Kalimantan.

The study team conducted 2 field visits that involved 2 researchers and 1 facilitator from a local partner. Field visits took 9-10 working days in each province including travel time. During the field work, the study team conducted one subnational workshop at the provincial level. In response to matters between national and subnational governments, the study team invited regency government representatives to attend the provincial-level workshop. The researchers and the facilitators conducted a scenario-building exercise to elaborate what would happen if particular conditions were present, drawing from the examples of mining closures. This method enabled the identification of predictive counterfactuals because, in communities in two locations, many of the social impacts of transitions away from coal have not yet been experienced.

The study also used online surveys that provided comparability with the information obtained from the two provinces in the case studies. These online surveys covered 14 regencies to exhibit the (1) indicative transitions that the companies have organized in response to the coal phasedown agenda; (2) companies' plans for their employees; and (3) social and environmental measures related to transitions. The online surveys also covered NGOs' views; social issues related to social impacts of mining closures; and the voices of civil societies regarding their perceptions of just transition, gender, and citizens' aspirations.

## APPENDIX E

## REGULATORY REVIEW

The regulatory review was based on desk reviews of regulations and documents related to local climate actions in Indonesia. Given the large scale of analysis needed to cover regulations related to local climate actions, the researchers narrowed the scope by carefully selecting priority regulations that focus on (1) Indonesia's commitments to mitigation and adaptation; (2) village governance; (3) key sectors, which include forestry, marine and coastal resources management, energy, and land and spatial planning; and (4) selected cases of subnational governments' regulatory initiatives related to climate mitigation and adaptation.

Initially, approximately 120 regulations were screened out. After an examination of these 120 regulations, 77 regulations/policies were reviewed more closely for additional analysis. The regulatory analysis was complemented with reviews of literature and reports and informal discussions with experts to examine challenges in implementing the policies and regulations.

For village governance, the review focused on Village Law (Law 6/2014) and decrees on Village Fund budget allocation. The Law significantly increases village governments' autonomy to plan and manage village development and establishes a legal and financial foundation for villages to contribute to Indonesia's rural development. The Law also includes provisions on climate actions and emphasizes communities' participation in climate mitigation and adaptation. Three sets of provisions within the Law relate to climate actions:

- 1. Local natural resources management.** The village government's role to ensure that the village development program and activities are carried out sustainably.<sup>91</sup>
- 2. Infrastructure development.** The village government's role to provide basic needs, facilities, and village infrastructure (Article 78). Although the provision does not specifically address climate resilient infrastructure, it could be used for climate resilient infrastructure.
- 3. Community participation in development activities.** Several provisions emphasize the communities' roles in the overall village governance processes, including village development planning and implementation. These provisions highlight the principles of self-governance. The Law also includes a provision on communities' participation in environmental preservation (Article 68: 2).

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<sup>91</sup> Principle 10 of village development, Annex "Explanation." The detailed provision on local government's role is stipulated in GR No. 43/2014 regarding the implementation of Village Law (Law 6/2014). Article 127 states, "The government, provincial regional government, district/city regional government, and village government make efforts to empower village communities."

Reviewing the decrees on Village Fund budget allocation in 2015-22, this review finds that, despite some variations over the years, the decrees include priority allocation related to local climate actions. Priority allocation covers four areas: (1) sustainable resource management (2) environmental protection, (3) renewable energy generation, and (4) disaster risk reduction.

Sustainable resource management has been included in the relevant regulations since the first year of Village Fund implementation in 2015. Environmental protection and renewable energy generation were first mentioned the following year (2016). Since 2017, disaster risk reduction has been explicitly stated in the spending priority of Village Fund. This continuing shift in Village Fund priority allocation demonstrates the increasing recognition of climate-related issues and the role of local actors in addressing them.

