



Strengthening Nunukan's Border Economy for National Resilience at the Indonesia-Malaysia Frontier

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Article Info:	Abstract
Keywords: <i>Asta Gatra</i> ; Border Economic Resilience; Cross Border Trade; National Resilience; Nunukan.	Purpose: This study develops an economic-resilience strategy for Nunukan, an Indonesian border regency whose economic life is closely connected with Tawau and Sebatik at the Indonesia–Malaysia frontier. It reframes border development from a predominantly security and infrastructure agenda into an economic pillar of national resilience.
Article History: Received : 11-6-2025 Revised : 11-9-2025 Accepted : 30-9-2025	Study Design/Methodology/Approach: A qualitative case-study and structured document analysis was undertaken using peer-reviewed literature published from 2015 to February 2025, the authors' earlier border-development study, official regulations, and BPS-Statistics Indonesia data available by 28 February 2025.
Article DOI : 10.55960/jlri.v13i3.1427	Findings: Nunukan's 2024 economy reached IDR 40.54 trillion in nominal GRDP and grew 4.03 per cent, while 5.73 per cent of the population remained below the poverty line and cross-border communities continued to depend on Malaysian markets and supply chains. The analysis identifies four resilience priorities: productive diversification, reliable domestic logistics, formalised but facilitative cross-border trade, and institutional coordination.
	Originality/Value: The article proposes a border economic-resilience framework linking local welfare, market connectivity, adaptive capacity, and national resilience, with policy implications for Nunukan and comparable Indonesian frontier regions.
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INTRODUCTION

Border regions occupy a strategic position in the global economy because flows of goods, people, capital, and information increasingly cross-national boundaries. However, the economic benefits of such connectivity depend on trade costs, logistics quality, production capacity, and institutional capability to respond to external change. The World Bank (2021) shows that transport, logistics, and trade procedures remain significant components of trade costs in developing economies, indicating that geographical proximity alone does not ensure efficient market access. Similarly, research on regional economic resilience shows that border openness can expand market opportunities while increasing exposure to policy changes, mobility disruptions, and dependence on external networks (Pascariu et al., 2020; Hippe et al., 2024). At the regional level, trade integration in Asia and the Pacific can strengthen economic resilience when supported by transport connectivity, trade facilitation, and value chain diversification (Asian Development Bank, 2022). This orientation is consistent with the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area Vision 2025 (BIMP-EAGA, 2017), which emphasises multimodal connectivity, trade facilitation, the integration of small and medium-sized enterprises into value chains, energy cooperation, and information technology to strengthen subregional connectivity. Nevertheless, integration may deliver limited benefits to peripheral regions when domestic distribution remains costly, local production capacity is constrained, or institutional arrangements do not adequately support local economic activity. In Indonesia, Law Number 43 of 2008 links territorial management with sovereignty, resource utilisation, and public welfare, while Presidential Regulation Number 118 of 2022 requires border management to follow holistic, integrated, thematic, and spatial principles. This policy direction is reinforced by Presidential Regulation Number 12 of 2025 on the National Medium-Term Development Plan for 2025-2029, which prioritises national defence and security, economic self-reliance, agromaritime development, downstream value creation, equitable economic development, and poverty reduction. From a national resilience perspective, these priorities place the economic dimension in close interaction with geography, demography, natural resources, ideology, politics, socio-cultural conditions, and defence and security within the broader *Asta Gatra* framework.

Nunukan Regency in North Kalimantan clearly illustrates this relationship due to its direct border with Malaysia, while Sebatik Island forms an economic space linked to Tawau. Shafitri et al. (2020) found that the fishery business networks between Nunukan and Tawau encompass access to resources, labour, markets, technology, capital, and savings and are underpinned by the social ties of coastal communities. Sarjono et al. (2022) demonstrated that the informal Smokol trade practice creates a multi-location market driven by resource interdependence, local economic integration, and economic activities that do not operate entirely through formal mechanisms. Meanwhile, Yanti and Muawanah (2020) showed that the development of the Sebatik Integrated Marine and Fisheries Center is linked to efforts to strengthen fishery activities and Indonesia's position in cross-border trade. These findings demonstrate the value of Tawau to the community's economic activities; however, they do not prove that increasingly intensive cross-border transactions automatically enhance Nunukan's economic resilience (Shafitri et al., 2020; Yanti & Muawanah, 2020; Sarjono et al., 2022).

