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ADAPTIVE PUBLIC SERVICE GOVERNANCE UNDER COASTAL ECOLOGICAL RISKS: EVIDENCE FROM KUALA SIMBUR VILLAGE, INDONESIA

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Abstract: This study aims to analyse the response of the Kuala Simbur Village Government to coastal ecological risks and to explain the process through which public service delivery is moving toward more adaptive governance. The study employs a qualitative descriptive approach, with data collected through in-depth interviews and documentation. Informants were purposively selected from the Kuala Simbur Village Government, namely the Village Head, Village Secretary, and Hamlet Heads, while documentary materials were used to trace the context of coastal erosion, tidal flooding, coastal conditions, and institutional responses. Data were analysed thematically through reduction, coding, category development, and theme generation. The findings indicate that recurrent ecological pressures have altered the context of village service delivery by increasing the need for information, data collection, coordination, and sustained government-community connectivity. Government responses still display reactive characteristics, yet a more preventive orientation and more flexible practices are beginning to emerge through stronger communication, the role of territorial officials, and collaborative activities. These adaptive practices have not yet been fully institutionalised within formal procedures and service systems. The study identifies five capacities for adaptive public service at the village level: ecological risk sensing, service flexibility, frontline connectivity, coordination and collaborative capacity, and institutional learning. The findings present ecological risk as a challenge to governance capacity and the continuity of public services in coastal areas, beyond its environmental dimension.

Keywords: adaptive public service; adaptive governance; ecological risk; village government; coastal areas.

INTRODUCTION

Environmental change in coastal areas increasingly affects the ability of governments to perform public service functions. Coastal erosion, tidal flooding, high waves, shoreline change, and extreme weather cause physical damage and affect settlements, mobility, livelihoods, and community needs for government services. The Intergovernmental Panel on Climate Change [IPCC] (2022) shows that coastal areas face increasing risks to settlements, infrastructure, and human well-being as a result of climate change. Ecological risk should therefore be understood as a governance issue that requires public institutions to maintain their functions under changing conditions (Adger, 2000; Duit, 2016).

Adaptation studies indicate that responses undertaken by governments and communities remain largely local, partial, and incremental. Berrang-Ford et al. (2021) found limited evidence of transformation and risk reduction through adaptation, while Magnan et al. (2023) and Wannewitz et al. (2024) identified gaps in capacity, long-term strategy, and the integration of coastal responses. These findings underline that actions taken after a disturbance do not by themselves demonstrate the emergence of adaptive governance.

In Indonesia, the village is the lowest tier of government and the institution closest to residents, which makes it a critical site for observing how ecological risk enters everyday administration. Research on Indonesian coastal villages shows that village governance depends on institutional mechanisms and civic forums that connect government and community (Nurlinah & Haryanto, 2020). At the same time, tidal flooding has been shown to expose coastal households to social vulnerability, with effects that vary across livelihood groups (Putiamini et al., 2022). These two observations frame the Kuala Simbur case: the village government must manage a hazard that is recurrent and uneven in its effects, using institutions whose formal authority and resources are limited, while remaining the first point of contact for residents seeking information, assistance, and linkage to higher levels of government. What matters is how adaptation takes shape inside ordinary service routines when formal procedures, data systems, and intergovernmental support are still developing.

The concept of adaptive governance emphasises the capacity of institutions to learn, use knowledge, build networks, and adjust institutional arrangements under conditions of change and uncertainty (Folke et al., 2005; Chaffin et al., 2014). In public administration, this capacity is associated with organisational resilience: the ability to anticipate, cope with, and learn from disturbances so that previous experience leads to changes in organisational practices (Duchek, 2020; Boin & Lodge, 2016).

Kuala Simbur Village in Muara Sabak Timur District, Tanjung Jabung Timur Regency, provides a relevant empirical context. In 2023, coastal erosion and waves were reported to have damaged residential roads and houses (Harpandi, 2023). In 2024, the village government was reported to have mobilised residents to plant trees as one measure to reduce erosion (Suratno, 2024). By the end of 2025, community-based mangrove conservation activities involved the village government, the Village Consultative Body, community groups, and academics (Putra et al., 2025). Coastal pressure became visible again in January 2026, when tidal flooding and high waves affected Kuala Simbur and an unoccupied house near the river was swept away (Sanjaya, 2026; ANTARA, 2026).

