IMPLEMENTATION OF BIMP-EAGA SUBREGIONAL COOPERATION WITH TRIANGLE ECONOMIC GROWTH APPROACH FOR OVERCOMING FOOD CRISIS IN MINDANAO

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Abstract

Mindanao, Philippines, is now facing a food crisis triggered by hydrometeorological disasters (floods) and limited human resource capacity. Official Philippine government data recorded crop failures on 20,000 hectares of rice fields and 8,800 hectares of staple crops, threatening stability of the local food supply. This study analyzes the role of BIMP-EAGA (Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area) subregional cooperation in crisis mitigation through the triangle economic growth approach. Using qualitative methods and policy analysis, the study examines three main mechanisms: (1) food security corridor as a commodity supply chain stabilizer, (2) farmer HR capacity building program based on agricultural technology transfer, and (3) agricultural infrastructure funding within the BIMP-EAGA Vision 2025 framework. Findings indicate that this collaboration significantly contributes to mitigating the impact of crop failure through regional food reserve schemes and cross-border trade facilities. However, implementation faces challenges due to domestic policy fragmentation and disparities in resource allocation. The study concludes that the effectiveness of BIMP-EAGA depends on the synergy of the economic growth triangle, especially in integrating climate adaptation, local community empowerment, and ASEAN policy harmonization.

Keywords: Mindanao, BIMP-EAGA, Philippines, Human Capital, Food Security, Triangle Economic Growth

INTRODUCTION

Mindanao is the second-largest island in the Philippines, following Luzon. Located in the southern part of the Philippine archipelago, it is geographically close to the northern regions of Indonesia and Malaysia, making it a strategically significant area in terms of both location and regional relations. The island spans approximately 471 kilometers from north to south and 521 kilometers from east to west, reflecting its vast geographic and demographic diversity. Administratively, Mindanao is divided into 25 provinces and six main administrative regions: the

Zamboanga Peninsula (Region IX), Northern Mindanao (Region X), Davao Region (Region XI), Soccsksargen (Region XII), Caraga (Region XIII), and the Autonomous Region in Muslim Mindanao (ARMM). This administrative division reflects the island's socio-political and cultural complexity, as it is not only rich in natural resources but also home to various ethnic and religious groups.

Despite its natural beauty, Mindanao faces serious challenges in food security, largely due to natural disasters. The island has a relatively cool tropical climate characterized by high rainfall throughout the year, consistently warm temperatures, high humidity, and stable atmospheric pressure. These climate conditions significantly affect the lives of the local population and have substantial implications for the agricultural sector, biodiversity, and the region's socio-economic dynamics. Mindanao is not only geographically vast but also has a significant population. According to civil registry data from the Philippine government, the population of Mindanao is estimated at around 26 million people, making it one of the most densely populated regions in the country. Among its major cities, Davao City is the largest urban center, with a population of approximately 1.7 million. Zamboanga City is also a major economic and social hub, with over 1 million residents. Other important cities contributing to the region's development include Butuan, Cotabato, and General Santos, each with hundreds of thousands of inhabitants playing key roles in shaping the island's socio-economic structure.

In 2021, nearly 70% of households reported being unable to afford a healthy diet, with approximately 33% of households experiencing food insecurity. This alarming situation has led to high rates of malnutrition, which are further worsened by lack of dietary diversity and inadequate feeding practices, particularly among vulnerable populations such as children and women of reproductive. The Philippines was placed 69th out of 121 nations in the Global Hunger Index in 2022, suggesting a moderate level of hunger; nonetheless, the nation is still grappling with rising rates of obesity and under nutrition.

According to polls, there has been an increase in hunger, with 14,2% of households reporting involuntary hunger in the first half of 2024, the highest percentage since May 2021. 10% of Filipino households, according to recent World Food Programme (WFP) data, experience food insecurity. BARMM where 61,3% of the population experience lives in extreme poverty and over 30% of the population experiences food insecurity. Compared to non-agricultural households report 25% more food insecurity, making them especially vulnerable.

