

Cross-Border Migration and Its Geodynamic Impacts on Demographic-Economic Vulnerability and Social Resilience in Border Communities of Nunukan Regency

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Received: 06/06/2026

Revised: 14/09/2026

Accepted: 19/10/2026

Abstract

The Indonesia–Malaysia border region is a dynamic space where cross-border migration creates economic opportunities while increasing the demographic-economic vulnerability of local communities. This study examines the interrelationships among migration geodynamics, demographic-economic vulnerability, and social resilience in Nunukan Regency, North Kalimantan Province, and formulates directions for integrated border development policies. The study covered mainland Nunukan, Sebatik Island, the former Simantipal Outstanding Boundary Problem (OBP) area, and the Sinapad Sesai segment. A qualitative approach supported by descriptive-quantitative secondary data was employed within a Grounded Policy Research framework. Data were collected through field observations, document analysis, and in-depth interviews with 17 purposively selected key informants: seven migrant workers, three migrant families, two community leaders, and five government officials. Data were analyzed using the Spradley Ethnographic Analysis Model. The findings show that high population mobility and strong economic linkages with Sabah, Malaysia, have increased dependence on informal economic activities, cross-border markets, and employment opportunities in Malaysia, contributing to structural demographic-economic vulnerability. Nevertheless, communities demonstrate social resilience through livelihood diversification, strengthened social capital, and adaptive population administration. The study concludes that integrated border development should prioritize local economic strengthening, downstream seaweed processing, and the strengthening of the Tol Laut (Sea Toll) logistics system, supported by improved population administration and cross-border governance. These interventions can reduce economic dependence on Malaysia, strengthen local economic self-reliance and social resilience, and position Nunukan as an economic shield that supports community welfare and national sovereignty

Keywords

Cross-Border Migration; Migration Geodynamics; Demographic-Economic Vulnerability; Social Resilience; Border Communities.

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1. INTRODUCTION

National border regions are no longer understood merely as administrative boundaries that delineate territorial sovereignty, but also as spaces of social, economic, and political interaction where diverse interests between countries converge. From the perspective of border studies, border regions constitute dynamic spaces shaped by population mobility, cross-border trade, and socio-economic networks arising from geographical proximity (Newman & Sheba, 2006; Scott, 2012). Therefore, the development of border regions should not be oriented solely toward security considerations but should also focus on strengthening community welfare, social resilience, and the sustainability of regional development.

In Indonesia, the development of border regions has undergone a paradigm shift from an inward-looking approach, which positioned border areas primarily as the outermost territories of the state, toward an outward-looking approach that positions borders as the country's front porch. This policy orientation seeks to strengthen regional connectivity, promote economic growth, and improve community welfare. Nevertheless, the implementation of border development continues to face various challenges, particularly in areas characterized by high levels of economic dependence on neighboring countries.

Nunukan Regency, North Kalimantan Province, represents one of the areas that reflects the complexity of Indonesia–Malaysia border development. The geographical proximity between Sebatik Island and Tawau, Malaysia, has encouraged high levels of population mobility, cross-border trade, and migrant worker flows. These interactions generate economic opportunities through access to markets, employment opportunities, and trading networks, but at the same time create dependence on Malaysia's economic system, particularly in the distribution of goods, employment, and trading activities. Such conditions have the potential to generate socio-economic vulnerabilities among border communities.

The vulnerability of border communities is influenced not only by economic disparities between countries but also by demographic characteristics and local economic structures. The mobility of the working-age population, the dominance of the informal sector, and limited livelihood diversification are factors that reinforce dependence on cross-border economic activities. From the perspective of international migration, population mobility constitutes a livelihood strategy shaped by economic factors, geographical proximity, and transnational social networks (Haas et al., 2020). At the same time, border communities possess adaptive capacities through the strengthening of social networks, livelihood diversification, and the utilization of local resources as forms of social resilience.

Several studies have demonstrated that the economic relationships of Indonesia–Malaysia border communities are strongly influenced by the intensity of cross-border interactions. Siburian (2012)

found that communities on Sebatik Island have strong economic linkages with Tawau through cross-border trade and the distribution of goods, although such conditions also generate dependence on the economic center of the neighboring country. This finding is consistent with Eilenberg (2012), who explains that border communities develop livelihood strategies through mobility and cross-regional economic networks in response to limitations in the domestic economy. Anggita et al. (2024) emphasize the importance of collaborative governance in managing migrant worker mobility, while Makmur (2025) demonstrates that the success of border development in Nunukan is influenced by policy implementation, government–community relations, and improvements in local welfare.