Macroeconomic metrics indicate that the economy of Nunukan is persistently expanding. In 2024, the Gross Regional Domestic Product (GRDP) at current prices attained IDR 40.54 trillion, with a per capita GRDP of IDR 192.21 million and an

economic growth rate of 4.03 per cent (BPS-Statistics Indonesia, Nunukan Regency, 2025a). The 2023 Agricultural Census documented 21,601 agricultural business households, reflecting a 38.25 per cent rise from 2013 (BPS-Statistics Indonesia, Nunukan Regency, 2023). These statistics illustrate the magnitude of economic engagement and the robustness of the principal livelihood foundation, but they fail to elucidate the producers' capacity to reach markets, technology, capital, and alternate distribution avenues. Shafitri et al. (2020) assert that the viability of fisheries enterprises is connected to the availability of diverse economic resources, whereas Yanti and Muawanah (2020) contextualise the Sebatik Integrated fisheries Center (SKPT) in terms of enhancing fishery output and commerce. Consequently, the fundamental concern is not in the presence of a production foundation but in the capacity of economic agents to sustain production and market decisions amidst changing external circumstances (BPS-Statistics Indonesia, Nunukan Regency, 2023, 2025a; Shafitri et al., 2020; Yanti & Muawanah, 2020).

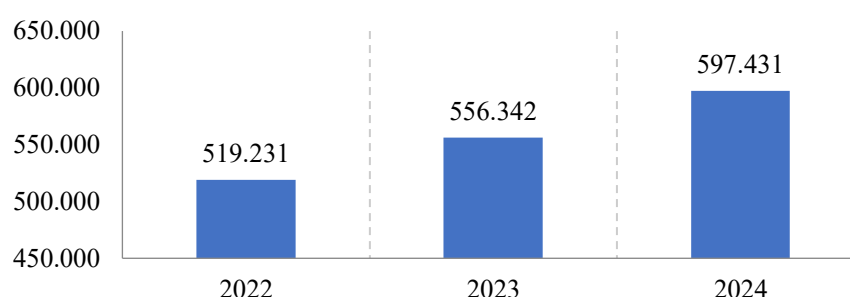


Figure 1. Poverty line increased continuously

Source: Badan Pusat Statistik Kabupaten Nunukan (2024).

Domestic circumstances depict a scenario that contrasts with overall economic expansion. In March 2024, Nunukan's poverty rate escalated to 5.73 per cent, equating to 12.61 thousand individuals, marking an uptick of 0.20 percentage points and 0.73 thousand persons from March 2023. The threshold for poverty increased from IDR 519,231 per capita monthly in 2022 to IDR 556,342 in 2023 and IDR 597,431 in 2024. From 2023 to 2024, the Poverty Gap Index escalated from 0.59 to 0.82, while the Poverty Severity Index advanced from 0.09 to 0.23 (BPS-Statistics Indonesia, Nunukan Regency, 2024). Statistics Indonesia (BPS) characterises P1 as the mean spending disparity of the impoverished in relation to the poverty threshold, while P2 denotes the allocation of expenditure among the poor demographic (Statistics Indonesia, 2025). These modifications do not establish that economic expansion or international commerce leads to poverty; instead, they illustrate that Gross Regional Domestic Product (GRDP) is inadequate as the exclusive measure of household economic fortitude.

Figure 1 shows that the poverty line in Nunukan rose from Rp519,231 per capita per month in 2022 to Rp597,431 in 2024; this increase must be interpreted alongside the P1 and P2 indices, as a rise in P1 reflects a widening average gap between the poor population's expenditure and the poverty line, while an increase in P2 indicates growing expenditure inequality within the poor population. Consequently, the figure more accurately reflects household economic vulnerability rather than implying a causal link to trade with Malaysia (BPS-Statistics Indonesia, Nunukan Regency, 2024; BPS-Statistics Indonesia, 2025). Meanwhile, price dynamics in February 2025 showed an

annual inflation rate of 0.41 per cent with a Consumer Price Index (CPI) of 106.03; however, movements varied across expenditure groups: the food and beverage serving services (restaurants) group rose by 8.11 per cent, followed by food, beverages, and tobacco (3.50 per cent), personal care and other services (3.25 per cent), clothing and footwear (1.88 per cent), and transportation (1.23 per cent), whereas housing, water, electricity, and household fuels experienced deflation of 14.18 per cent, alongside health (1.10 per cent), recreation, sports, and culture (0.73 per cent), and information, communication, and financial services (0.57 per cent) (BPS-Statistics Indonesia, Nunukan Regency, 2025b).