With 59 million Filipinos expected to be food insecure in 2019, up from 44,9 million in 2014-2016, the problem has gotten worse in recent years. Here is a map of the primary Mindanao conflict:



Figure 1. Map of Primary Conflict Area

Historically, Mindanao has been recognized as a region with a strong agricultural base, a tradition that has persisted for centuries. This agrarian foundation is not only the backbone of local livelihoods but also a key driver of the island's international trade. Most of the population depends on sectors such as agriculture, fisheries, and horticulture. Major export commodities from Mindanao include fresh seafood, tropical flowers, mangoes, papayas, and other agricultural products that are in high demand across Southeast Asia and beyond. Mindanao's southern geographical position and direct proximity to Indonesia and Malaysia provide strategic advantages for cross-border trade. This makes Mindanao one of the Philippines' key gateways to Southeast Asian regional markets and a vital node in sub regional economic cooperation, such as the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA). Despite its abundant food production potential, Mindanao suffers from alarming levels of food insecurity. The Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) region, for instance, reports the highest rates of moderate to severe food insecurity in the country, with nearly half of all households affected. Chronic food insecurity in Mindanao is primarily driven by poor food accessibility and utilization. Limited purchasing power is a major factor preventing access to food, worsened by the lack of livelihood opportunities, high illiteracy rates, and low educational attainment. High unemployment rates further hinder adequate food consumption, as much of the population relies on daily-wage labor. These unstable and seasonal income sources make communities vulnerable to economic shocks. Additionally, recurring armed conflicts in some parts of Mindanao can rapidly disrupt livelihoods and exacerbate food insecurity.

BIMP-EAGA (Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area) is a sub-regional economic cooperation initiative established in 1994 with the primary goal of promoting inclusive growth and development in border areas and underdeveloped regions of its four member countries. This initiative emerged in response to development disparities within Southeast Asia, where many border and remote regions lag behind major economic centers. Through cross-border collaboration, BIMP-EAGA aims to accelerate economic growth by harnessing local potential, improving connectivity, and strengthening trade and investment integration across the region. One of the key focus areas of this cooperation is the development of Mindanao in southern Philippines, which holds vast natural resource potential particularly in agricultural products. However, this potential remains underutilized due to challenges such as limited infrastructure, low agricultural productivity, and supply chain constraints. In response, the Philippine government, in collaboration with BIMP-EAGA, has developed sustainable development strategies for Mindanao that prioritize the strengthening of the agricultural sector as the main engine of economic growth.

This article seeks to analyze the form of cooperation between the Philippines and BIMP-EAGA in fostering economic growth in Mindanao through the application of the growth triangle economic approach. This approach is chosen for its relevance in explaining the dynamics of regional border development through synergistic interaction among three main actors: government, private sector, and local communities, within the framework of regional economic integration. Mindanao is selected as a case study due to its strategic position in the context of BIMP-EAGA, as well as its significant potential in producing agricultural commodities and natural resources that can drive inclusive economic growth. However, challenges such as development inequality, social conflict, and infrastructure limitations continue to hinder the full optimization of this potential.

METHODOLOGY

This research adopts a qualitative approach, supported by policy analysis and grounded in the theoretical framework of the Triangle Economic Growth model. The objective is to provide a comprehensive understanding of the dynamics of regional economic cooperation between BIMP-EAGA and Mindanao, and its implications for the development of the agricultural sector. Data sources include peer-reviewed academic journals and official data retrieved from the FAO, WHO, IFAD, UNICEF, WFP official website and BIMP-EAGA Vision 2025.

We focus on three core mechanisms within this triangular framework, each addressing interrelated critical challenges. First is the food security corridor. This mechanism is prioritized due to the strategic importance of the food supply chain in the BIMP-EAGA sub region. The study evaluates how policy interventions can stabilize food supply, reduce distribution costs, and prevent price volatility that threatens food security. Second is a capacity-building program for human resources (Farmers). As the second pillar of the growth triangle, this mechanism underscores the importance of modern agricultural technology and practices being effectively adopted by local farmers. Policy analysis highlights how partnerships with research institutions and the private sector accelerate innovation diffusion, improve productivity, and foster cross-regional knowledge networks.