From a social perspective, border communities also possess adaptive capacities through cultural networks and transnational social relations. Azwar et al. (2024) demonstrate that socio-cultural relations between Indonesian and Malaysian communities contribute to maintaining harmony and sustaining cross-border interactions. Nevertheless, cross-border migration continues to entail dimensions of vulnerability, particularly with regard to migrant worker protection and unequal access to economic opportunities (Suhada et al., 2024). Syahrudin and Ulfah (2025) further demonstrate that cross-border migration can contribute to community resilience through remittances and enhanced human resource capacity, but it requires improved migration governance.

Recent international scholarship emphasizes that borderlands should be understood as place-based and relational spaces in which migration, development, and local livelihoods are mutually interconnected. Rather than viewing migration simply as a movement between origin and destination, a place-based mobility perspective highlights how the experiences of migrants and border residents are simultaneously shaped by economic, social, political, and spatial conditions. This perspective is particularly relevant to border regions where mobility can generate economic opportunities while also reproducing uneven development and dependence on external economic centers (Kaşlı & Winters, 2025).

Recent evidence also indicates that community resilience in migration contexts is shaped by the interaction of economic resources, community competence, information, and social capital. These dimensions determine how communities respond to the pressures and opportunities associated with migration and changing socio-economic conditions (Olcese et al., 2024). In the Indonesian context, this perspective is complemented by evidence that contemporary migration and border governance faces challenges related to changing mobility patterns, institutional coordination, and the need to balance movement facilitation with security and sustainable development (Arifin et al., 2024). Taken together, these findings suggest that the resilience of border communities cannot be separated from the quality of migration governance and the local economic structures within which cross-border mobility takes place

Theoretically, analyzing migration geodynamics, demographic-economic vulnerability, and social resilience as separate dimensions may obscure the reciprocal mechanisms through which border communities experience and respond to cross-border mobility. Studies focusing primarily on migration tend to emphasize flows, trajectories, or migrant livelihoods, while vulnerability-oriented studies generally focus on structural exposure to economic and demographic risks, and resilience studies emphasize community adaptive capacity. When treated independently, these perspectives may overlook how population mobility simultaneously reshapes local demographic structures, alters livelihood opportunities and dependencies, and stimulates adaptive responses within households and communities. In borderlands, these processes are particularly interconnected because migration, markets, institutions, and social networks operate across territorial boundaries and multiple spatial scales. Recent place-based mobility scholarship emphasizes that migrants and border residents should be examined simultaneously because their mobilities and livelihoods are mutually embedded in the transformation of borderland spaces (Kaşlı & Winters, 2025). Therefore, an integrated analytical framework is necessary to explain not only how migration produces economic opportunities and vulnerabilities, but also how communities transform these pressures into adaptive strategies and forms of social resilience. This integrated perspective constitutes the novelty of the present study by connecting migration dynamics, demographic-economic vulnerability, and social resilience within a single borderland analytical framework.

In this study, migration geodynamics refers to the spatial, temporal, demographic, economic, and social dynamics generated by the movement of people across and around national borders, including the intensity and direction of mobility, migrant trajectories, population redistribution, cross-border livelihood practices, and the networks and institutions that facilitate or constrain such movements. The concept emphasizes that migration is not merely a flow of people from an origin to a destination but a dynamic process through which mobility interacts with geographical proximity, border regulations, labor markets, economic opportunities, social networks, and local livelihoods (Axelsson & Hedberg, 2025). This conceptualization is consistent with geographical approaches that understand migration through the interconnected dimensions of people, borders, and trajectories, while recognizing that mobility and immobility are shaped by spatial and institutional conditions (Velde & van Naerssen, 2010). It also corresponds with contemporary place-based mobility perspectives, which emphasize that different forms of mobility and immobility transform border communities through interconnected economic, social, political, and spatial processes (Kaşlı & Winters, 2025). Accordingly, migration geodynamics in Nunukan are understood as an evolving interaction between cross-border population mobility, the Indonesia–Malaysia border, local economic structures, and the social networks and adaptive practices of border communities