Table 1: Year-on-Year Changes in CPI Expenditure Groups in Nunukan

Expenditure Group	Year-on-Year Change (%)	Direction	Absolute Change
Housing, water, electricity and household fuels	-14,18	Deflation	14,18
Health	-1,10	Deflation	1,10
Recreation, sport and culture	-0,73	Deflation	0,73
Information, communication and financial services	-0,57	Deflation	0,57
Furnishings, household equipment and routine maintenance	0,48	Inflation	0,48
Education	0,70	Inflation	0,70
Transportation	1,23	Inflation	1,23
Clothing and footwear	1,88	Inflation	1,88
Personal care and other services	3,25	Inflation	3,25
Food, beverages and tobacco	3,50	Inflation	3,50
Restaurants / food service	8,11	Inflation	8,11

Headline inflation = 0.41 per cent year-on-year; CPI = 106.03

Source: Badan Pusat Statistik Kabupaten Nunukan (2025b).

Table 1 shows that Nunukan's headline inflation of 0.41 per cent stems from price changes that vary significantly across expenditure groups; consequently, this figure is insufficient to fully capture the price pressures experienced by all households. Prices, income, costs, information, and available alternatives shape household and producer decisions from a microeconomic standpoint (Pindyck & Rubinfeld, 2018). Therefore, price variations and the existence of cross-border market networks are relevant when assessing household and market capacity, although these factors do not demonstrate that trade between Nunukan and Tawau directly causes changes in the Consumer Price Index (CPI) (Pindyck & Rubinfeld, 2018; Shafitri et al., 2020; Sarjono et al., 2022). Institutional dimensions also shape these conditions; Kurniasih and Umar (2022) found a significant positive relationship between the implementation of border area policies and the effectiveness of Nunukan's regional resilience, although their study did not isolate the specific contributions of production structures, market connectivity, household conditions, and informal trade. Meanwhile, Sarjono et al. (2022) demonstrated that Smokol practices evolved in response to economic needs and social networks that were not fully accommodated by formal mechanisms; thus, border governance involves not only oversight but also the institutional capacity to manage community economic activities in an adaptive manner (Kurniasih & Umar, 2022; Sarjono et al., 2022).

The literature on regional economic resilience distinguishes economic growth from a region's ability to withstand shocks through concepts including resistance, recovery, adaptation, structural change, and inter-component economic relationships (Sensier et al., 2016; Evenhuis, 2017; Sutton & Arku, 2022; Sutton et al., 2023), while Hippe et al. (2024) demonstrate that border regions may exhibit resilience patterns distinct from other regions. This perspective complements macroeconomics, which explains growth and stability (Carlin & Soskice, 2015); microeconomics, which explains household and producer choices (Pindyck & Rubinfeld, 2018); and international trade, which explains the roles of relative prices, trade costs, comparative advantage, and policy in cross-border exchange (Krugman et al., 2018). Within the *Asta Gatra* framework, Nunukan's economic resilience reflects the interaction of geography, demography, natural resources, socio-cultural conditions, politics, and defence and security, as these dimensions jointly influence production, market access, community networks, institutional authority, and mobility across the national border (Tangka et al., 2025). However, existing research has tended to address business networks, fisheries trade, Smokol practices, border policies, and the demand for goods and services in isolation (Shafitri et al., 2020; Yanti & Muawanah, 2020; Sarjono et al., 2022; Kurniasih & Umar, 2022; Agusriyanti et al., 2024); consequently, there is currently no framework that integrates macroeconomic conditions, microeconomic choices, cross-border trade, household capacity, and governance to explain Nunukan's economic ability to maintain its functions amidst changing external conditions.