And third is agricultural infrastructure investment schemes based on BIMP-EAGA Vision 2025, infrastructure investment serves as the third strategic pillar to ensure long-term sustainability. The research focuses on the financing and implementation of integrated irrigation projects, rural connectivity (village roads and small bridges), and post-harvest processing facilities ranging from cold storage warehouses to local food processing plants. By detailing the food security corridor, human capital development, and infrastructure financing as the three main angles of the growth triangle, this study aligns with the BIMP-EAGA Vision 2025, particularly in advancing agricultural irrigation systems, harvest storage facilities, and road access to farming areas.

RESULTS AND DISCUSSION

Crisis Context and Challenges in Mindanao The food crisis in Mindanao is a structural issue rooted in a long history of conflict dating back to the Spanish colonial era in the 16th century. More than 400 years of continuous unrest including tensions with the central government in Manila have resulted in the destruction of agricultural infrastructure, disruption of food supply chains, and mass displacement of the population. Ironically, this region, dubbed the "food basket of the Philippines" since the 1990s, has become the epicenter of chronic food insecurity. Despite Mindanao contributing 80% of the country's banana production and 100% of its rubber output, around 40% of its households experience food insufficiency (FAO, 2021). This development paradox stems from an unequal agribusiness model in which fertile lands are predominantly allocated for export-oriented commodities rather than for meeting local food needs. Smallholder farmers, who typically own an average of 2.4 hectares, are trapped in a vicious cycle of limited access to financing, inadequate technology transfer, and weak farmer organizations. This situation is further worsened by recurring armed conflict, land degradation due to unsustainable farming practices, and the marginalization of farmers in policymaking processes.

The consequences are evident in development indicators. Mindanao records the lowest economic growth in the country, with poverty rates reaching up to 60% in the Autonomous Region in Muslim Mindanao (ARMM) and a Human Development Index (HDI) that is 20% below the national average. This multidimensional crisis demands a holistic solution that integrates sustainable peace, progressive agrarian reform, a transition to regenerative agriculture, and the strengthening of farmer institutions. Without a systemic approach, Mindanao will remain caught in the dilemma of being a global commodity producer that is unable to feed its own population. Currently, Mindanao faces an escalating food crisis driven by hydro meteorological disasters particularly prolonged flooding and limited human resource capacity in the agricultural sector. Official government data show that flooding has damaged approximately 20,000 hectares of rice fields and 8,800 hectares of staple crops, triggering widespread crop failure that directly disrupts local food supplies. Farmers and fishers are further isolated from markets due to damaged infrastructure and broken connectivity, compounded by structural poverty making food security in Mindanao extremely fragile. As of December 2024, about 30.3% of households in the region were reported to be experiencing hunger, surpassing the peak of food insecurity during the COVID-19 pandemic lockdowns. This underscores the urgent need for integrated

interventions ranging from infrastructure repair and human resource development in agriculture to the enhancement of early warning systems—to restore food security on the island.

The Philippine government has shown a strong commitment to ensuring food security for its most vulnerable populations. This is evident in state-led food aid responses, supported by international organizations such as the World Food Programme (WFP), which have delivered mass food assistance to hundreds of thousands of internally displaced persons (IDPs) in Mindanao. Moreover, peace negotiations with the Moro Islamic Liberation Front (MILF) have been a key strategy to address the root causes of displacement, with the hope of restoring stability and enabling IDPs to rebuild their lives.