Based on these studies, research on the Indonesia–Malaysia border region has extensively examined cross-border trade, migrant labor, socio-cultural relations, and regional development. However, studies integrating cross-border migration dynamics, demographic-economic vulnerability, and community social resilience remain limited. Most existing studies examine these dimensions separately and therefore do not fully explain how population mobility shapes socio-economic transformations and adaptive strategies among border communities. Therefore, this study aims to analyze the interrelationships among cross-border migration geodynamics, demographic-economic vulnerability, and social resilience among communities in Nunukan Regency as a strategic border region between Indonesia and Malaysia.

2. METHODS

This study employed a qualitative research approach supported by secondary descriptive-quantitative data to analyze the interrelationships among cross-border migration geodynamics, demographic-economic vulnerability, and social resilience among communities in the border region of Nunukan Regency. A qualitative approach was selected because it enables an in-depth exploration of social phenomena by examining community experiences, perceptions, practices, and adaptive strategies in responding to the dynamics of border regions (Creswell & Poth, 2018). The study adopted a grounded policy approach as the overarching analytical framework for understanding border development policy from an empirical and inductive perspective. This approach allows conceptual understanding to be constructed from empirical findings in the field and facilitates the interpretation of relationships between social phenomena, community responses, and the dynamics of border development policies (Aslipour & Zargar, 2022; Richards & Farrokhnia, 2016). In this study, the grounded policy approach does not constitute a separate research design but serves as an analytical orientation for connecting empirical findings with the formulation of integrated border development policies.

The study was conducted in Nunukan Regency, North Kalimantan Province, as a strategic Indonesia–Malaysia border region characterized by intensive cross-border interactions, particularly in terms of economic relations, population mobility, and migration activities involving Sabah, Malaysia. The research site was purposively selected because its characteristics represent the phenomenon under investigation, namely the presence of economic opportunities arising from cross-border connectivity alongside vulnerabilities resulting from dependence on the neighboring country's economic system.

The research data consisted of primary and secondary data. Primary data were collected through field observations, documentation of the socio-spatial conditions of the border region, and in-depth interviews with 17 key informants selected using purposive sampling. Informants were selected based

on their direct involvement, experience, and knowledge of cross-border migration, transnational economic activities, and the social dynamics of border communities. The informants included representatives of local government, border management institutions, community leaders, cross-border economic actors, and community members with experience of international mobility. The number of informants was determined based on the principle of information richness, whereby data collection continued until the information obtained provided sufficient depth to develop a comprehensive understanding of the phenomena under investigation (Creswell & Poth, 2018).

Tabel 1. Key Informant Profile Matrix

Informant Code	Informant Category	Number	Relevance to Study
MW-01-07	Migrant workers	7	Cross-border mobility, employment, livelihood strategies
MF-01-03	Border Migrant Families	3	Household economy, migration impacts, adaptation
CL-01-02	Community Leaders	2	Social capital, community resilience, local dynamics
GI-01-05	Government/Border Institutions	5	Migration governance, population administration, border policy
Total		17	

Secondary data were obtained through documentary research and the analysis of institutional data related to the demographic, social, and economic characteristics of border communities. Secondary data sources included population administration data from the Nunukan Regency Population and Civil Registration Office, border-region development documents, and the 2026 presentation materials of the Nunukan Regency Regional Border Management Agency. These secondary data were used to strengthen the interpretation of interview findings and provide an overview of the demographic structure and socio-economic conditions of border communities.

Data validity was established through source and methodological triangulation by comparing information obtained from interviews, field observations, policy documents, and supporting statistical data. Triangulation was employed to enhance the credibility of the research by examining the consistency of information across multiple data sources and methods (Creswell & Poth, 2018; Denzin, 2017). This approach enabled the study to develop a more comprehensive understanding of the relationship between cross-border mobility, demographic-economic vulnerability, and community adaptive capacity.

Data analysis was conducted using James Spradley's Qualitative Analysis Model as the primary framework for systematically interpreting the qualitative data. The model consists of four analytical stages: domain analysis, taxonomic analysis, componential analysis, and cultural theme analysis.

