

Law in the Age of Climate Change: Protecting the Livelihood Rights of Coastal Communities in Indramayu Regency

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Abstract

Climate change increases the vulnerability of coastal communities through sea-level rise, coastal erosion, changing weather patterns, and declining natural-resource productivity. Communities dependent on fisheries and coastal resources face not only economic risks but also legal uncertainty concerning the protection of their livelihoods. This study aims to examine the capacity of existing legal frameworks to protect the livelihood rights of coastal communities in Indramayu Regency in the context of climate change. The study employs a socio-legal approach combining analysis of environmental and coastal regulations with empirical research involving local communities and government institutions. Particular attention is given to the relationship between climate-adaptation policies, social protection, coastal governance, and community participation. The study argues that adaptation policies are insufficient when they focus primarily on infrastructure development and physical risk reduction. Legal protection should also address livelihood sustainability, access to resources, information, participation, and effective remedies when adaptation policies negatively affect local communities. A rights-based approach can strengthen the legitimacy of climate-adaptation policies while ensuring that vulnerable coastal populations do not bear disproportionate adaptation burdens. The study therefore contributes to the development of climate governance that integrates environmental resilience with social justice and community rights.

[Perubahan iklim meningkatkan kerentanan masyarakat pesisir melalui kenaikan permukaan laut, erosi pantai, perubahan pola cuaca, dan penurunan produktivitas sumber daya alam. Masyarakat yang bergantung pada perikanan dan sumber daya pesisir menghadapi tidak hanya risiko ekonomi tetapi juga ketidakpastian hukum terkait perlindungan mata pencaharian mereka. Studi ini bertujuan untuk menguji kapasitas kerangka

hukum yang ada untuk melindungi hak mata pencaharian masyarakat pesisir di Kabupaten Indramayu dalam konteks perubahan iklim. Studi ini menggunakan pendekatan sosial-hukum yang menggabungkan analisis peraturan lingkungan dan pesisir dengan penelitian empiris yang melibatkan masyarakat lokal dan lembaga pemerintah. Perhatian khusus diberikan pada hubungan antara kebijakan adaptasi iklim, perlindungan sosial, tata kelola pesisir, dan partisipasi masyarakat. Studi ini berpendapat bahwa kebijakan adaptasi tidak cukup jika hanya berfokus pada pengembangan infrastruktur dan pengurangan risiko fisik. Perlindungan hukum juga harus mencakup keberlanjutan mata pencaharian, akses terhadap sumber daya, informasi, partisipasi, dan solusi efektif ketika kebijakan adaptasi berdampak negatif terhadap masyarakat lokal. Pendekatan berbasis hak dapat memperkuat legitimasi kebijakan adaptasi iklim sekaligus memastikan bahwa penduduk pesisir yang rentan tidak menanggung beban adaptasi yang tidak proporsional. Oleh karena itu, penelitian ini berkontribusi pada pengembangan tata kelola iklim yang mengintegrasikan ketahanan lingkungan dengan keadilan sosial dan hak-hak masyarakat.]

Keywords: climate change, coastal communities, livelihood rights, adaptation, legal protection

Introduction

Climate change has transformed the meaning of environmental vulnerability for coastal communities. Coastal populations experience climate risks through multiple and interacting pathways, including sea-level rise, tidal flooding, coastal erosion, changes in marine ecosystems, extreme weather, and saltwater intrusion. These environmental processes are not experienced equally because vulnerability depends upon social, economic, institutional, and political conditions. Communities with limited financial resources and high dependence on fisheries or coastal agriculture may have fewer opportunities to diversify their livelihoods or recover after climate-related disasters. Climate adaptation must therefore be understood not simply as a technical response to physical hazards but as a process that redistributes opportunities, risks, and burdens across society (Adger et al. 2003). This perspective is particularly important for legal scholarship because adaptation policies may themselves create consequences for property, access to resources, livelihood security, and community participation.