**TABLE D.1** Relevant Regulations of Village Government

THEME	REGULATION	DESCRIPTION
Overarching regulation on sustainable natural resource management in village	Law No. 6 Year 2014 regarding Village	<ul style="list-style-type: none"> <li>• <b>Article 78:</b> Village development aims to reduce poverty and improve the quality of life and the welfare of the community through providing basic needs, improving village facilities and infrastructure, developing local economic potential, and sustainably using natural resources and the environment. <b>Article 26 (4):</b> One role of a Village Head is to unfold the village's natural resources potential and promote environmental protection.</li> </ul>
Infrastructure development	Law No. 6 Year 2014 regarding Village – Article 78(1)	<ul style="list-style-type: none"> <li>• <b>Article 78 (1):</b> Objectives of village development include improving people's welfare and quality of life, eradicating poverty through providing basic needs, village facilities and infrastructure development, enhancing local economic potential, and sustainably managing resources.</li> </ul>
	Home Affair Regulation No. 114/2014 regarding Village Development Guideline	<ul style="list-style-type: none"> <li>• <b>Article 41 (3):</b> To date, no regulation standardizes the quality of village infrastructure. However, MoHA Regulation 114/2014 suggests that village governments seek technical expertise to ensure the quality of village construction. Expertise could come from village community members, government officers in charge of development infrastructure at district levels, and/or professional assistants.</li> <li>• <b>Article 73:</b> Experts who are community members should be prioritized.</li> </ul>
	Ministry Home Affair Regulation No 114/2014 on Village Development Guideline	<ul style="list-style-type: none"> <li>• <b>Article 85:</b> Community participation in village development is carried out during the planning, implementing, and reporting. Monitoring in the planning stage is carried out by assessing the preparation of the Village RPJM (village medium-term development plan) and Village RKP (village government action plan). Monitoring in the implementation stage is carried out by assessing, among others, procurement of goods and/or services, procurement of goods and materials, procurement of staffpower, managing financial administration, delivering goods/materials, paying wages, and quality of results of village development activities.</li> </ul>

TABLE D.1 *continued*

THEME	REGULATION	DESCRIPTION
		<ul style="list-style-type: none"> <li>• <b>Article 82:</b> In the reporting stage, the village community could provide inputs to the village development implementation report.</li> </ul>
	Strategic Plan Document and letter of Directorate General of Citra Kerja, Ministry of Public Work and Public Housing (PUPR) regarding community-based infrastructure program and technical guidelines to implement community-based infrastructure	<ul style="list-style-type: none"> <li>• The Strategic Plan is part of the PUPR program for community-based infrastructure. The Plan focuses on the following areas: water supply, sanitation, waste management, development of regional socioeconomic infrastructure and City without Slums Program. Community groups can lead the planning, preparation, implementation, monitoring, and evaluation. A facilitator and a consultant from the provincial and/or central government will assist the community groups throughout the construction.</li> </ul>
Community participation	Law No. 6 Year 2014 regarding Village	<p>The Law includes provisions that emphasize communities' participation in the overall development processes and governance at the village level, including those related to climate change. These provisions cover key elements related to community participation:</p> <ul style="list-style-type: none"> <li>• Emphasis on communities' empowerment in participating and engaging in the development processes and in village government's authority for self-governance</li> <li>• <b>Article 68:2:</b> Obligation for village community to seek self-development and to preserve the environment within the village</li> <li>• <b>Article 68:2:</b> Communities' roles and rights in monitoring village development to enhance transparency and accountability of village government</li> <li>• <b>Article 82</b> Communities' rights to receive information and monitor overall development process and oblige village governments to disseminate the full report on planning and implementation through the Village Deliberation Forum</li> <li>• <b>Articles 61-63:</b> Village Deliberation Forum (BPD) functions include soliciting and analyzing information from the village government, proposing draft village regulations, channeling community aspirations, general oversight, and ensuring the application of democratic principles and gender equity.</li> </ul>
Village Fund allocation	MoV Decree on spending priority allocation for year 2015 (Permendes 5/2015)	<ul style="list-style-type: none"> <li>• <b>Article 5:</b> Poverty alleviation through (a) fulfilling basic needs (b) developing physical infrastructure (c) developing local economic potential and (d) sustainably using natural resources. Some activities are allowed to be proposed that relate to climate actions: physical infrastructure, renewable energy generation, sustainable use of natural resources.<sup>a</sup></li> </ul>