Coastal adaptation research has largely focused on environmental protection, infrastructure, disaster management, and community resilience, while public service literature has more often emphasised organisations, networks, co-production, and service quality (Osborne, 2006; Osborne et al., 2016). Research remains limited on how recurrent ecological risks reshape everyday public service practices at the village-government level. The gap matters

because village governments are the public institutions closest to residents and serve as nodes for information, administration, and linkage with higher levels of government.

Against this background, this study aims to analyse how the Kuala Simbur Village Government responds to ecological risks and to explain the process through which public services are moving toward more adaptive governance. It asks how ecological pressures alter the context of village services, how the village government adjusts information, coordination, and service practices, and what factors support or constrain the institutionalisation of adaptive public service. The study links adaptive governance to public service practices in a coastal village setting.

LITERATURE REVIEW

This study draws on three related bodies of literature: adaptive governance and resilience, public service as a relational process, and collaborative governance. Together they provide the analytical lens for the case, expressed here through five adaptive capacities defined below and applied in the analysis of the findings.

Adaptive Governance and Organisational Resilience

Adaptive governance refers to the capacity of institutions to learn, use knowledge, build networks, and adjust institutional arrangements under conditions of change and uncertainty (Folke et al., 2005; Chaffin et al., 2014). It emerged from the study of social-ecological systems, where disturbance is treated as a condition that may create opportunities for learning, reorganisation, and cross-level collaboration, rather than simply as damage to be repaired (Armitage et al., 2009; Cash et al., 2006). Polycentric arrangements, in which authority is distributed across levels and actors rather than concentrated in a single centre, matter for this capacity because they allow information and decisions to move across scales (Tuda et al., 2021). In public administration, this capacity is associated with organisational resilience: the ability to anticipate, cope with, and learn from disturbances so that previous experience leads to changes in organisational practices (Duchek, 2020; Boin & Lodge, 2016). Duchek (2020) distinguishes resilience into anticipation, coping, and adaptation, a distinction that matters for this study because post-event action alone, such as data collection after a flood, demonstrates coping rather than adaptation. Adaptation becomes visible only when experience changes procedures, data use, communication, and service practices in subsequent events. Duit (2016) likewise argues that resilience should be considered beyond crisis management, in everyday institutional functioning, while Termeer et al. (2015) identify reflexivity, resilience, responsiveness, and revitalisation as governance capacities for dealing with wicked problems. Ostrom (2007) warns that social-ecological problems cannot be addressed through universal solutions and instead require context-sensitive institutional diagnosis, a point that supports a single-case design focused on how adaptation actually unfolds in one village.

Public Service as a Relational Process

In public service delivery, adaptation should be assessed through changes in information mechanisms, coordination, task distribution, and service accessibility, rather than through response speed alone. The New Public Governance perspective views public service as a relational process embedded in networks rather than as the output of a single bureaucracy (Osborne, 2006), and co-production shows that service users and communities can become part of the process through which public value is created (Osborne et al., 2016). Recent research on service delivery during crises likewise finds that organisational capacity, collaboration, and public service motivation shape whether services continue to function under disruption (Dimitrijevska-Markoski et al., 2024). Adaptive leadership also matters: the ability of public managers to sustain adaptability over time, rather than only in the moment of crisis, conditions whether new practices survive (Alibašić, 2024).