Addressing this gap, this study develops a Border Economic Resilience Framework based on four analytical dimensions developed specifically for this study: productive capacity, connectivity capacity, household and market buffer capacity, and governance capacity. These dimensions are operationalised through perspectives drawn from macroeconomics, microeconomics, international trade, and regional economic resilience rather than being constructs adopted from a single theory. The study addresses the question: how can the economic capacity of the Nunukan border area be strengthened so that connectivity between Nunukan and Tawau expands economic options, enhances adaptability, and supports national resilience? Consequently, the study positions growth as one element of a broader resilience system that must be analysed alongside the four analytical dimensions.

LITERATURE REVIEW

Theoretical Studies

Macroeconomics explains how growth, inflation, interest rates, exchange rates, and policy shape domestic stability and external interaction (Carlin & Soskice, 2015), while microeconomics examines how prices, income, costs, information, and resource constraints influence household and producer choices (Pindyck & Rubinfeld, 2018). International trade theory links comparative advantage, relative prices, trade costs, and policy to specialisation and cross-border exchanges (Krugman et al., 2018). However, growth and efficient exchange do not necessarily ensure resilience. Regional economic resilience, therefore, emphasises resistance, recovery, adaptation, and economic reconfiguration when external conditions change (Evenhuis, 2017; Sutton & Arku, 2022). This study integrates these perspectives through four analytical dimensions developed for the Nunukan Tawau border economy: productive capacity, connectivity capacity, household and market buffer capacity, and governance capacity. Their implications are

interpreted through the economic *gatra* and its interaction with geography, demography, natural resources, socio-cultural relations, politics, defence, and security within the broader framework of national resilience.

Empirical Studies

Studies of the border between Indonesia and Malaysia show that being close to each other can create economic opportunities and make people more dependent on cross-border markets. Kurnia (2018) identifies cross-border trade as an important means of supporting the welfare of Sebatik communities, while Shafitri et al. (2020) demonstrate mutual dependence between coastal communities in Nunukan and Tawau for basic necessities and fishery production inputs, with business networks relying on access to resources, labour, markets, technology, capital, and savings. Yanti and Muawanah (2020) further show that the development of the Sebatik Integrated Marine and Fisheries Centre was intended to strengthen Indonesia's position in cross-border fisheries cooperation. However, formal arrangements do not encompass all economic activity (Veronika, 2016). Sarjono et al. (2022) demonstrate that the informal Smokol practice forms a multi-location market through resource dependence, local economic integration, and community networks that operate partly outside formal regulation. Infrastructure and governance also shape these relationships. Mubarak (2021) documents uneven infrastructure availability in Nunukan, while Kurniasih and Umar (2022), using questionnaires from 125 respondents and simple linear regression, demonstrate a significant relationship between border policy implementation and regional resilience, although their model does not isolate the specific economic mechanisms involved. Raharjo and Anuar (2022) identify strong socioeconomic ties across Sebatik and assess the feasibility of a Sebatik Border Trade Center as a mechanism for regional economic integration while retaining security considerations. Anuar (2016) similarly highlights the economic interdependence of the Tawau and Nunukan border areas and argues for border development that combines economic advancement with defence and security considerations. Agusriyanti et al. (2024) further examine the demand for goods and services in Sebatik within the context of cross-border trade and local natural resources. Together, these studies explain important elements of Nunukan's border economy, although trade, infrastructure, household activity, and governance are largely examined as separate dimensions.

The empirical literature consequently reveals a distinct void. Research on Nunukan and Sebatik has investigated fisheries networks, transnational commerce, infrastructure, informal markets, policy execution, and regional integration; however, it has failed to incorporate macroeconomic conditions, microeconomic decisions, and the framework of cross-border exchange into a cohesive model of border economic resilience. Giri et al. (2024) situate integrated development in the Nunukan and Malaysia border within the larger framework of national resilience; however, the economic processes that collectively influence resilience through production, connectivity, household and market buffer capacity, and governance are not adequately implemented. The impact of enhanced cross-border connections on adaptive capacity versus structural dependence in the absence of local options remains ambiguous. To address this gap, the study combines macroeconomics, microeconomics, international trade, and regional economic resilience to explain the economic environment, actor choices, exchange patterns, and adaptive capacity (Carlin & Soskice, 2015; Pindyck & Rubinfeld, 2018; Krugman et al., 2018;

Evenhuis, 2017; Sutton & Arku, 2022), while empirical evidence from Nunukan and Sebatik shows that production, market access, household livelihoods, formal and informal trade, infrastructure, and governance interact within the Nunukan Tawau border economy (Shafitri et al., 2020; Yanti & Muawanah, 2020; Sarjono et al., 2022; Kurniasih & Umar, 2022). This research delineates border economic resilience via four interconnected capacities: productive capacity, connectivity capacity, household and market buffer capacity, and governance capacity, whose interplay signifies the border economy's capability to withstand shocks, adjust to evolving circumstances, sustain vital economic operations, and enhance the economic *gatra* within the overarching *Asta Gatra* framework of national resilience, as illustrated in Figure 2.