Figure 2. WFP Country Strategy

Based on figure 2, WFP Country Strategy show that Country Strategic plan 2024-2028 there is a total requirement of 131.19 M US\$, the allocated contribution is 21.72 M US\$ and in six months the Net Funding Requirement reaches 4.22 M US\$. The World Food Programme (WFP) is working together with the Philippine government to develop the Philippines Country Strategic Plan for 2024–2028. This plan focuses on strengthening resilience to shocks, ensuring timely emergency response, and promoting nutrition-sensitive social protection efforts. Its main goal is to build resilient food systems that provide fair and consistent access to food for all citizens, while also responding to the challenges posed by climate change. By addressing the underlying drivers of food insecurity and reducing poverty, the initiative aims to foster a more sustainable and food-secure future for the nation. However, several systemic challenges continue to significantly hinder food security efforts and obstruct long-term solutions:

- Natural resource degradation and declining agricultural productivity: Farmland is increasingly being converted for industrial and urban use, and the slow adoption of modern technology reduces crop yields. In marine areas, destructive fishing practices (bottom trawling, illegal fishing), overfishing, ocean acidification, coral bleaching, and land-based pollution (waste, deforestation) all threaten key fisheries ecosystems that serve as vital food sources.
- Agricultural infrastructure constraints: Around 50% of rice fields are irrigated, but many existing irrigation systems are outdated or inefficient. Climate-related disruptions such as droughts and floods further burden the sector, exposing the vulnerability of infrastructure to extreme weather events. Although the National Irrigation Administration (NIA) is mandated to rehabilitate irrigation systems, progress is often stalled by significant budgetary and logistical constraints.
- Post-conflict recovery and social vulnerability: Many affected populations have lost their homes, assets, and livelihoods, making recovery impossible without comprehensive rehabilitation programs (land, capital, tools, and training). This situation exacerbates poor health indicators, including high infant and maternal mortality rates and low educational attainment due to hunger creating a cycle of poverty and food insecurity that undermines long-term food resilience.

The Role of BIMP-EAGA as a Sub regional Solution

a. Food Security Corridor

One of the key strategies adopted to address the persistent food crisis in the region is the implementation of the Food Basket Strategy (FBS) a strategic approach explicitly outlined in the BIMP-EAGA Vision (BEV) 2025. This strategy is designed to maximize the potential of food-producing areas within the sub region, particularly Mindanao. FBS serves as one of the main pillars of BEV 2025, with the ultimate goal of establishing a sustainable, competitive and climate-resilient agro-industrial and fisheries sector, ensuring food security, export development, and livelihood enhancement.

The Food Basket Strategy (FBS) is formulated as a strategic effort to promote sustainable development while strengthening sub regional integration in the agro-industry and fisheries sectors within the BIMP-EAGA. It is driven by four interrelated and mutually reinforcing objectives:

- To ensure long-term food availability as a foundation for regional stability.
- To optimize the potential of key commodities from agriculture, livestock, and fisheries to enhance export competitiveness.
- To promote the development of sustainable livelihood systems for local farmers and fishers, enabling not just survival but also economic growth.
- To broaden participation and raise awareness of the importance of FBS among public and private stakeholders, fostering more inclusive cross-sector collaboration to support sub regional food security.

To translate these goals into concrete actions, the Food Basket Strategy outlines three strategic priorities for implementing an effective and focused agribusiness development agenda:

- Enhancing food production by increasing productivity and profitability in the agrofisheries sector. This can be achieved through stronger collaboration in research and development (R&D), followed by the adoption of innovative technologies to support more efficient and adaptive production systems. Additionally, optimizing the use of land and water resources, and strengthening infrastructure across agriculture, livestock, and fisheries are top priorities to reinforce the region's food production base.
- Identifying and clustering intra- and extra-regional areas—such as Mindanao—that are capable of producing high-quality priority commodities identified by stakeholders (e.g., rice, shrimp, coconut, cattle, and seaweed). These designated zones will focus on specialized commodity production, targeting a 10% increase in yields. Export volumes are projected to rise by 5% for intra-regional trade and 9% for extra-regional trade, thus generating additional income. To stimulate agribusiness exports, the strategy also promotes the development of the rapidly growing halal food industry, which is valued in the trillions of dollars globally. Export facilitation will be supported by tariff reductions, which, however, require renegotiation through intersessional agreements to align with each country's national policies.

 Promoting sustainable agriculture and fisheries practices by implementing field-level interventions such as agro-industrial extension services to improve the livelihoods of farmers and fishers. These include infrastructure development and climate adaptation measures.