Analytical Framework: Five Adaptive Capacities

Drawing on these literatures, this study uses five adaptive capacities as its analytical framework. Ecological risk sensing is the ability to recognise environmental change and translate it into service-relevant information. Service flexibility is the ability to adjust working mechanisms, task distribution, and communication in response to changing conditions. Frontline connectivity is the ability to maintain relationships with residents through the officials closest to them. Collaborative capacity is the ability to connect authority and resources across actors and levels of government. Institutional learning is the ability to convert experience into practices, procedures, and data that are reused in subsequent events. The five capacities are an analytical synthesis from the Kuala Simbur case, not a universally validated model; they serve to examine how far adaptive practice has moved from event-based response toward institutionalised service routines. Each capacity is examined in the findings against observable indications: whether risk information is collected and used, whether tasks and communication actually change, whether frontline officials function as information channels, whether other actors are involved in sustained processes rather than single events, and whether experience is recorded in procedures or data systems that outlast the event itself.

METHOD

This study employs a qualitative descriptive approach to obtain a contextual account of how the Kuala Simbur Village Government responds to ecological risks and adjusts public service practices. This approach stays close to the empirical data and gives a direct account of actors' practices and experiences (Sandelowski, 2000, 2010).

Data were collected through in-depth interviews and documentation. Informants were purposively selected from the Kuala Simbur Village Government and consisted of the Village Head, Village Secretary, and Hamlet Heads. These positions represent leadership and

decision-making, service administration, and frontline implementation. Informant selection was based on the specificity and relevance of the information they were expected to provide, consistent with the principle of information power in qualitative interview research (Malterud et al., 2016). Informants are referred to by their institutional position rather than by name.

Informant selection was guided by information power: the Village Head, the Village Secretary, and Hamlet Heads were selected because their positions cover leadership and decision-making, service administration, and frontline implementation, so that a small number of purposively selected informants can still provide relevant and specific information (Malterud et al., 2016). Documentary materials were examined through document analysis, which treats documents as a source of context and as a means of tracing chronology and distinguishing implemented actions from plans (Bowen, 2009).

Documentation was used as supporting evidence and for triangulation, including government publications, scientific articles, disaster-related information, and verifiable news reports concerning ecological conditions and institutional responses in Kuala Simbur. Documentary materials were used to trace the chronology of events and to distinguish implemented actions from programme plans and from authors' interpretations (Bowen, 2009).

Data were analysed thematically through repeated reading, data reduction, coding, category development, and theme generation. Comparisons were made across informant positions and between interview data and documentary evidence to strengthen interpretive consistency. The Framework Method was used to maintain traceability between data sources, categories, and themes (Gale et al., 2013), while interview reporting follows the transparency principles emphasised in COREQ (Tong et al., 2007).

Triangulation was pursued in two directions: across informant positions, so that accounts from leadership, administration, and frontline roles could be compared, and between interview data and documentary evidence, so that claims about events could be checked against dated records. Where interview accounts and documents pointed in the same direction, the interpretation was treated as strengthened; where they diverged, the divergence itself was treated as a finding about the limits of available information.

RESULT AND DISCUSSION

Ecological Risks and the Changing Context of Village Service Delivery

The analysis indicates that ecological pressures in Kuala Simbur are recurrent and have created a new context for village governance. Coastal erosion, high waves, and tidal flooding cause physical damage and increase the need for information, data collection, communication, coordination, and facilitation of responses at the community level. Documentation from 2023 records damage to residential roads and houses caused by erosion and waves in Kuala Simbur (Harpandi, 2023). In January 2026, tidal flooding and high waves

again affected the area, and an unoccupied house near the river was reported to have been swept away (Sanjaya, 2026; ANTARA, 2026).

The interview data indicate that changing coastal conditions are increasingly understood as part of the operational context of village government rather than solely as an environmental issue. Ecological disturbances may increase community needs for information, data collection, communication with government, and facilitation of matters that fall outside village authority. In this position, the village government serves as a link between residents' conditions and the wider government structure by receiving reports, identifying needs, and communicating information to relevant institutions.

These changes show that ecological impacts on public services do not always take the form of complete service interruption. Pressure may instead appear through increased information needs, shifting priorities, the need for faster data collection, or more intensive communication with residents. Ecological shock therefore changes the operational context and tests the village government's ability to maintain service functions under non-routine conditions.