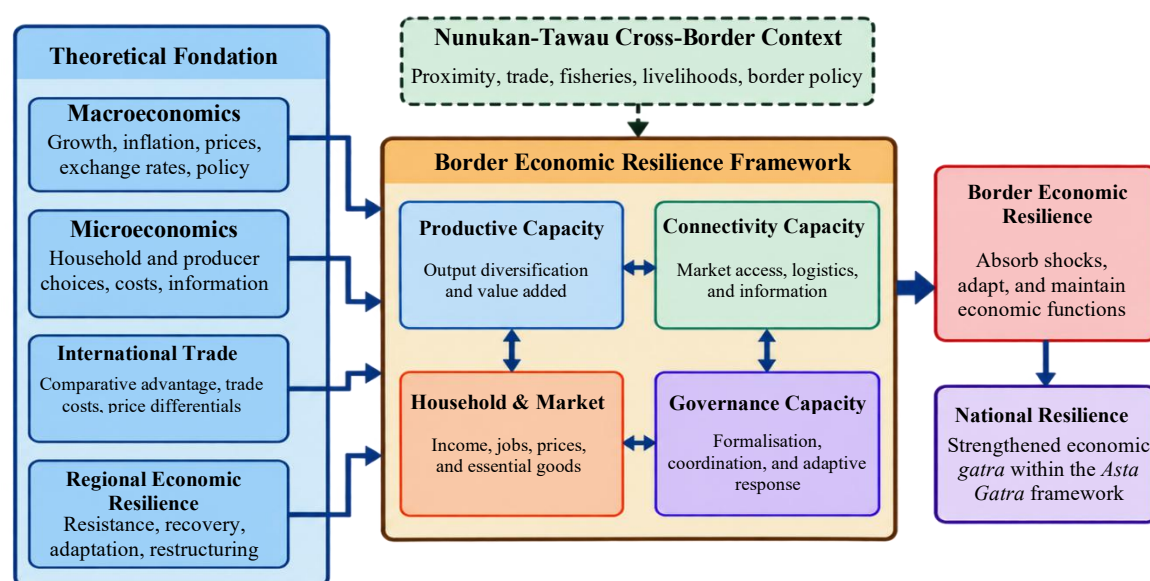


Figure 2. Research Conceptual Framework

METHODS

This research uses an embedded single case study and qualitative document analysis to examine the economic resilience of Nunukan Regency, an Indonesian border region adjacent to Malaysia, with Sebatik Island and the Nunukan-Tawau economic corridor as embedded units of analysis. The design examines economic dynamics within their geographical and institutional contexts using multiple sources of evidence (Yin, 2018), while document analysis supports the systematic selection and interpretation of evidence relevant to the research question (Morgan, 2022). The evidence cut-off was 28 February 2025. Sources comprised official BPS statistics, applicable national and regional regulations, and peer-reviewed journal articles and conference proceedings published from 2015 to the cut-off date on Nunukan, Sebatik, cross-border trade, regional economics, and regional economic resilience. Publications released after 28 February 2025 were used only when they reported conditions for 2024 or February 2025 and were available before the manuscript was finalised. Sources were selected for relevance, authority, traceability, credibility, and temporal appropriateness. Figure 2 guided the organisation of evidence on output growth, inflation, poverty, production structure, livelihoods, trade, connectivity, and governance. Evidence was coded deductively into

four analytical dimensions developed for this study: productive capacity, connectivity capacity, household and market buffer capacity, and governance capacity (Saldaña, 2021). Evidence that did not fit these initial dimensions was examined inductively to preserve context-specific features of Nunukan. Data from official statistics, legislation, and previous empirical research were then analysed through cross-source synthesis to identify convergent and divergent patterns. The analysis followed data reduction, evidence display, and conclusion drawing and verification (Miles et al., 2020), with cross-source triangulation used to strengthen reliability (Yin, 2018). Because the study uses neither primary data nor econometric analysis, the findings identify patterns of vulnerability and adaptive capacity rather than causal relationships.