Domain analysis was conducted to identify the major categories related to cross-border migration, demographic-economic vulnerability, social resilience, and border governance. Taxonomic analysis was subsequently used to examine the relationships and hierarchical structures among the identified categories. Componential analysis was then conducted to identify the distinguishing characteristics, contrasts, and dimensions of each phenomenon. Finally, cultural theme analysis was used to identify overarching patterns and relationships that explain how border communities develop adaptive strategies in responding to the socio-economic dynamics of the border region.

First, domain analysis identified broad empirical domains emerging from interviews, observations, and documents, including population administration, employment and industry, logistics and monetary practices, and regional development. Second, taxonomic analysis organized each domain into subcategories and relationships, such as informal employment, migrant mobility, dependence on Malaysian goods, population-documentation gaps, and the utilization of local resources. Third, componential analysis compared the characteristics, constraints, and opportunities within and across these categories to identify critical vulnerabilities and locally available capacities. Fourth, cultural theme analysis synthesized these relationships into overarching themes concerning economic dependence, adaptive capacity, local self-reliance, and border resilience. These empirically derived themes were then matched with relevant secondary indicators from Disdukcapil and BPPD to formulate the policy dimensions, identify measurable problems, and determine strategic interventions. Thus, Table 2 represents the final analytical translation from qualitative evidence and supporting secondary data into grounded policy recommendations rather than a predetermined policy framework (Spradley, 1980).

The findings generated through the Spradley analytical process were subsequently interpreted within the grounded policy approach to connect empirical patterns with broader border development and governance issues. This analytical integration was used to identify the relationships among cross-border migration geodynamics, demographic-economic vulnerability, and social resilience, and to formulate policy implications for integrated border governance. In particular, the analysis was directed toward identifying how local economic diversification, adaptive population administration, cross-border mobility governance, and the development of industries based on regional potential can strengthen community resilience and reduce structural economic dependence on the neighboring country. Through this process, the study conceptualizes the strengthening of the border region as an economic shield, namely a development orientation that enables border communities to benefit from cross-border connectivity while simultaneously strengthening local economic self-reliance and social resilience.

3. FINDINGS AND DISCUSSION

3.1. Demographic Dynamics and Demographic-Economic Vulnerability of Border Communities

Analysis of population administration data from the Nunukan Regency Population and Civil Registration Office for 2025 shows that, of the total population of 235,283, approximately 133,003 people (56.53%) were within the working-age population, defined as those aged 15–49 years. During the 2022–2025 period, the regency also recorded positive net migration of 3,418 people, with the number of in-migrants (46,298) exceeding the number of out-migrants (42,880). Meanwhile, the employment structure remained largely dominated by informal economic activities, including farmers or plantation workers (8.20%), self-employed workers (6.51%), and casual daily laborers (3.68%). In contrast, the manufacturing sector employed only eight workers (0.003%). Furthermore, 52.55% of the population was recorded as unemployed, not working, or engaged as homemakers.

These findings indicate that Nunukan Regency exhibits distinctive spatial geodynamics characterized by high population mobility and strong economic linkages with Sabah, Malaysia. The geographical proximity between Sebatik Island and Tawau has transformed the border region into an active space of interaction that facilitates population movements, trade, and cross-border labor circulation. From the perspective of border studies, this condition demonstrates that borders function as functional spaces that shape transnational socio-economic relations rather than merely serving as administrative boundaries (Brunet-Jailly, 2005; Scott, 2012).

However, the relatively high proportion of the working-age population has not been accompanied by the expansion of the formal economic sector. Consequently, a substantial proportion of the population remains dependent on informal employment and cross-border economic activities. This condition demonstrates that spatial geodynamics generate not only economic opportunities but also reinforce demographic-economic vulnerability through dependence on markets and employment opportunities in Malaysia. This phenomenon is consistent with international migration theory, which suggests that population mobility is influenced by differences in economic opportunities, geographical proximity, and social networks (Haas et al., 2020). From the perspective of the New Economics of Labour Migration, migration can also function as a household livelihood strategy for diversifying income sources when local employment opportunities remain limited (Stark & Bloom, 1985).