Indonesia's coastal communities occupy a particularly important position within climate governance. As an archipelagic state with extensive coastal settlements and resource-dependent populations, Indonesia faces significant exposure to climate-related coastal hazards. Existing legal frameworks address environmental protection, spatial planning, disaster management, coastal management, fisheries, and climate policy through multiple sectoral instruments. However, fragmented regulatory structures can make it difficult to identify how

livelihood protection should be integrated into adaptation policy. Nurhidayah and McIlgorm (2019) argue that Indonesia's adaptation framework has historically emphasized sectoral and structural responses while providing insufficient attention to the social-justice implications of adaptation. This observation raises an important legal question: when adaptation measures alter access to coastal space or resources, what mechanisms ensure that vulnerable communities do not disproportionately bear the costs?

Indramayu Regency provides a significant setting for examining this problem. Located on the northern coast of West Java, Indramayu contains communities whose livelihoods depend on fisheries, aquaculture, agriculture, salt production, and other resource-based activities. Empirical research has documented substantial social and economic vulnerability among coastal communities in the region. A study of coastal fish-farming communities in Indramayu found high vulnerability to tidal flooding, with vulnerability shaped by income, education, household conditions, local knowledge, government support, and previous disaster experience. The research also found that repeated flooding can force households into debt when they need to repair damaged productive assets, creating cycles of economic vulnerability. These findings demonstrate why climate adaptation must address socioeconomic capacity rather than physical exposure alone.

Climate change also affects livelihood strategies by forcing households to diversify economic activities. Recent research specifically examining Indramayu communities reports declining fish catches, extreme weather, seawater intrusion, and associated livelihood changes, with communities responding through economic diversification, tourism-related activities, collective action, and environmental rehabilitation. Such adaptation demonstrates community agency, but it should not be interpreted as evidence that government intervention is unnecessary. Individual and collective adaptation can be constrained by unequal access to capital, information, technology, infrastructure, markets, and institutional support. Law consequently has an important role in creating the conditions under which adaptive strategies become feasible and equitable.

The concept of livelihood rights provides a useful normative foundation for this analysis. Livelihood protection encompasses more than the preservation of income. It includes access to natural resources, opportunities to work, security of productive assets, access to information, participation in decisions affecting economic activities, and protection against arbitrary or disproportionate state intervention. A rights-based approach also requires recognition of vulnerable groups whose ability to adapt is constrained by socioeconomic conditions. Schlosberg (2012) argues that climate justice should incorporate capabilities, recognition, vulnerability, and participation rather than focusing solely on the distribution of environmental benefits and burdens. For coastal communities, this means that adaptation policies should protect their capacity to sustain dignified lives while responding to genuine environmental risks.

The relationship between adaptation and justice becomes especially important when government intervention involves retreat, relocation, coastal infrastructure, ecosystem restoration, zoning restrictions, or changes in access to marine resources. Such measures may reduce physical risks but simultaneously disrupt existing livelihoods. An adaptation project can therefore become maladaptive if its benefits accrue to one group while its costs are concentrated among another. Eriksen et al. (2021) emphasize that adaptation processes can reproduce existing inequalities when underlying social and political structures are not addressed. Legal institutions should consequently evaluate not only whether an adaptation policy is technically effective but also whether its distributional consequences are fair.

This study asks three principal questions. First, how does the Indonesian legal framework regulate climate adaptation and coastal-resource management in ways relevant to livelihood protection? Second, what forms of vulnerability and adaptation characterize coastal communities in Indramayu Regency? Third, what legal and institutional mechanisms are necessary to ensure that climate-adaptation measures protect rather than undermine livelihood rights? The study argues that Indonesian climate governance should move toward an integrated rights-based model combining environmental resilience, livelihood security, meaningful participation, social protection, and effective remedies. Such an approach would recognize that climate resilience cannot be separated from the legal and socioeconomic capacity of communities to survive and adapt.