As part of the intra-regional cluster within BIMP-EAGA, Mindanao holds a strategic and high-potential role in driving the production of internationally competitive agro-products. Thanks to its fertile soil and resource-rich environment, Mindanao is positioned to become a key driver in developing the sub regional supply chain, particularly for the priority commodities identified by BIMP stakeholders namely rice, coconut, and cattle. Therefore, BIMP-EAGA's strategy emphasizes strengthening logistics infrastructure, reducing cross-border trade barriers, and building an efficient agribusiness ecosystem. Mindanao is placed as a focal point for strategic value chain development. Throughout this chain from farm to international markets the strategy includes identifying trade bottlenecks that hinder goods flow and exploring opportunities to improve connectivity across production zones, processing centers, ports, and final distribution points.

b. Farmer Human Resource Capacity Building

As previously mentioned, one of the strategic foundations for addressing the food crisis is the active identification, adoption, and promotion of best practices that have proven effective on the ground for farmers and fishers. BIMP-EAGA is committed to organizing extension programs and workshops that introduce climate-resilient cultivation techniques, sustainable land management practices, and post-harvest technological innovations aimed at improving yields and product quality. Since 2010, various initiatives have been implemented in strategic areas particularly in and around Mindanao to ensure that local communities are not merely participants in the production chain but are also the main actors in sustainable development.

In the agricultural sector, the KASAMAKA Project in Bukidnon Province, Northern Mindanao, has provided local farmers with training on eco-friendly cultivation and product quality improvement. This includes grafting techniques for rubber and cacao trees to enhance yields. Additionally, farmers received support in the form of agricultural tools such as solar panels, coffee grinders, and fertilizers. The project covers 490 hectares of land, 96% of which has been successfully cultivated by local farmers. The outcomes of this project are expected to

provide additional income sources for the farming community. Another initiative, the Community-Based Agri-Ecotourism Pilot Project (CBAEPP) in Lake Sebu, goes beyond agriculture by also promoting community-based tourism. One of its core programs is the creation of a community organic garden, collectively managed by participating households. Each family is allocated a 160 m² plot to grow organic vegetables, local food crops, and high-value plants.

The partnership between BIMP-EAGA and South Korea through the BIMP-EAGA-Republic of Korea Cooperation Fund (BKCF) since 2021 has brought significant transformation to the agriculture and fisheries sectors in Mindanao, Philippines. With a total funding allocation of USD 10 million for 30 projects through 2024, the program focuses on technology transfer and capacity building for local farmers and fishers. In agriculture, farmers in the Zamboanga Peninsula have successfully adopted the Sustainable Intensification through Vegetables Intercropping method, which has increased yields on dry lands without compromising soil fertility. Meanwhile, the Smart FARM project introduced Korean nano-sensor-based IoT technology for Liberica coffee cultivation, resulting in a 20% increase in productivity and a rise in the selling price of cacao—from 95 pesos/kg in 2022 to 250 pesos/kg in 2024.

In the digital sector, the Farm Konek Agri-Tech platform has enabled direct connections between Mindanao farmers and regional markets, reducing reliance on middlemen and increasing profit margins by up to 35%. In the fisheries sector, the application of Smart Crab Culture Systems, supported by AI-based feed technology, has increased juvenile crab survival rates by 30%. This program also includes internship visits to research facilities in Korea, such as the National Fisheries Research and Development Institute, to strengthen the technical capacity of local fishers. As of 2024, more than 10 BKCF projects in Mindanao have reached 1,200 farmers and 800 fishers, forming 20 independent farmer groups capable of managing production and climate risk mitigation autonomously.

c. Agricultural Infrastructure Financing

Between 2021 and 2023, the BIMP-EAGA region experienced significant investment growth, with total capital inflows rising from USD 152.0 billion in 2021 to USD 194.5 billion in 2023. This growth was primarily driven by a remarkable surge in domestic investment, which increased from USD 7.2 billion (2021) to USD 12.4 billion (2023) growing by nearly 30% annually, far surpassing the 10% annual growth target set by the Trade and Investment Facilitation and Promotion Cluster (TIPC). Indonesia emerged as the main contributor, with domestic investment rising from USD 7.6 billion to USD 10.0 billion, while the Philippines and Malaysia recorded moderate growth and Brunei remained relatively stable.