This livelihood strategy was also reflected in the experience of migrant workers. One migrant worker explained, “Working in Nunukan does not necessarily provide sufficient income to meet our family’s needs. Because there are more job opportunities and better income in Malaysia, we choose to work there, even though we have to travel back and forth across the border” (MW-03, interview, 2025). This account illustrates that cross-border mobility is embedded in household livelihood

strategies rather than being driven solely by individual migration decisions. The decision to work in Malaysia reflects the interaction between limited local employment opportunities, wage differentials, and geographical accessibility. Thus, mobility provides an adaptive mechanism for households while simultaneously reinforcing economic dependence on the neighboring country.

These findings reinforce the studies of Siburian (2012) and Eilenberg (2012), which demonstrate that Indonesia–Malaysia border communities develop their livelihoods through mobility and cross-border economic activities. However, this study further indicates that spatial geodynamics function as a connecting mechanism between population mobility, demographic structure, and the economic vulnerability of border communities. Therefore, border development should not focus solely on connectivity and territorial security but should also prioritize strengthening local economic capacity, expanding formal employment opportunities, and improving human resource capacity to reduce dependence on the economic system of the neighboring country.

The adaptive dimension of household livelihoods was further illustrated by a family of migrant workers: “We do not rely solely on income from Malaysia. We continue to farm and run a small business at home. When work opportunities in Malaysia are limited, the income from these local activities still helps meet our family’s needs” (MF-02, interview, 2025). This narrative demonstrates how livelihood diversification functions as a coping and adaptive strategy among border households. Rather than relying exclusively on cross-border income, households combine migration-related earnings with local economic activities to reduce exposure to fluctuations in external employment and markets. Such diversification represents an important dimension of social resilience because it enables households to maintain their livelihoods amid changing cross-border economic conditions.

Population administration data further indicate that electronic identity card (e-ID/KTP-el) registration coverage has reached 98.11%, whereas the adoption of Digital Population Identity (Identitas Kependudukan Digital/IKD) remains relatively low at only 3.62%. This finding indicates that conventional population administration services have been implemented relatively effectively; however, digital transformation remains limited in comparison with the high level of population mobility in the border region. From a border governance perspective, strengthening digital population administration services is an important component of mobility management, the provision of accurate population data, and the strengthening of the socio-economic resilience of border communities (Brunet-Jailly, 2005; Scott, 2012).

An informant also highlighted the practical challenges of digital population administration: “People are already familiar with the KTP and understand the registration process. However, many people still do not understand how to use and activate the IKD, especially those who frequently move between locations or work outside the region” (GI-04, interview, 2025). This testimony suggests that

the low adoption of IKD is not merely a technological issue but is also related to digital literacy, service accessibility, and the highly mobile characteristics of border populations. Consequently, mobile population-administration services and direct assistance at strategic mobility points, such as ports, are important to ensure that population mobility does not create administrative exclusion.

3.2. Forms of Social Resilience among Border Communities

Although communities in Nunukan Regency face vulnerabilities arising from high levels of cross-border mobility, the dominance of the informal sector, and economic dependence on Sabah, the findings demonstrate that communities are able to develop adaptive capacities through economic strategies, social networks, and the strengthening of local institutions. Norris et al. (2007) explain that social resilience refers to the capacity of communities to maintain social functioning by strengthening economic capacity, social capital, communication, and institutional resources in response to pressures and environmental change. In the context of border regions, these capacities constitute important resources for sustaining community livelihoods amid the dynamics of cross-border migration.

At the household level, resilience is manifested through livelihood diversification. Households engaged in farming, fishing, and small-scale businesses combine local economic activities with cross-border trade or informal economic activities as strategies to reduce the risk of income loss in response to commodity price fluctuations and changes in cross-border policies. This strategy demonstrates that migration and cross-border economic activities are perceived as adaptive mechanisms for sustaining livelihoods. As Ellis (2000) explains, diversifying income sources constitutes an important mechanism for strengthening household economic resilience in areas vulnerable to market shocks.