**TABLE D.1** *continued*

THEME	REGULATION	DESCRIPTION
	MoV Decree on spending priority <sup>b</sup> allocation for year 2016 (Permendes 8/2016)	<ul style="list-style-type: none"> <li>• <b>Article 6:</b> Poverty alleviation through building, development, and maintenance of (a) physical infrastructure for livelihoods, food security, and housing; (b) healthcare facilities; (c) education, social, and cultural facilities; (d) infrastructure that enhances economic activities including production and distribution; and (e) renewable energy infrastructure and environment and protection.</li> <li>• Permitted activities related to climate action: Physical infrastructure, sustainable use of NR, village forest management, and waste management.</li> </ul>
	MoV Decree on spending priority allocation for year 2017 (Permendes 22/2016)	<ul style="list-style-type: none"> <li>• <b>Article 4-7:</b> Allocation divided in 2 categories: (a) Village development, mostly of physical infrastructure and maintenance, including renewable energy generation, disaster and other unprecedented event risks prevention facility, and environmental conservation; and (b) community empowerment, including capacity building for environmental protection and disaster risk reduction.</li> <li>• Provision for climate action: Renewable energy infrastructure and environmental protection.</li> </ul>
	MoV Decree on spending priority allocation for year 2018 (Permendes 19/2017)	<ul style="list-style-type: none"> <li>• <b>Article 4-8:</b> Priority spending categories and items remain unchanged. However, there is increased emphasis on community participation, democratization, and transparency in planning, implementation, and monitoring of VF spending.</li> <li>• Provision for climate action: Support environmental conservation activities and preparedness for facing and handling natural disasters.</li> </ul>
	MoV Decree on spending priority allocation for year 2019 (Permendes 16/2018)	<ul style="list-style-type: none"> <li>• <b>Article 4-8:</b> Most spending categories and items remain unchanged. Added are stunting prevention activities in (Article 6), some emphasis on the accountability aspect of VF spending (Article 13) regarding open reporting of VF spending, and Article 21-22 regarding grievance/complaint mechanism.</li> <li>• Provision for climate intervention: Support environmental conservation activities and preparedness for facing and handling natural disasters.</li> </ul>
	MoV Decree on spending priority allocation for year 2020 (Permendes 11/2019)	<ul style="list-style-type: none"> <li>• <b>Article 5-11:</b> All items from previous year priority allocation remain the same. Increases are in stunting prevention and healthcare allocation with emphasis on developing human capital and labor opportunities. Development of information technology starting to get attention.</li> <li>• Provision for climate action: Remains the same as previous two years. However, allocation for climate change mitigation and adaptation is written explicitly in the annex as one example of VF priority spending.</li> </ul>

TABLE D.1 *continued*

THEME	REGULATION	DESCRIPTION
	MoV Decree on spending priority allocation for year 2021 (Permendes 13/2020 )	<ul style="list-style-type: none"> <li>• <b>Article 6:</b> Responding to COVID 19 impacts, the allocation of VF in 2021 should focus on (a) economic recovery, (b) national priority programs, (c) adaptation to a "new normal," and (d) climate action: Mitigation of, and adaptation to, disasters, electrification and sustainable natural resource use for economic recovery to achieve Village SDGs.</li> </ul>
	MoV Decree on cash transfer. Provision for spending priority allocation for year 2022 (Permendes 7/2021)	<ul style="list-style-type: none"> <li>• <b>Article 6:</b> Allocation should focus on (a) economic recovery, (b) national priority programs, (c) mitigation of, and adaptation to, disasters, and (d) cash transfer.</li> <li>• Provision for climate action: No change (see 2021).</li> </ul>
	MoV Decree on spending priority allocation for year 2023 (Permendes 8/2022)	<ul style="list-style-type: none"> <li>• <b>Article 6:</b> Allocation should focus on (a) economic recovery, (b) national priority programs, (c) mitigation of, and adaptation to, disasters, and (d) cash transfer.</li> </ul> <p>In addition, 2023 regulation includes guidelines to achieve village food security through sustainable farming practices.</p> <p>Provision for climate action: No change (see 2021 and 2022).</p>

Source: Based on Regulatory Review carried out by the authors.