RESULTS AND DISCUSSION

Result

Socioeconomic Baseline and Productive Capacity

Nunukan recorded a population of 227,460 in 2024, a nominal GRDP of IDR 40.54 trillion, and an economic growth of 4.03 per cent. The poverty rate reached 5.73 per cent, representing 12.61 thousand people, while the poverty line increased to IDR 597,431 per capita per month. The poverty depth and severity indices also rose to 0.82 and 0.23, respectively (BPS-Statistics Indonesia, Nunukan Regency, 2024, 2025a, 2025c). The 2023 Agricultural Census recorded 21,601 agricultural business households, an increase of 38.25 per cent from 2013 (BPS-Statistics Indonesia, Nunukan Regency, 2023). Table 2 reports these documentary indicators together with their reference periods and their relevance to the analytical dimensions used in this study. The observed pattern combines positive output growth with higher poverty indicators and a substantial agricultural livelihood base; interpretation of its implications for resilience is reserved for the Discussion section.

Table 2. Selected Socioeconomic Indicators for Nunukan

Indicator	Latest value	Reference period	Resilience relevance
Nominal GRDP	IDR40.54 trillion	2024	Scale of local economic activity
Economic growth	4.03%	2024	Capacity to sustain output
Population	227,460	2024	Labour force and market base
Poverty rate	5.73% (12.61 thousand people)	March 2024	Household buffer and inclusion
Poverty line	IDR597,431/capita/month	March 2024	Minimum purchasing-power benchmark
Agricultural business households	21,601 households	2023 Census	Production base and livelihood dependence
Inflation	0.41% y-on-y; CPI 106.03	February 2025	Short-term price conditions

Source: BPS-Statistics Indonesia, Nunukan Regency (2023, 2024, 2025a, 2025b, 2025c).

The production structure also extends beyond aggregate output. Shafitri et al. (2020) found that fisheries business networks between Nunukan and Tawau involve access to resources, labour, markets, technology, capital and savings, while Yanti and Muawanah (2020) documented the role of the Sebatik Integrated Marine and Fisheries

Centre in supporting fisheries production and cross-border trade. These findings show that productive capacity depends not only on the availability of local resources but also on the ability of producers to access inputs, markets and supporting economic facilities.

Connectivity and Cross-Border Market Access

Nunukan's geographical location has created a market structure in which Tawau serves as the nearest economic hub for parts of the Sebatik region. Fisheries networks link Nunukan and Tawau through the supply of necessities, production inputs, and market access (Shafitri et al., 2020), while Yanti and Muawanah (2020) have documented formal cross-border trade arrangements linked to the development of the fisheries sector. However, formal administrative boundaries do not fully align with the functional markets utilized by border communities. Sarjono et al. (2022) found that the *Smokol* phenomenon shapes a cross-location market driven by resource dependency, local economic integration, and cross-border practices that extend beyond formal government arrangements.

Uneven domestic connectivity in the border area resulted in disparities regarding infrastructure availability in Nunukan between 2015 and 2019; while roads, markets, and shops met established availability standards, electricity and clean water infrastructure fell short of these benchmarks (Mubarak, 2021). Thus, evidence indicates that proximity to Tawau expands market access, yet the sustainability of this connectivity also depends on the availability of domestic transport, infrastructure, and formal cross-border routes. Consequently, connectivity in Nunukan is characterized by cross-border accessibility existing alongside uneven domestic alternatives.

Household and Market-Buffer Capacity

Household and market conditions reveal that Nunukan's overall economic performance does not fully reflect the pressures experienced by vulnerable households. The poverty rate rose from 5.53 per cent in 2023 to 5.73 per cent in 2024, while poverty depth increased from 0.59 to 0.82 and poverty severity from 0.09 to 0.23 (BPS Statistics Indonesia, Nunukan Regency, 2024). Although annual inflation was relatively low at 0.41 per cent in February 2025, with a CPI of 106.03, price movements differed substantially across expenditure groups, with food, beverages and tobacco increasing by 3.50 per cent and restaurants by 8.11 per cent, while housing, water, electricity and household fuels declined by 14.18 per cent (BPS Statistics Indonesia, Nunukan Regency, 2025b). At the same time, fisheries networks connect households and businesses in Nunukan and Tawau to labour, markets, technology, capital, and other economic resources (Shafitri et al., 2020). These findings indicate that household and market buffer capacity in Nunukan is shaped by the ability of households to maintain income and livelihoods, access essential goods, and use both domestic and cross-border market channels when economic conditions change, without implying that cross-border trade itself causes changes in poverty or prices.