At the community level, resilience is developed through strong social capital. Kinship networks, neighborhood relations, and community solidarity function as informal mechanisms for providing logistical assistance, temporary accommodation, and social support to migrant workers and deportees before they receive assistance from government authorities. These findings demonstrate that social capital not only strengthens community cohesion but also functions as a community-based social safety net. As one community leader explained, "When residents return from Malaysia or experience difficulties, their families and neighbors are usually the first to provide assistance. Some offer temporary accommodation or food, while others help contact the relevant government authorities" (CL-01, interview, 2025). This condition is consistent with Putnam (1993), who emphasizes that trust, norms, and social networks constitute collective resources that enhance communities' capacity to respond to various forms of vulnerability.

Resilience also develops at the institutional level through increasing community awareness of the importance of population administration. The high levels of birth certificate ownership and electronic

identity card (KTP-el) registration indicate that communities perceive legal identity as an important means of protecting civil rights amid high levels of cross-border mobility. From a border governance perspective, population administration is not merely an instrument for supporting public service delivery but also an important mechanism for strengthening social protection and legal certainty for highly mobile border communities (Scott, 2012). Thus, population administration constitutes an integral component of community adaptive capacity in responding to the dynamics of the border region.

These findings extend the work of Azwar et al. (2024), which emphasizes the importance of social capital in maintaining cohesion among border communities. This study demonstrates that social resilience in Nunukan Regency is developed not only through social networks but also through the integration of household economic capacity, community social capital, and the strengthening of local institutions. These three dimensions constitute an adaptive system that enables communities to sustain their livelihoods amid the geodynamics of cross-border migration and demographic-economic vulnerability. The findings further demonstrate that border communities should not be viewed solely as vulnerable populations but also as active agents with adaptive capacities that can contribute to sustainable border-region development.

3.3. Determinants of Social Resilience Capacity

The social resilience capacity of border communities in Nunukan Regency is shaped by the interaction between enabling factors and constraining factors at the individual, household, and community levels. From the perspective of Community Resilience, the adaptive capacity of communities develops through the strengthening of economic resources, social capital, information, and community competencies in responding to change (Norris et al., 2007). The findings demonstrate that the ability of communities to cope with the dynamics of cross-border migration is influenced not only by economic resources but also by the quality of border governance and institutional support.

Table 2. Matrix of Determinants of Social Resilience Capacity among Border Communities in Nunukan Regency

Scale	Enabling Factors	Constraining Factors	Resilience Dimension (Norris et al., 2007)
Individual	Multi-skilling, proficiency in cross-border local languages, and work adaptability.	Low levels of formal education, limited legal literacy regarding immigration regulations, and risks of labor exploitation.	Economic Development and Community Competence
Household	Diversification of income sources, remittances, and access to dual Indonesia–Malaysia markets.	Dependence on a single source of remittance income and vulnerability to wage fluctuations.	Economic Development
Community	Strong social capital, coordination through the Task Force for the Prevention and Handling of Trafficking in Persons (TPPO), and support from customary and religious institutions.	Limited basic infrastructure, restricted access to public services, and regulatory uncertainty regarding cross-border activities.	Social Capital and Information and Communication

Source: Authors' analysis (2026), adapted from Norris et al. (2007).

As shown in Table 1, at the individual level, resilience is shaped by the ability of community members to develop flexible work skills, acquire cross-border language proficiency, and adapt to changes in the labor market. However, low levels of formal education and limited legal literacy increase the risk of exploitation among migrant workers. At the household level, livelihood diversification and the utilization of remittances constitute key strategies for maintaining household economic stability. Nevertheless, high dependence on remittances may increase vulnerability when migration policies change or demand for labor in Malaysia declines (Asis & Piper, 2016; Ellis, 2000).

At the community level, resilience capacity is strengthened by strong social capital, kinship networks, and collaboration among community members, customary institutions, religious organizations, and the Task Force for the Prevention and Handling of Trafficking in Persons (TPPO). These forms of social capital facilitate the rapid dissemination of information and strengthen social protection mechanisms for both local communities and migrant workers. However, their effectiveness remains constrained by limited basic infrastructure and regulatory uncertainty concerning cross-border activities, which restrict access to public services and labor protection (Eilenberg, 2012; Putnam, 1993).

These findings demonstrate that the social resilience capacity of border communities results from the interaction of individual capacities, household economic resilience, community social capital, and the quality of border governance. Therefore, strengthening resilience cannot rely solely on increasing household incomes but also requires human resource development, local economic diversification, institutional strengthening, and more adaptive border governance. These findings extend the framework proposed by Norris et al. (2007) by demonstrating that, in the context of border regions, the effectiveness of adaptive capacity is strongly influenced by the quality of cross-border governance.