Notes:

a The budget for activities financed by the Village Fund is regulated by the Indonesia Government State Budget (Anggaran Pendapatan dan Belanja Negara, or APBN). Depending on the category under which the activity falls, the maximum amount of budget will vary based on the earmarking. For example, in 2023, if the village government proposes a renewable energy generation, it may fall into a "national priority program" in the MoV decree but into an "other priority allocation" category in the state budget/APBN (as stipulated in GR 130/2022 regarding APBN breakdown), which accounts for 32% of the Village Fund.

b Setting priorities for the use of Village Funds is carried out after coordinating with those who administer government affairs for national development planning, including the Minister of Home Affairs and technical ministers/heads of nonministerial government agencies (GR 22/2015, Article 21).

To facilitate local climate actions, it is important for communities and subnational governments to establish linkages with cross-sectoral regulations that could facilitate locally led community actions related to climate mitigation and adaptation. Such linkages will enable the communities and subnational governments to develop comprehensive multisectoral approaches to local climate actions and access to resources, and ensure environmental integrity. Given the large scale of regulatory reviews to be carried out in the sector, the researchers narrowed the scope by focusing on selected regulations in key sectors: forestry, marine and fisheries, land and spatial planning, energy, and agriculture and water.

**TABLE D.2** Selected Key Sector Regulations

SECTOR	REGULATION	DESCRIPTION
Forestry	MoEF Regulation No. 83/2016 regarding social forestry and MoEF Regulation No. 9/2021 regarding management of social forestry	<ul style="list-style-type: none"> <li>Promote the social forestry program as an integrated forest management system implemented primarily by communities, indigenous people, and forest farmers group. Goals are to reduce poverty, improve community welfare, and protect forests from degradation and land conversion.</li> </ul>
	MoEF Regulation No, 46 on Environmental Economic Instruments	<ul style="list-style-type: none"> <li>Covers various forms of environmental economic instruments to encourage and incentivize various stakeholders (government, private sectors, communities) to carry out effective, efficient environmental management and boost public compliance with precautionary principles and environmental sustainability. Includes provisions on financial incentives to empower subnational governments and communities to carry out sustainable environmental management, explicitly through payments for ecosystem.</li> </ul>
	MoEF Regulation No. 4/2019 regarding guidance to identify ecosystem-based climate adaptation	<ul style="list-style-type: none"> <li>Is meant to guide central government's responsibility for climate mitigation but also can be used by subnational governments, universities, NGOs, and other stakeholders (Appendix, section 1.c.). Regulation mentions that the adaptation plan should be informed by a provincial-government-generated "biodiversity profile" document, as stipulated in Permen KLHK 29/2009, and by other ecological attributes of the region.</li> </ul>
	Law No.32/2009 on Protection and Management of Environment	<ul style="list-style-type: none"> <li>Acknowledges the changes in decentralized governance and the importance of community involvement in planning environmental management. Law also acknowledges traditional communities' local environmental management customs. However, this law strongly emphasizes that environmental management is a governmental affair and that community involvement is limited to monitoring, giving suggestions or complaints, and reporting cases.</li> </ul>
	MoEF Regulation 3/2016 on Forest and Land Fire Management	<ul style="list-style-type: none"> <li>Includes provisions related to community forest fire brigades (<i>Masyarakat Peduli Api</i>) that encourage communities to participate actively in forest and land fire management and provide capacity building activities for communities.</li> </ul>