Theoretical Framework

1. Climate Vulnerability and Adaptive Capacity

Climate vulnerability is not determined exclusively by exposure to environmental hazards. Adger et al. (2003) explain that vulnerability emerges through the interaction of exposure, sensitivity, and adaptive capacity. Two communities exposed to similar hazards may experience significantly different outcomes because their economic resources, institutions, infrastructure, social networks, and access to information differ. This distinction is crucial in analyzing Indramayu because coastal communities may face the same tidal flooding or erosion but possess different capacities to protect homes, repair ponds, diversify employment, or access government assistance.

Adaptive capacity refers to the ability of individuals, households, communities, and institutions to anticipate, respond to, and recover from environmental change. Adger (2003) emphasizes the importance of social capital and collective action in building adaptive capacity. Social networks, trust, reciprocal relationships, and community organizations can help households share information and resources during periods of environmental stress. However, social capital cannot substitute for public policy. Where communities lack infrastructure, financial resources, market access, or institutional recognition, collective action may be insufficient to address large-scale climate risks.

The sustainable-livelihoods perspective further strengthens this analysis. Ellis (2000) conceptualizes rural livelihoods as combinations of assets and activities through which households secure their means of living. Climate change can affect natural, physical, financial, human, and social capital simultaneously. For coastal communities, declining fish stocks may reduce natural capital, damaged ponds may destroy physical capital, reduced income may weaken financial capital, and displacement may undermine social capital. Legal protection must therefore be sensitive to the multidimensional character of livelihood vulnerability.

2. Climate Justice and Rights-Based Adaptation

Climate justice requires attention to the unequal distribution of climate risks and adaptation opportunities. Schlosberg (2004) argues that environmental justice should incorporate distribution, recognition, participation, and the ability of affected communities to function and flourish. In the context of climate adaptation, these principles require policymakers to ask who receives protection, who bears adaptation costs, whose knowledge is recognized, and who participates in decision-making.

Schlosberg (2012) develops this argument through a capabilities-based approach to climate justice. Adaptation should protect people's basic capabilities while recognizing differences in vulnerability and enabling public participation. This approach is particularly relevant to livelihood-dependent coastal communities because environmental changes can threaten not only income but also food security, housing, health, social relationships, and cultural continuity.

Environmental justice scholarship similarly emphasizes that environmental burdens are frequently distributed along existing lines of socioeconomic inequality (Schlosberg 2013). Vulnerable coastal communities may have contributed relatively little to global greenhouse-gas emissions while experiencing substantial consequences from climate change. Justice therefore requires adaptation policies that reduce vulnerability without transferring costs onto populations that have limited resources to absorb them.

3. Livelihood Rights and the Law

The notion of livelihood rights can be derived from interconnected human-rights principles concerning work, adequate living standards, food, housing, property, participation, and access to natural resources. Livelihood protection does not necessarily require government to guarantee a particular occupation indefinitely. Rather, it requires public institutions to avoid unjustified interference with existing livelihood opportunities and to provide reasonable safeguards when environmental or development policies inevitably affect them.

This distinction is important because climate adaptation may require changes to existing activities. For example, a coastal area may become too hazardous for continued settlement, or ecosystem degradation may require restrictions on particular fishing practices. A rights-based framework does not prevent such

measures. Instead, it requires decision-makers to assess proportionality, provide information, consult affected communities, consider alternatives, and establish appropriate compensation or transition mechanisms where serious livelihood impacts cannot be avoided.

4. Legal Framework for Coastal Climate Adaptation in Indonesia

Indonesia does not have a single comprehensive climate-adaptation statute governing all aspects of coastal vulnerability. Instead, climate adaptation is addressed through interconnected environmental, spatial, disaster, coastal, fisheries, and development regulations. Nurhidayah and McIlgorm (2019) identify this sectoral structure as an important challenge because adaptation responsibilities can become fragmented between institutions and policy sectors. The absence of a single comprehensive statute does not mean that legal protection is absent. Rather, the challenge lies in integrating existing legal obligations into a coherent framework that recognizes both physical and social dimensions of climate vulnerability.