On the other hand, Foreign Direct Investment (FDI) saw a slight decline from USD 19.9 billion (2022) to USD 19.5 billion (2023). This decrease was largely due to slower FDI inflows in Indonesia (from USD 18.2 billion to USD 17.6 billion) and Malaysia (from USD 2.0 billion to USD 1.4 billion), although the Philippines significantly improved its FDI performance, increasing from USD 0.1 billion to USD 0.6 billion. The share of EAGA investment in the total BIMP investment fluctuated—rising from 13.7% (2021) to 18.2% (2022) before falling again to 16.4% (2023). This indicates that while the subregion succeeded in attracting heightened investor interest in 2022, investment growth in 2023 was more evenly distributed across the broader BIMP area.

Indonesia's dominance in both domestic and foreign investments underscores its role as the main driver of growth within EAGA. However, the slowdown in FDI in Malaysia and Brunei, alongside Brunei's investment deficit, highlights the need for more intensive efforts to boost the sub region's investment appeal—through enhanced incentives, improved ease of doing business, and more aggressive promotion strategies. The Philippines' success in attracting FDI serves as a valuable lesson for other member countries in optimizing their own investment potential.

CONCLUSION AND RECOMMENDATIONS

Regional collaboration has positively contributed to mitigating crop failure impacts through regional food reserves and cross border trade facilities. However, implementation challenges remain, including: Domestic policy fragmentation among government institutions. Disparities in resource allocation and capacity between regions within the Philippines and across BIMP-EAGA member states. In conclusion, the BIMP-EAGA sub regional cooperation demonstrates significant potential in mitigating Mindanao's food crisis through its economic growth triangle approach leveraging food security corridors, agricultural technology transfer, and infrastructure development. However, its long term success hinges on overcoming policy fragmentation and ensuring equitable resource allocation. By strengthening climate adaptation,

local empowerment, and ASEAN-wide harmonization, this framework can serve as a model for resilient food systems in vulnerable regions. Let us move forward with collaborative action to transform challenges into sustainable opportunities.

Adopts the Triangle Economic Growth Approach, which integrates three key development actors such as government (policy and infrastructure enablers), private sector (investment and innovation drivers), and local communities (capacity building and empowerment). Here are a set of strategic recommendations for the implementation of BIMP-EAGA sub regional cooperation using the Triangle Economic Growth Approach to effectively address the food crisis in Mindanao:

- a. Government Engagement: Policy and Infrastructure Enablers
 - Establish a "Mindanao Food Security Task Force" to coordinate national-sub regional policy.
 - Rehabilitate and expand irrigation, rural roads, and cold chains in priority agrozones.
 - Simplify cross-border agro-trade procedures within BIMP-EAGA through a "Green Lane" system.
- b. Private Sector Engagement: Investment and Innovation Drivers
 - Launch Agro-Investment Corridors (Bukidnon, South Mindanao) via Public-Private Partnerships (PPP).
 - Scale digital platforms (e.g., Farm Konek Agro-Tech) and smart farming technologies.
 - Strengthen value chains for priority commodities: rice, coconut, cacao, seaweed, and livestock.
- c. Local Communities: Capacity Building and Empowerment
 - Scale climate-smart agriculture and post-harvest training (e.g., KASAMAKA, CBAEPP).
 - Support cooperatives and women/youth-led agribusinesses.
 - Expand nutrition-sensitive agriculture and risk insurance schemes.

Cross-Cutting Priorities:

- Develop a BIMP-EAGA food security monitoring dashboard.
- Mobilize green financing and regional development funds (e.g., BKCF).

- Integrate food security efforts with Mindanao peace building programs. Expected Outcomes:
- Strengthened food supply chains and production resilience in Mindanao.
- Inclusive growth and increased regional agro-export capacity.
- Improved livelihoods and reduced vulnerability of rural communities.

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