TABLE D.2 *continued*

SECTOR	REGULATION	DESCRIPTION
	MoEF Regulation 11/2016 on Climate Village Program ( <i>Program Kampung Iklim/ Proklam</i> )	<ul style="list-style-type: none"> <li>• Issued to enhance communities' and stakeholders' participation in climate adaptation and mitigation at the village level.</li> <li>• <i>Proklam</i> includes three components of activities: (a) climate change adaptation to control drought, floods, and landslides; increase food security; anticipate sea level rise; and control climate-related diseases; (b) climate change mitigation activities, including waste and waste management, use of new and renewable energy, energy conservation and saving, low GHG emission agricultural cultivation, increasing vegetation cover, and preventing and overcoming forest and land fires; (c) institutional development and support for the sustainability of activities</li> </ul>
<b>Marine and Fisheries</b>	Law No.27/2007 regarding Management of Coastal Area and Small Islands	<ul style="list-style-type: none"> <li>• Article 4: "Objective 1: Protecting, conserving, rehabilitating, using, and enriching Coastal and Small Islands Resources and their ecological system[s] in a sustainable manner."</li> <li>• Article 3: Sustainability is the first principle in the Management of Coastal Area and Small Islands, as written in Article 3 of the Act. Law promotes community participation (7th principle in Article 3) and better cooperation among stakeholders (5th principle in Article 3) by requiring local governments to develop management plans with support from their communities. Law also acknowledges local customs and traditions including customary institutions in the area, and they must be considered in the development plan (principle of equality, decentralization, and fairness, Article 3).</li> </ul>
	Ministry of Marine and Fisheries (MoMF) Decree 58/2001 on Procedures for the Implementation of the Community Monitoring System in the Management and Usation of Fisheries and Procedures for the Implementation of Marine Resources	<ul style="list-style-type: none"> <li>• Minister Decree includes provisions to engage and empower communities for marine monitoring by developing Community-Based Monitoring System.</li> </ul>

TABLE D.2 *continued*

SECTOR	REGULATION	DESCRIPTION
	Law No. 45/2009 and Law No.31/2004 on Fisheries	<ul style="list-style-type: none"> <li>Regulates fishery management, which includes fishing and aquaculture practices; and prohibits illegal fishing by explaining the illegal fishing gear and fishing methods, penalty, and fisheries court system in Indonesia. Law underlines the decentralization model and acknowledges the local customs and tradition in the fisheries community. Law allows limited community involvement in monitoring and fisheries surveillance.</li> </ul>
	MoMF Decree 47/2017 regarding LPP WPP as Management Authority in WPP Area	<ul style="list-style-type: none"> <li>Decree regulates the establishment of the Fisheries Management Institution (<i>Lembaga Pengelola Perikanan</i>, or LPP) in Fisheries Management Areas (<i>Wilayah Pengelolaan Perikanan</i>, or WPPs). Fisheries Management Areas are defined based on an area's characteristics, diversity of fisheries resources, marine topography, seafloor morphology, and Indonesian maritime boundaries. Therefore, the WPPs are characterized as transboundary, which could be cross-village, cross-district, and/or cross-province.</li> <li>In contrast, the LPP is an independent nonstructural agency specifically mandated to coordinate and recommend sustainable fisheries practices in WPPs. This institution enables broader range of stakeholders, including communities, to engage and shape the management of WPPs.</li> </ul>
	Law 7/2016 on Protection and Empowerment of Fishermen, Fish Raisers, and Salt Farmers	<ul style="list-style-type: none"> <li>Law provides for the protection and empowerment of fishers, fish raisers, and salt farmers. Law's scope encompasses planning, protection, empowerment, funding and financing, supervision, and public participation.</li> <li>Law establishes the requirements to benefit from financial assistance to perform fisheries, aquaculture, and salt exploitation activities. S</li> <li>Law aims to employ infrastructure and facilities to develop related businesses; implement sustainable development; improve capabilities of fishers, fish raisers, and salt farmers; strengthen institutional framework and develop the principles of environmental conservation; develop financing system; protect above-mentioned workers against the risks of natural disaster, climate change, contamination, and others.</li> </ul>