In terms of the analytical framework, the findings in this subsection concern ecological risk sensing. Disturbances are increasingly recognised as part of the operational context, and the need for information, data collection, and communication has grown. What remains unclear at this stage is whether sensing is systematic, with records and data systems that persist between events, or whether it depends on ad hoc reporting after each disturbance.

Table 1. Chronology of ecological pressures and village responses in Kuala Simbur, 2023-2026

Period	Event	Village or government response	Source
2023	Coastal erosion and high waves damage residential roads and houses	Damage recorded; reporting to higher government	Harpandi (2023)
2024	Continued erosion pressure	Village government mobilises residents to plant trees	Suratno (2024)
2025	Community-based mangrove conservation	Village government, Village Consultative Body, community groups, and academics involved in education, problem identification, and planning	Putra et al. (2025)
January 2026	Tidal flooding and high waves; an unoccupied house	Regency Disaster Management Agency conducts data	Sanjaya (2026); ANTARA (2026)

	near the river swept away	collection and coordination

Service Adjustment and the Role of Village Officials

Government responses initially continue to display reactive characteristics: disturbances or damage become known first and are then followed by reporting, data collection, coordination, requests for intervention, or other actions within the available authority. In the January 2026 incident, for example, the Tanjung Jabung Timur Regency Disaster Management Agency conducted data collection and coordination with relevant agencies after tidal flooding and high waves occurred (ANTARA, 2026). This pattern shows that intergovernmental response depends on locally generated information.

At the same time, a more preventive orientation has begun to appear. In 2024, the Kuala Simbur Village Government was reported to have mobilised residents to plant trees as one effort to reduce coastal erosion (Suratno, 2024). Community-based mangrove conservation in 2025 also involved the village government, the Village Consultative Body, community groups, and academics in environmental education, problem identification, and conservation planning (Putra et al., 2025). Although these activities primarily belong to the environmental domain, they indicate the development of risk recognition before subsequent impacts occur.

The interview data further point to administrative and operational adjustments. Public service delivery continues to follow village-government mechanisms, but certain conditions require faster communication, greater use of information from hamlet level, more flexible task distribution, and data collection that reflects residents' circumstances. In this context, data are a basis for identifying community conditions and determining appropriate follow-up, rather than an administrative requirement alone.

Hamlet Heads occupy a strategic position in this process because they are the village officials closest to residents. Their territorial proximity and everyday relationships enable them to serve as information channels, assist in collecting data on residents' conditions, convey needs to the village government, and bridge communication when residents cannot fully rely on office-based service mechanisms. This role shows how frontline connectivity works in coastal village service delivery.

However, service adjustment does not always mean formal procedural change. Adaptation may begin through relatively simple practices, such as faster communication, the use of territorial officials as information nodes, adjustments in task distribution, and efforts to bring services closer to residents' conditions. The adaptive value of these practices becomes stronger when they are repeated, recognised organisationally, and reused during subsequent disturbances.

These adjustments show service flexibility and frontline connectivity. Communication becomes faster, task distribution becomes more flexible, and Hamlet Heads function as

information channels between residents and the village office. The evidence also shows the limits of flexibility without institutionalisation: adjustments remain practices that depend on the people involved rather than procedures that any official would follow.

Gradual Adaptation and the Institutionalisation Gap

The shift toward adaptive public service in Kuala Simbur is gradual rather than a completed transformation. Risk recognition, preventive action, more active communication, stronger roles for territorial officials, and collaborative relationships have begun to emerge. However, available evidence is insufficient to conclude that all these elements have been institutionalised in standard operating procedures, vulnerability data systems, alternative service mechanisms, specific task arrangements, or post-disruption service evaluations.

The interview data also position internal coordination among the Village Head, Village Secretary, and Hamlet Heads as an important mechanism for maintaining government-community linkages. Adjustment appears more strongly as the strengthening of work patterns than as changes to organisational structure. This suggests that adaptation at the village level may develop through changes in everyday administrative practice before being formalised in institutional arrangements.