Governance Capacity and Border Economic Organisation

The evidence identifies two governance patterns in Nunukan's border economy. First, Kurniasih and Umar (2022), using data from 125 respondents and simple linear regression, found a significant positive relationship between border policy implementation and regional resilience, although their analysis did not isolate the contribution of specific economic interventions. Second, Sarjono et al. (2022) found that

informal Smokol practices persist alongside formal border arrangements through resource dependence, community networks, and local economic integration. Taken together, these findings show that Nunukan's border economy operates through both formal institutional arrangements and community-based economic practices. Governance capacity therefore emerges from the extent to which these arrangements can accommodate production, market access, and everyday cross-border transactions within the existing regulatory framework (Kurniasih & Umar, 2022; Sarjono et al., 2022). These findings, together with the preceding analysis of productive, connectivity, and household and market buffer capacities, are synthesised in Table 3 to present the proposed Border Economic Resilience Framework for Nunukan.

Table 3. Border Economic Resilience Framework for Nunukan

Capacity	Evidence-based vulnerability	Resilience function	Illustrative indicator	<i>Asta Gatra</i> linkage
Productive	Limited value addition and commodity concentration	Retain local value and diversify markets	Processed output; buyer diversity	Economic <i>gatra</i> ; geography as a contextual dimension
Connectivity	High domestic logistics costs and limited routes	Maintain alternative market and supply channels	Freight cost and time; route reliability	Economic <i>gatra</i> ; geography as a contextual dimension.
Household and market buffer	Household exposure to income, poverty, and price pressures	Absorb income, price, and supply disruptions	Poverty depth; essential goods prices; income diversity	Economic <i>gatra</i> ; demography and socio-cultural relations as contextual dimensions.
Governance	Fragmented authority and uncertain formalisation	Coordinate facilitation, regulation, and adaptation	Clearance time and cost; formal trade participation; institutional response	Economic <i>gatra</i> ; politics, defence, and security as contextual dimensions.

Source: Synthesis based on Evenhuis (2017), Sutton and Arku (2022), Sutton et al. (2023), and the Nunukan-Sebatik evidence reviewed in this study.

Discussion

Border Economic Resilience within the Asta Gatra Framework

Nunukan's border economic resilience depends not only on the scale of cross-border activity but also on the interaction between economic openness and local adaptive capacity. Macroeconomics explains the role of growth, inflation, and external conditions; microeconomics clarifies household and producer responses to prices, costs, distance, and alternatives; while international trade theory explains how proximity, comparative advantage, and trade costs shape exchange (Carlin & Soskice, 2015; Pindyck & Rubinfeld, 2018; Krugman et al., 2018). Resilience emerges when economic actors can maintain essential functions and adjust production, sourcing, and market relationships

during disruption, consistent with resistance, recovery, adaptation, and structural adjustment (Sensier et al., 2016; Evenhuis, 2017; Sutton & Arku, 2022; Sutton et al., 2023). In this study, the economic *gatra* is the focal analytical dimension. Productive capacity, connectivity capacity, household and market buffer capacity, and governance capacity are analysed as economic-resilience dimensions, while geography, demography, natural resources, socio-cultural relations, politics, defence, and security are treated as interacting contextual dimensions rather than as separate measured variables. This interpretation positions Nunukan's production, distribution, livelihoods, market access, and border governance within the broader *Asta Gatra* structure of national resilience.