The 1945 Constitution provides a fundamental normative basis for environmental and livelihood protection. Article 28H recognizes rights associated with welfare and a good and healthy environment, while Article 27(2) recognizes citizens' right to work and obtain a livelihood appropriate to human dignity. These constitutional provisions are significant because climate adaptation directly affects both environmental conditions and livelihood opportunities. Adaptation policies should therefore be interpreted within a constitutional framework that seeks to reconcile environmental protection with human welfare.

Law Number 32 of 2009 concerning Environmental Protection and Management provides a central statutory framework for environmental governance. Its principles include sustainability, participation, environmental justice, and state responsibility. These principles are relevant to climate adaptation because environmental policies can have significant consequences for communities dependent upon natural resources. The environmental-law framework consequently provides a basis for requiring decision-makers to consider social consequences rather than treating environmental management as exclusively ecological.

Law Number 1 of 2014, amending Law Number 27 of 2007 concerning the Management of Coastal Areas and Small Islands, is also important because it regulates the management and utilization of coastal areas. Coastal governance involves competing interests among conservation, fisheries, settlements, infrastructure, tourism, and economic development. The law's emphasis on integrated coastal management provides an institutional basis for considering multiple interests simultaneously. For climate adaptation, integration is essential because physical interventions can change resource access and coastal livelihoods.

Law Number 24 of 2007 concerning Disaster Management establishes responsibilities for disaster risk reduction, preparedness, response, and recovery. Climate-related coastal hazards such as tidal flooding and extreme weather can fall

within the broader disaster-management framework. Yet disaster policy traditionally emphasizes immediate risk reduction and emergency response, while livelihood protection requires longer-term planning. Adaptation policy should therefore connect disaster management with social protection, economic diversification, spatial planning, and community development.

Law Number 7 of 2016 concerning the Ratification of the Paris Agreement reinforces Indonesia's international climate commitments. International climate obligations create an additional normative context for domestic adaptation policy. However, implementation ultimately depends on domestic institutions, budgets, regulatory coordination, and community participation. International commitments should therefore be translated into locally meaningful adaptation measures rather than remaining primarily within national climate-policy documents.

Methods

This study uses a socio-legal qualitative methodology to examine the relationship between climate adaptation law and the livelihood experiences of coastal communities in Indramayu Regency. The normative component analyzes Indonesian constitutional provisions, environmental legislation, coastal-management regulations, disaster-management rules, spatial-planning instruments, fisheries policies, and relevant climate-policy documents. The empirical component focuses on the experiences and perceptions of community members and institutional actors concerning climate-related livelihood disruption and adaptation. Primary qualitative information should be obtained through semi-structured interviews with small-scale fishers, aquaculture farmers, salt producers, coastal residents, community leaders, local-government officials, and relevant agencies responsible for environmental management, fisheries, disaster response, and spatial planning. Purposive sampling is appropriate because participants should possess direct experience of coastal livelihood vulnerability or adaptation governance. The research focuses on access to resources, climate-related economic disruption, government assistance, participation, adaptation measures, information, and perceived legal protection.

Data are analyzed through thematic analysis, combining empirical themes with normative legal categories. Interview material is organized around five principal themes: vulnerability, livelihood adaptation, institutional support, participation, and legal remedies. Documentary analysis is then used to determine whether the experiences reported by communities correspond with the protections and responsibilities established in applicable laws. Triangulation is undertaken by comparing community accounts with statements from government institutions and relevant policy documents. The analysis also uses a rights-based climate-justice framework to evaluate distribution, recognition, participation, and procedural fairness. Particular attention is paid to situations in which adaptation policies may unintentionally create new livelihood burdens. Because coastal communities may be economically and socially vulnerable, participant confidentiality and informed

consent should be maintained throughout the research process. The methodology therefore seeks to move beyond identifying whether adaptation policies exist toward evaluating whether legal institutions actually enable vulnerable communities to participate in and benefit from climate adaptation.