3.4. Policy Integration: Transforming the Border Region into an Economic Shield

The findings demonstrate that strengthening the social resilience of border communities cannot be achieved through sectoral policies alone but requires an integrated policy framework that connects population administration, industrial development, logistics strengthening, and spatial planning in the border region. This approach is intended to transform the border region from an area dependent on the economic system of the neighboring country into an economic shield capable of strengthening local economic self-reliance while simultaneously safeguarding national sovereignty. Based on the Klassen Typology analysis, accelerating the development of agro-maritime sectors through processing-based industries constitutes a key strategy for increasing the added value of local commodities and expanding employment opportunities in Nunukan Regency.

Table 3. Policy Integration Matrix for Strengthening the Border Region of Nunukan Regency

Policy Dimension	Empirical Database (Disdukcapil & BPPD)	Strategic Intervention Program
Population Administration and Protection	A total of 165,700 residents are required to possess a National Identity Card (KTP), with 98.11% having completed the biometric registration process. Digital Population Identity (IKD) adoption stands at 3.62%.	Expansion of IKD services through mobile service units at ports, accompanied by the strengthening of the Command Center for the Prevention of Non-Procedural Indonesian Migrant Workers (PMI).
Employment and Industry	The industrial sector absorbs only 8 workers, while casual daily workers account for 8,651 individuals.	Development of a seaweed-processing industry through communal oven-drying facilities to increase value-added production and expand local employment opportunities.
Logistics and Monetary Sovereignty	High dependence on the supply of goods from Tawau, coupled with the widespread use of the Malaysian Ringgit in local transactions.	Optimization of the Sea Toll Program (Tol Laut) to strengthen domestic logistics distribution, reduce the prices of essential commodities, and promote the use of the Indonesian Rupiah.

Regional Development	Positive net migration (+3,418 residents) and potential utilization of 5,207 hectares of land resulting from compensation related to the Outstanding Boundary Problem (OBP).	Development of a Special Economic Zone (SEZ) in the border area and diversification of export markets through a bypass strategy
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Source: Researchers' analysis based on data from the Population and Civil Registration Office of Nunukan Regency (Disdukcapil) (2025) and the Regional

As presented in Table 2, policy integration is structured around two main pillars. First, strengthening territorial certainty through the resolution of the Outstanding Boundary Problem (OBP), the optimization of compensation land, and the development of border-area infrastructure to support public service functions and economic activities. Second, strengthening economic self-reliance through the downstream development of leading commodities, the development of processing industries, the optimization of the Sea Toll Program (Tol Laut) network, and the diversification of export markets to reduce dependence on the distribution hub in Tawau. These strategies not only enhance local economic value added but also strengthen domestic supply chains and expand formal employment opportunities.

The continued circulation of the Malaysian Ringgit in Nunukan also represents a dimension of economic dependence that extends beyond trade and logistics into monetary sovereignty. In border economies, the use of a foreign currency for everyday transactions may emerge from the convenience of cross-border trade, stronger purchasing power, market integration, and residents' familiarity with the neighboring economy. However, persistent currency substitution can reduce the role of the domestic currency in local pricing and transactions and may weaken the effective reach of domestic monetary institutions within border communities. Recent studies emphasize that currency substitution is closely associated with the use of foreign currency in domestic transactions and can constrain monetary policy autonomy, particularly where informal economies and cross-border financial activities are significant (Chia, 2024; Madison, 2024). From this perspective, strengthening the use of the Indonesian Rupiah should not be interpreted as eliminating legitimate cross-border economic transactions, but as ensuring that domestic economic activities remain anchored in Indonesia's monetary and financial system. This requires improving access to Rupiah-based payment facilities, affordable currency exchange services, domestic supply chains, and cross-border payment mechanisms that facilitate trade while maintaining monetary sovereignty (Chu & Rathbun, 2025)).