The main gap therefore lies between adaptive actions and the institutionalisation of adaptive public service. Post-event response remains necessary, but adaptive capacity becomes stronger when experience from a disturbance is converted into data, procedures, role distribution, communication mechanisms, and learning that can be reused in subsequent events. The emerging process begins with ecological disturbance, which prompts a government response, followed by risk recognition, service adjustment, and institutional learning.

The gap described here is, in framework terms, a gap in institutional learning and collaborative capacity. Collaboration is present in conservation activities, but the conversion of experience into standard operating procedures, vulnerability data systems, and post-disruption evaluation has not yet occurred. Adaptation is therefore real but incomplete: the capacities are visible as emerging practices, not yet as institutional routines.

From Reactive Response to Adaptive Public Service

The Kuala Simbur findings show that ecological shock can trigger change but does not automatically produce adaptive governance. Adaptive governance literature views disturbance as a condition that may create opportunities for learning, knowledge use, reorganisation, and cross-actor collaboration (Folke et al., 2005; Chaffin et al., 2014). Adaptive co-management similarly emphasises that addressing social-ecological complexity requires a combination of learning and cross-level collaboration (Armitage et al., 2009), while Cash et al. (2006) underline the importance of cross-scale relationships in the management of information and decision-making.

At the initial stage, data collection, reporting, and coordination after disturbance are more closely associated with coping capacity. Duchek (2020) distinguishes resilience into anticipation, coping, and adaptation; thus, post-event action alone is insufficient to demonstrate institutional change. Tree planting and mangrove conservation indicate a growing anticipatory orientation, but adaptation becomes clearer only when such experience changes procedures, data use, communication, and service practices in subsequent events.

This pattern is consistent with global literature showing that adaptation remains largely incremental and fragmented (Berrang-Ford et al., 2021; Magnan et al., 2023; Wannewitz et al., 2024). What the Kuala Simbur case shows is a transition from event-based response toward a service capacity more sensitive to ecological risk, not full transformation. This is also consistent with Ostrom's (2007) warning that social-ecological problems cannot be addressed through universal solutions and instead require context-sensitive institutional diagnosis.

Evidence from Central Java likewise shows that community-based mangrove management can contribute to coastal protection (Damastuti et al., 2023). This supports reading the Kuala Simbur mangrove activities as adaptive practice rather than environmental routine alone, while also underlining the difference between an activity and an institutionalised capacity: conservation is carried out, but its continuation depends on collaboration that is not yet secured in procedures or budgets.

In public administration, these findings extend the discussion of resilience from crisis management to everyday institutional practices. Duit (2016) places resilience in everyday institutional functioning rather than crisis management alone, while Boin and Lodge (2016) call for institutional designs capable of functioning under disruption and uncertainty. Termeer et al. (2015) likewise identify reflexivity, resilience, responsiveness, and revitalisation as important governance capacities for dealing with wicked problems.

Adaptive Capacity of Village Government

At the village level, adaptive public service does not necessarily begin with the creation of new organisations or programmes. Adaptation can emerge through changes in how government obtains information, adjusts workflows, distributes tasks, communicates with residents, and links local needs with other actors. The New Public Governance perspective views public service as a relational process embedded in networks rather than as the output of a single bureaucracy (Osborne, 2006). Co-production similarly shows that service users and communities can become part of the process through which public value is created (Osborne et al., 2016).

The findings position Hamlet Heads as important actors in frontline adaptive governance. Their proximity to residents allows local information to reach the village government without depending entirely on residents visiting the village office. This function can reduce informational distance and help the government respond to variations across local areas. At

the same time, service adjustment requires the decision-making support of the Village Head and the administrative management of the Village Secretary so that changes do not remain isolated individual practices.

Collaboration matters because coastal pressures exceed the authority and resources of the village. Ansell and Gash (2008) and Emerson et al. (2012) show that collaboration should not be assessed merely by the number of actors involved, but by the capacity to build shared processes, collective action capacity, and sustained relationships. In the Indonesian context, Djalante (2012) likewise points to multi-stakeholder platforms and networks in adaptive governance for disaster risk reduction.