Results and Discussion

1. Climate Vulnerability as a Livelihood Problem

The evidence concerning Indramayu demonstrates that coastal climate vulnerability should be understood as a livelihood problem rather than merely an environmental problem. Research on coastal fish-farming communities in Indramayu identifies high vulnerability to tidal flooding and emphasizes the importance of income, household expenditure, education, local knowledge, government mitigation, and external support. The study further indicates that repeated flooding can damage productive assets and force households to incur debt, potentially producing persistent poverty. These findings are consistent with the broader vulnerability literature, which emphasizes that environmental hazards become socially damaging when people lack the resources and institutional capacity required to respond.

Livelihood vulnerability is particularly significant because coastal communities frequently depend upon productive assets located in hazard-prone areas. Fish ponds, fishing equipment, salt-production infrastructure, agricultural land, boats, and coastal housing cannot always be moved easily. When hazards repeatedly damage these assets, households may experience a gradual erosion of economic security. Adaptation policies that focus only on protecting physical infrastructure may therefore miss the cumulative effects on household debt, employment, education, and food security.

The implications for law are substantial. If climate impacts undermine livelihoods, legal protection should extend beyond disaster response to include mechanisms that strengthen adaptive capacity. This can include access to information, social protection, financial assistance, alternative livelihood programs, secure resource access, and participatory planning. Legal protection becomes meaningful when it improves communities' ability to withstand environmental change rather than merely recognizing vulnerability after damage occurs.

2. Community Adaptation and Economic Diversification

Coastal households are not passive victims of climate change. They develop diverse adaptation strategies based on local knowledge, economic resources, social networks, and changing environmental conditions. Research specifically examining Indramayu reports economic diversification, microenterprise development, tourism opportunities, collective environmental activities, and mangrove rehabilitation as components of community resilience. These strategies demonstrate the importance of community agency in climate adaptation.

However, the ability to diversify is unequally distributed. A household with access to capital, education, transportation, and market networks may be able to establish a new business, while a poorer household may remain dependent on increasingly unstable fisheries or aquaculture. Adaptation can therefore reproduce inequality when policy support is distributed without attention to existing differences in adaptive capacity.

Law should consequently facilitate rather than merely observe livelihood diversification. Training programs, access to finance, cooperatives, market infrastructure, and recognition of community-based environmental initiatives can expand the range of feasible adaptation options. Such measures can be integrated into local development planning so that climate adaptation becomes part of economic policy rather than an isolated environmental program.

3. Physical Infrastructure Is Not Enough

Coastal adaptation policies frequently prioritize physical infrastructure such as seawalls, embankments, drainage systems, flood barriers, and other protective structures. Infrastructure can provide important benefits, particularly in areas experiencing recurrent flooding. Nevertheless, infrastructure alone cannot eliminate vulnerability. If communities remain economically dependent on damaged resources, lack access to insurance or social protection, and have limited opportunities to participate in planning, physical protection may provide only temporary security.

Nurhidayah and McIlgorm (2019) identify precisely this problem within Indonesia's coastal adaptation framework. Their analysis found that existing legal instruments often emphasize structural or hazard-based responses while paying less attention to resilience, vulnerability, and social justice. The implication is not that infrastructure should be abandoned but that it should be incorporated into broader adaptation strategies.

Infrastructure projects can also produce unintended effects. A protective structure may redirect water flows, affect sediment movement, restrict access to fishing areas, or alter the economic use of coastal space. Adaptation planning should therefore include social and environmental impact assessments and meaningful community consultation. The legal question should not simply be whether infrastructure is technically justified but whether the intervention distributes benefits and burdens fairly.

4. Access to Information as a Legal Protection

Information is an important but sometimes overlooked dimension of livelihood protection. Coastal residents need timely information concerning weather conditions, tidal flooding, coastal hazards, government programs, spatial restrictions, resource-management policies, and available assistance. Without reliable information, communities may be unable to make effective adaptation decisions.

Access to information also has a participatory function. Communities cannot meaningfully participate in policy-making if they lack information about proposed projects, environmental risks, or regulatory changes. Public authorities should therefore provide information in accessible formats and through communication channels that coastal residents actually use.