From cross-border connectivity to economic optionality

Access to Tawau provides Nunukan with nearby demand, production inputs, and commercial opportunities, as reflected in fisheries networks, cross-border trade, and informal market formation in Sebatik (Putra, 2015; Shafitri et al., 2020; Yanti & Muawanah, 2020; Sarjono et al., 2022). The same connectivity can nevertheless create vulnerability when firms have few alternative buyers, households rely on limited supply routes, or domestic distribution cannot substitute for cross-border access during disruption. This study defines economic optionality as the availability of several viable production, sourcing, logistics, and market channels that allow essential economic functions to continue when one channel is disrupted. Economic optionality can reconcile market efficiency with national resilience because producers may rationally choose Tawau when distance and transaction costs are lower, whereas redirecting activity to substantially higher-cost domestic routes would not necessarily increase resilience (Pindyck & Rubinfeld, 2018; Krugman et al., 2018). The analytical implication is therefore to assess whether productive upgrading, stronger domestic logistics, predictable formal border procedures, and household buffers expand feasible alternatives. These relationships are interpreted as patterns of vulnerability and adaptive capacity; the documentary evidence does not establish that cross-border connectivity causes poverty, inflation, or resilience.

Policy Relevance and Analytical Limits

Policy relevance lies in assessing whether interventions expand economic options and reduce critical dependencies rather than merely increasing infrastructure or formalising transactions. Productive capacity requires value-added processing, storage, financing, quality standards, and diversified buyers, while connectivity capacity depends on reliable domestic logistics and predictable cross-border procedures. Household and market buffer capacity concerns livelihood diversification and the continuity of essential-goods supply, whereas governance capacity concerns effective institutional coordination, facilitation, and adaptive response. Progress can be monitored through freight costs, travel time, price differentials, local processing, buyer diversification, formal trade participation, and border-clearance performance alongside established BPS indicators. However, the document-based single case study cannot establish household-level causal effects; therefore, rising poverty cannot be attributed to cross-border trade, nor can low inflation be interpreted as evidence of structural resilience. The contribution instead lies in integrating verified economic indicators with border evidence to identify vulnerability and adaptive capacity, while future empirical research should test the relative influence and interaction of the four analytical dimensions.

CONCLUSIONS AND SUGGESTIONS

This study addresses the research question by demonstrating that Nunukan can transform its connectivity with Tawau into a source of national resilience when cross-border relations broaden economic opportunities rather than generate dependence on a single market, supply route, or institutional channel. Positive GRDP growth and low headline inflation, taken in isolation, are insufficient indicators of economic resilience because household vulnerability, dependence on primary-sector livelihoods, uneven connectivity, and institutional constraints continue to shape the capacity of economic actors to respond and adapt to disruption. The proposed Border Economic Resilience Framework therefore integrates four mutually reinforcing capacities: productive capacity, connectivity capacity, household and market buffer capacity, and governance capacity. Within this framework, the economic *gatra* serves as the principal analytical dimension, while geography, demography, natural resources, socio-cultural relations, political institutions, and defence and security constitute interconnected contextual factors that shape economic resilience. Accordingly, strengthening border economic resilience does not imply reducing legitimate economic interaction with Malaysia. Rather, it requires sufficient domestic productive capability, diversified market and supply channels, and adaptive institutional capacity to sustain essential economic functions when prices, logistics networks, market conditions, or border procedures change.

For policy, the findings support a coordinated strategy that strengthens local value addition in agriculture and fisheries, improves reliable domestic logistics and storage, facilitates predictable and legitimate small-scale cross-border trade, protects continuity in household livelihoods and essential-goods supply, and strengthens inter-agency coordination. An integrated border-economic monitoring system could complement BPS indicators with freight costs and travel times, commodity-price differentials, local processing rates, buyer diversity, formal-trade participation and clearance performance. The study is limited by its document-based single-case design, regency-level statistical aggregation, absence of new household and firm data, and inability to estimate causal effects. Future research should therefore test the four-capacity framework through mixed-method, longitudinal and comparative border studies, supported by household and firm panels, formal and informal trade-flow data, commodity-level price differentials, freight and clearance-time measurements, and spatial accessibility data across *Sebatik* and other Indonesian border regions.

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Declarations

Joseph Robert Giri contributed to conceptualisation, drafting, and supporting data; Kup Yanto Setiyono contributed to methodology, analysis, validation, review, and finalisation. Both authors approved the manuscript. This research received no external funding, and the authors declare no conflicts of interest. Ethical approval and informed consent were unnecessary because the study used secondary data and document analysis. Data were sourced from official statistics, regulations, and literature.

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