The settlement of the Outstanding Boundary Problem (OBP) also introduces a critical spatial dimension to the concept of the economic shield. The approximately 5,207.7 hectares incorporated into Indonesian territory following the Sinapad–Sesai border re-demarcation should not be viewed merely

as an increase in territorial area, but as a strategic spatial resource whose developmental value depends on effective territorial governance, spatial planning, infrastructure provision, and productive utilization. The completion of the Indonesia–Malaysia border demarcation through the 2025 bilateral agreement provides greater territorial certainty and creates an institutional basis for subsequent spatial planning and development interventions. Recent policy developments emphasize that post-demarcation management requires synchronization of spatial, demographic, topographic, and development data to ensure that newly confirmed border territories can be integrated into regional planning (Geospatial Information Agency, 2024; Ministry of Home Affairs, 2026). Therefore, spatial sovereignty in Nunukan should be understood not only as the legal recognition of territorial boundaries but also as the state's capacity to govern, connect, develop, and provide public services within its territory. In this sense, the productive utilization of the 5,207.7-hectare area can become part of an economic-shield strategy when it is directed toward agro-maritime development, local processing industries, logistics infrastructure, and community-based economic activities rather than merely territorial expansion.

Taken together, the Ringgit issue and the post-OBP territorial settlement demonstrate that the economic shield concept has both monetary and spatial dimensions. Monetary sovereignty requires strengthening the role of the Rupiah and domestic payment infrastructure while maintaining efficient and legitimate cross-border transactions, whereas spatial sovereignty requires converting territorial certainty into effective governance, connectivity, productive land use, and public-service provision. The economic shield therefore should not be understood simply as economic self-sufficiency, but as the capacity of the border region to control and utilize its economic, monetary, and territorial resources while remaining connected to neighboring economies. This integrated perspective is consistent with recent scholarship showing that border governance in Indonesia remains constrained when territorial authority, local development capacity, and multilevel institutional coordination are not effectively aligned (Seran et al., 2025).

From a border governance perspective, border-area development is no longer oriented solely toward territorial security functions but also toward strengthening economic competitiveness and community welfare (Brunet-Jailly, 2005; Scott, 2012). Therefore, policy integration serves as an important instrument for aligning population mobility management, local economic development, spatial planning, and logistics systems within a unified border-area development framework. This approach also shifts the paradigm of border development from a buffer zone toward an economic shield—an area that not only safeguards national sovereignty but also functions as a center of economic growth capable of reducing dependence on neighboring countries and strengthening community social resilience.

4. CONCLUSION

This study demonstrates that cross-border migration geodynamics in Nunukan Regency create interconnected effects on demographic dynamics, economic vulnerability, and community social resilience. High population mobility and strong economic linkages with Sabah provide livelihood opportunities but also reinforce structural dependence on informal employment, cross-border markets, and Malaysia's economic system. At the same time, communities demonstrate resilience through livelihood diversification, social capital, and adaptive population administration. These findings confirm that border resilience is shaped by the interaction between community capacity and the effectiveness of border governance.

The study contributes theoretically by integrating migration geodynamics, demographic-economic vulnerability, and social resilience into a unified analytical framework. Practically, policy implementation should be differentiated according to institutional authority. At the national level, BNPP should strengthen integrated cross-border governance and coordinate development priorities; the Ministry of Finance (Kemenkeu) should strengthen domestic logistics and Rupiah-based economic transactions through optimization of the Sea Toll Program and appropriate fiscal support; while the Ministry of Home Affairs (Kemendagri) should accelerate digital population administration, mobile IKD services, and integrated population-data systems in border areas. At the local level, the Nunukan Regency Government should prioritize seaweed downstream processing, expansion of formal employment, productive utilization of the approximately 5,207.7 hectares of territory incorporated through the Sinapad–Sesai boundary settlement, and stronger local supply chains. These interventions should be implemented as an integrated strategy to establish Nunukan as an economic shield based on economic self-reliance, monetary sovereignty, spatial control, and community resilience.

This study is limited to Nunukan Regency and relies primarily on qualitative evidence supported by secondary quantitative data. Future research should employ GIS-based spatial analysis and real-time or longitudinal migration-mobility data to identify and monitor migrant mobility corridors, population concentration, and cross-border economic nodes. Comparative studies across Indonesia's land and maritime border regions and mixed-method designs are also recommended to quantitatively assess variations in demographic-economic vulnerability and social resilience.

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