From a legal perspective, information should not be regarded merely as a technical service. It is part of the institutional conditions necessary for meaningful participation and informed decision-making. Information transparency can also improve government accountability because communities are better positioned to question policies that may affect their livelihoods.

5. Participation in Adaptation Decision-Making

Participation is central to rights-based climate adaptation. Coastal communities possess experiential knowledge concerning tidal patterns, fishing grounds, seasonal changes, coastal erosion, mangrove conditions, and the practical consequences of infrastructure projects. Such knowledge can complement scientific and technical assessments. Adger (2003) emphasizes that collective action and social capital can strengthen adaptive capacity, while Schlosberg (2012) places participation at the center of just adaptation.

Participation, however, should not be reduced to consultation after a project has already been designed. Meaningful participation requires opportunities to influence problem definition, policy alternatives, location decisions, implementation, and monitoring. Communities should be able to explain how proposed adaptation measures could affect their livelihoods and propose alternative approaches.

Institutional participation can also strengthen legitimacy. Policies developed through dialogue are more likely to reflect local conditions and receive community support. Where disagreements remain, transparent explanations of governmental decisions are essential. Participation does not mean that every community demand must be accepted; it means that affected communities should have a genuine opportunity to influence decisions and understand the reasons for final outcomes.

6. Climate Adaptation and Resource Access

Many coastal livelihoods depend upon continued access to natural resources. Fishers need access to fishing grounds, aquaculture farmers need water and productive coastal areas, and salt producers depend upon suitable land and climatic conditions. Climate adaptation can alter these access arrangements through conservation zones, coastal infrastructure, relocation, spatial planning, or restrictions on resource use.

This creates a potential conflict between environmental protection and livelihood rights. Conservation may be necessary to restore degraded ecosystems, but restrictions imposed without alternative livelihood opportunities may disproportionately affect communities that depend directly on natural resources. A

rights-based approach therefore requires balancing ecological sustainability with social justice.

The principle of sustainable use provides a possible bridge between these objectives. Rather than assuming that conservation and livelihood protection are inherently contradictory, governance can seek arrangements that maintain ecological functions while preserving sustainable economic opportunities. Community-based resource management, co-management, mangrove restoration linked with livelihood programs, and sustainable fisheries can provide examples of integrated approaches.

7. The Risk of Maladaptation

Climate adaptation can produce maladaptive outcomes when interventions reduce one form of vulnerability while increasing another. For example, infrastructure that protects a particular settlement may shift flooding elsewhere, while conservation policies may improve ecosystem conditions but eliminate income opportunities for resource-dependent households. Eriksen et al. (2021) argue that maladaptation can emerge when adaptation interventions fail to consider structural inequalities and broader social consequences.

This concept has direct implications for Indonesian coastal governance. Legal approval of an adaptation project should not be interpreted as evidence that the project is socially neutral. Authorities should consider who benefits, who bears costs, whether vulnerable groups have participated, and whether alternative measures could achieve similar risk-reduction objectives with fewer livelihood consequences.

A legal framework addressing maladaptation should therefore require impact assessment, monitoring, community participation, and mechanisms for policy revision. Adaptation should be treated as an iterative process rather than a one-time technical decision. Where evidence demonstrates that a policy is creating disproportionate harm, institutions should have the authority and obligation to modify it.

8. Social Protection and Livelihood Resilience

Climate adaptation cannot be separated from social protection. Households experiencing repeated climate shocks may require temporary assistance to prevent the loss of productive assets, withdrawal of children from education, accumulation of debt, or deterioration of food security. Social protection can provide a foundation from which households can undertake longer-term adaptation rather than remaining trapped in cycles of emergency recovery.

For coastal communities, social protection may include cash transfers, livelihood assistance, insurance, credit access, vocational training, food-security programs, and recovery support following disasters. The appropriate combination depends on local conditions. What matters legally is that adaptation policy should recognize socioeconomic resilience as part of climate resilience.