Research on service delivery during crises likewise finds that organisational capacity, collaboration, and public service motivation shape whether services continue to function under disruption (Dimitrijevska-Markoski et al., 2024). This is consistent with the Kuala Simbur pattern, in which continuity depends less on formal procedures than on the capacity and motivation of frontline officials and on coordination with actors beyond the village.

The study identifies five adaptive public service capacities at the village level: ecological risk sensing, service flexibility, frontline connectivity, collaborative capacity, and institutional learning. Risk sensing refers to the ability to recognise environmental change and translate it into service-relevant information; service flexibility refers to the ability to adjust working mechanisms; frontline connectivity refers to the ability to maintain relationships with residents through the closest officials; collaborative capacity refers to the ability to connect authority and resources across actors; and institutional learning refers to the ability to convert experience into practices that are reused.

The five capacities are an analytical synthesis from the Kuala Simbur context, not a universally validated model, and they require further testing in other cases. Adaptive capacity therefore depends on risk awareness and on an organisation's ability to sustain action consistently over time.

Table 2. Five adaptive capacities and their evidence in Kuala Simbur

Capacity	Meaning in this study	Evidence in Kuala Simbur
Ecological risk sensing	Recognising environmental change and translating it into service-relevant information	Disturbances treated as operational context; growing need for information and data collection
Service flexibility	Adjusting working mechanisms, task distribution, and communication	Faster communication; flexible task distribution; data collection reflecting residents' circumstances
Frontline connectivity	Maintaining relationships with residents through the closest officials	Hamlet Heads as information channels, data collectors, and bridges to the village office
Collaborative capacity	Connecting authority and	Mangrove conservation with

	resources across actors and levels	consultative body, community groups, and academics; coordination with regency agency
Institutional learning	Converting experience into practices reused in later events	Not yet evident: no standard operating procedures, vulnerability data systems, or post-disruption evaluation

Limitations

This study has several limitations. First, it examines a single village, so the findings describe one trajectory of adaptation and cannot be generalised statistically to all coastal villages. Second, it draws on the perspective of village-government actors, while the experiences of residents, vulnerable groups, basic service providers, and higher levels of government are not included; whether institutional adjustments actually improve service access and continuity from the residents' side therefore remains untested. Third, the chronology of events rests in part on documentary and news sources, which record visible damage and publicised actions rather than the full range of administrative work. Fourth, the study does not measure service outcomes, so it can show that practices are changing but not how much service continuity has improved. These limitations point to the need for multi-village comparison, resident-level evidence, and outcome measures in future research.

CONCLUSION

Ecological pressures have altered the context of village services in Kuala Simbur. Recurrent erosion, high waves, and tidal flooding have done more than cause physical damage: they have increased the need for information, data collection, communication, coordination, and sustained connectivity between government and community, and they have made non-routine conditions a regular part of service delivery.

The village government has adjusted its information, coordination, and service practices in several ways. Responses still begin reactively, with reporting, data collection, and coordination after a disturbance, but a more preventive orientation is emerging through tree planting, mangrove conservation, faster communication, greater use of information from hamlet level, and more flexible task distribution. Hamlet Heads have become central to this adjustment as frontline channels for information and data.

Several factors support the institutionalisation of adaptive public service, while others constrain it. Supporting factors are risk recognition, preventive action, the frontline role of territorial officials, more active communication, and collaboration with the Village Consultative Body, community groups, academics, and the regency government. Constraining factors are the absence of standard operating procedures, vulnerability data systems, alternative service mechanisms, and post-disruption evaluation, together with the single-

village scope of the evidence. Adaptive practice is therefore emerging but not yet institutionalised.

The study extends adaptive governance to village-level public service by identifying five capacities: ecological risk sensing, service flexibility, frontline connectivity, collaborative capacity, and institutional learning. For practice, strengthening coastal villages requires attention to administrative capacity, data quality, frontline officials, coordination, and learning, alongside environmental management. Future research should include residents and vulnerable groups, compare villages, and assess whether institutional adjustments improve service access and continuity.

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