TABLE D.2 *continued*

SECTOR	REGULATION	DESCRIPTION
	MoMF Decree 93/2020 regarding Marine Tourism Village	<ul style="list-style-type: none"> <li>• Decree encourages eligible villages to apply to be recognized by the Indonesian government as a “Marine Tourism Village/<i>Desa Wisata Bahari/Dewi Bahari</i>.”</li> <li>• Article 2: Describes that <i>Dewi Bahari</i> recognition permits the village government to (a) improve economic added value through use of ecosystem services, (b) improve the residential area environment and ecosystem rehabilitation, (c) improve community awareness in managing and using coastal and marine resources, and (d) preserve maritime cultures. Funding is available for this recognition to be allocated to develop <i>Dewi Bahari</i> village tourism. This funding is sourced from the Indonesia Government State Budget, Local Government Budget, and village budget.</li> </ul>
<b>Land and Spatial Planning</b>	Law 26/2007 regarding spatial planning	<ul style="list-style-type: none"> <li>• Article 48: One objective of village-area planning is to ensure ecological conservation and sustainable natural resource use. Another objective is to seek community empowerment, food security, cultural heritage protection, and rural-urban balanced development.</li> <li>• Article 65: Acknowledges community participation in 3 aspects: planning, usation, and control of spatial planning.</li> <li>• Government Regulation No. 68/2010: Form and Procedure of Community's Role in Spatial Planning describes avenues by which communities can provide input regarding (a) preparation of spatial planning, (b) determination of regional or area development, (c) identification of regional development potentials and problems, (d) formulation of spatial planning conception, and/or (e) stipulation of spatial planning (Article 6a).</li> </ul>
	Presidential Regulation on Agrarian Reform (TORA) 86/2018	<ul style="list-style-type: none"> <li>• TORA regulates agrarian reform. TORA includes land certification and distribution to solve land tenure conflicts. For example, in tenurial conflicts in state forest areas, the regulation includes provisions that allow releasing the state forest areas in which the communities have long lived and settled.</li> </ul>
<b>Energy</b>	MEMR Regulation No. 38/2016 regarding rural electrification using renewable sources	<ul style="list-style-type: none"> <li>• Regulation facilitates regional enterprises and cooperatives to develop small-scale power plants with maximum capacity of 50 megawatts in small villages, outer islands, borders, and other regions with limited basic infrastructure.</li> </ul>

TABLE D.2 *continued*

SECTOR	REGULATION	DESCRIPTION
	MEMR Regulation 26/2021 on Rooftop Solar Power Plant Connected to the Electricity Grid for Public Interest License Holder	<ul style="list-style-type: none"> <li>Regulation facilitates domestic solar uptake. It includes a provision that enables customers of the state utility company/PLN and beyond to export excess electricity from their rooftop photovoltaic systems to the national grid at an exchange tariff of 100 percent of applicable tariff.</li> </ul>
	MEMR Regulation 25/2018 on Mineral and Coal Mining Business	<ul style="list-style-type: none"> <li>Regulation includes a provision related to community development and empowerment (Chapter XII, article 38). Regulation requires the mining companies to develop and implement a master plan for community development and empowerment during the production and post-mining closure.</li> </ul>
<b>Agriculture and Water Resources</b>	Ministry of Agriculture Regulation 15/2015 regarding technical guideline to achieve "Desa Mandiri Pangan/food self-sufficient village"	<ul style="list-style-type: none"> <li>Regulation emphasizes importance of responsible/sustainable natural resource usation (p 19).</li> <li>Furthermore, MoV Regulation 82/2022 issued guidelines to achieve village food security that rules the use of sustainable farming practices as described in Village SDGs.</li> </ul>
	Law 17/2019 regarding Water Resources (Water Resource Law)	<ul style="list-style-type: none"> <li>Articles 15-17: Village governments are responsible to assist regional/national governments in water management in villages and maintenance of water resources management, as well as encourage communities' initiative and participation in water resources management.</li> </ul>
	Law 19/2013 on Farmers' Protection and Empowerment	<ul style="list-style-type: none"> <li>Law stipulates providing extension services and farmer insurance to help farmers cope with various issues (access to market, agricultural production issues, failed crops, and climate change impacts).</li> <li>Law also includes provisions to empower farmers with training, scholarships for agricultural education, and financial support to agricultural businesses.</li> </ul>
	Ministry of Agriculture Regulation No. 39/2018 regarding Early Warning System and Climate Change Impacts Management in Agriculture	<ul style="list-style-type: none"> <li>Regulation defines measures of the early warning system and climate change impact management in agriculture.</li> <li>Article 11: Measures include the government's responsibilities to develop the system. They provide a range of assistance from infrastructure development and rehabilitation assistance to compensation of depopulated livestock or livestock destroyed in the cut test to agricultural insurance.</li> <li>Articles 13, 14: Other provisions assist farmers through disseminating information and providing technical guidance, education, and training.</li> </ul>

Source: Based on Regulatory Review carried out by the authors.

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