Social protection also raises questions of administrative accessibility. Vulnerable households may have difficulty obtaining government assistance because of documentation requirements, limited information, geographic distance, or administrative complexity. Simplifying access and improving coordination between environmental, disaster, fisheries, and social-service agencies can therefore strengthen the practical effectiveness of legal protection.

9. Gender and Unequal Adaptation Capacity

Climate impacts are not necessarily experienced equally by men and women. Women may depend on coastal livelihoods indirectly through fish processing, trading, household enterprises, or unpaid care work. When climate shocks reduce household income, women may experience increased unpaid labor and reduced access to economic resources. Adaptation programs that focus only on male-dominated fishing activities can therefore overlook important dimensions of household resilience.

A rights-based approach should incorporate gender-sensitive participation and livelihood planning. Women should be represented in community consultations and adaptation institutions, and adaptation programs should recognize the economic activities in which women participate. This is particularly important where diversification strategies involve small businesses, food processing, tourism, or household enterprises.

Gender-sensitive governance also strengthens the quality of adaptation itself. Different community members possess different forms of environmental and economic knowledge. Inclusive participation can therefore improve the information available to policymakers while ensuring that adaptation benefits are not distributed only among the most visible resource users.

10. Local Government and Institutional Coordination

Local government plays a critical role in translating national climate and environmental frameworks into concrete adaptation measures. Yet coastal governance involves multiple agencies and policy sectors. Environmental management, fisheries, spatial planning, disaster management, infrastructure, social protection, and economic development may each operate through different institutional structures. Fragmentation can create gaps in responsibility. A community may experience flooding as a livelihood crisis, while one agency treats it as a disaster-management issue and another treats it as a spatial-planning problem. Without coordination, policies may address individual symptoms without addressing the underlying vulnerability.

An integrated coastal governance mechanism could improve this situation. Local governments should establish coordination procedures linking climate risk assessments with livelihood planning, spatial decisions, infrastructure development, environmental conservation, and social protection. Community

representatives should be incorporated into these mechanisms so that coordination is not limited to government agencies.

11. Toward a Rights-Based Coastal Adaptation Model

The analysis supports the development of a Rights-Based Coastal Adaptation Model for Indramayu. The model should rest on six principles: vulnerability recognition, livelihood security, participation, equitable resource access, institutional coordination, and remedy. Vulnerability recognition requires government to identify socioeconomic differences within coastal communities rather than treating all residents as equally capable of adapting. Livelihood security requires adaptation policies to consider income, productive assets, food security, and economic diversification. Participation requires affected communities to influence decisions before and during implementation.

Equitable resource access is equally important. Adaptation should not result in vulnerable communities losing access to coastal resources without adequate alternatives. Institutional coordination should connect environmental, disaster, fisheries, spatial, and social policies. Finally, remedy requires mechanisms through which communities can challenge decisions or seek correction when adaptation policies cause disproportionate harm.

This model differs from conventional hazard-management approaches because it places human capabilities at the center of adaptation. A seawall may reduce flooding, but it does not necessarily increase adaptive capacity if households remain economically insecure. A mangrove restoration project may improve ecosystem resilience, but its legitimacy depends partly on how it affects people who previously relied upon the area. Legal protection should therefore measure adaptation success through both environmental outcomes and improvements in community resilience.

12. Policy Recommendations

First, local government should undertake livelihood-sensitive climate vulnerability assessments before implementing major coastal adaptation projects. Assessments should identify households dependent upon fisheries, aquaculture, agriculture, salt production, tourism, and other coastal activities. They should also identify groups with limited adaptive capacity because of poverty, age, gender, disability, education, or restricted access to institutional resources.

Second, climate adaptation planning should include mandatory livelihood-impact assessment for interventions likely to affect access to coastal resources. Such assessment should consider both direct and indirect effects, including loss of productive land, reduced fishing access, relocation costs, changes in consumer flows, and restrictions on traditional economic activities.

Third, government should strengthen community participation mechanisms. Participation should occur during project design, site selection, implementation, and monitoring. Community knowledge should be formally incorporated into

environmental and climate-risk assessments rather than treated merely as supplementary anecdotal information.

Fourth, adaptation programs should integrate livelihood diversification and social protection. Training, microfinance, cooperatives, market access, insurance, and temporary income support can strengthen adaptive capacity. Diversification should not be imposed uniformly; programs should reflect existing community skills, market opportunities, and ecological conditions.

Fifth, coastal adaptation projects should undergo maladaptation screening. Authorities should assess whether proposed interventions could shift risks, displace vulnerable communities, reduce resource access, or create new inequalities. Monitoring should continue after implementation so that unintended consequences can be addressed.

Sixth, local governments should establish accessible grievance and remedy mechanisms. Coastal communities should have clear channels to submit complaints concerning relocation, resource restrictions, infrastructure impacts, environmental damage, or inadequate consultation. Effective remedies are essential to ensure that climate adaptation remains accountable to the people it is intended to protect.

13. Limitations

This study has several limitations. First, a socio-legal qualitative approach emphasizes institutional processes and community experiences rather than statistical generalization. The vulnerability of coastal communities varies significantly according to livelihood type, geographic location, household resources, and access to public institutions. Future research should therefore combine qualitative research with household surveys and spatial analysis to develop more detailed measurements of livelihood vulnerability across different coastal villages in Indramayu.

Second, climate adaptation is a dynamic process. Coastal conditions, government programs, environmental regulations, and household strategies can change over time. A longitudinal study would be valuable for examining whether adaptation programs actually improve livelihood resilience or merely reduce short-term physical risks. Future research could compare communities receiving different forms of adaptation intervention and examine long-term changes in income, productive assets, resource access, and perceptions of legal protection.

Third, further research should investigate the perspectives of women, youth, informal workers, small-scale fishers, aquaculture farmers, and other groups whose adaptation experiences may differ. Particular attention should also be given to potential conflicts between environmental conservation, infrastructure development, and livelihood protection. Such research would strengthen understanding of how climate justice can be operationalized within local coastal governance.

Conclusion

Climate change presents coastal communities with a challenge that is simultaneously environmental, economic, social, and legal. In Indramayu Regency, tidal flooding, coastal erosion, changing climatic conditions, and declining resource productivity can disrupt fisheries, aquaculture, agriculture, salt production, and other livelihood activities. Existing research demonstrates that coastal vulnerability is shaped not only by exposure to hazards but also by income, education, local knowledge, government support, and access to adaptive resources. Consequently, adaptation policies that focus exclusively on physical infrastructure are unlikely to provide comprehensive protection. The legal framework should recognize livelihood security as an essential dimension of climate resilience. Environmental protection, coastal management, disaster risk reduction, spatial planning, and climate policy should be interpreted together rather than as isolated regulatory fields. The existing Indonesian framework provides important foundations, but fragmentation and limited integration of social-justice considerations can reduce its effectiveness. As Nurhidayah and McIlgorm (2019) demonstrate, strengthening community participation and addressing social burdens are essential for improving the legitimacy of Indonesian coastal adaptation.

A rights-based approach does not require government to preserve every existing livelihood regardless of environmental circumstances. Coastal ecosystems may require restoration, hazardous settlements may require relocation, and certain resource uses may need to be restricted. However, such measures should be implemented through transparent procedures that recognize vulnerability, provide meaningful participation, consider alternatives, and avoid disproportionate burdens. Where livelihood disruption cannot be avoided, appropriate transition and social-protection measures should be provided. The central proposition of this study is therefore that climate adaptation should be understood as a matter of legal protection as well as environmental management. A resilient coastal community is not simply one protected by infrastructure; it is a community possessing the resources, information, institutional recognition, participation opportunities, and legal remedies necessary to respond to environmental change. For Indramayu, strengthening these dimensions can help transform adaptation from a primarily hazard-reduction strategy into a more inclusive model of climate governance grounded in livelihood security, environmental sustainability, and social justice.

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