



Value Chain Analysis on
Selected Commodities:

A TOOL FOR DEVELOPMENT PROGRAMS FOR WOMEN, YOUTH AND INDIGENOUS PEOPLE IN BASILAN

Vegetable



Coconut



Fish



Rubber



EU BAEP

European Union
through the Bangsamoro
Agri-Enterprise Programme

WEE-SAFE

Strengthening Agri-fishery Enterprise
through Women and Youth Empowerment
Inclusive Business and Climate Resilience

ABOUT THE EU-BAEP WEE-SAFE PROJECT

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Project Title : **Value Chain Analysis on Selected Commodities: Tool for Development Programs for Women and Youth in Basilan**

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Executive Summary

The Province of Basilan is endowed with rich and fertile soil, suitable for the production of food crops and high-value industrial crops such as rubber and coconut. It is also home to a variety of fish and other marine resources, including crustaceans and cephalopods. These resources, if managed and developed properly, will bring significant economic potential and progress. A study on the value chain of rubber, coconut, vegetables, and fisheries underscores the different strategic interventions needed to achieve the goal of more inclusive, sustained productivity, and globally competitive products that will bring higher economic benefits for the people.

Basilan's rubber industry urgently needs intervention to combat leaf disease (*Pestalotiopsis*) and boost yields. Establishing a budwood nursery for high-yielding clones, creating DTI-assisted market facilities, and implementing a world market price monitoring system are crucial steps. Intercropping with high-value crops can further increase farmer income. While currently male-dominated, women can play a greater role in latex tapping and other farm activities. Raising cash crops and livestock (including native chickens) offers additional income generation opportunities. Success hinges on access to credit, market information, and technical assistance.

Coconut, a major national export, faces challenges in Basilan, including cocolisap infestation, low productivity, and limited resources. Initiatives to revitalize the industry include replanting, diversification, and value-addition. The report analyzes the coconut value chain, highlighting the roles of various stakeholders, including women in financial management. It identifies a gap in price transparency for farmers and emphasizes the importance of input subsidies, technical assistance, and market information to achieve success. Overcoming limitations like limited inputs and fluctuating prices, alongside capitalizing on opportunities for improvement, is key. External factors like policies and weather conditions also play a significant role. A flourishing coconut industry can empower farmers and contribute to a sustainable Basilan.

Basilan's vegetable production is dominated by small-scale farmers facing an unbalanced value chain. Cash-advance systems employed by traders dictate buying prices, squeezing farmer profits. While farmers also sell directly to consumers at weekly "tabuan" markets, they incur losses due to handling and transport damage. Women play a significant role alongside men in vegetable production and trading. Cassava is the primary crop, but eggplants, string beans, cucumbers, and sweet potatoes are also cultivated. Local production falls short of the island's demand, necessitating imports from Zamboanga City (carrots, cabbage, tomatoes, onions, garlic). To improve vegetable quantity and quality, input support, technical assistance, and market information are essential.

Lamitan City's fishing industry boasts significant economic potential, but faces challenges like weather disruptions, high production costs, and fishermen's health concerns. Accurate financial planning requires distinguishing between cash and non-cash income. The Participatory Systems Analysis (PSA) identifies critical intervention areas such as market information, input subsidies, and credit facilities to enhance industry productivity and long-term viability. Opportunities exist in input provision, production efficiency, and local trading to address constraints like overfishing, inadequate infrastructure, and financial limitations. The industry's labor-intensive nature necessitates skill development and cost-saving measures. Efficient product, information, and payment flows are crucial for market responsiveness and profitability. Sustainable practices, improved infrastructure, and targeted policies can cultivate a resilient and prosperous fishing sector that benefits both fishermen and the broader community.

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ACRONYMS

AAF	Agriculture, Forestry and Fishing
ANRPC	Association of Natural Rubber Producing Countries
ARB	Agrarian Reform Beneficiaries
ARMM	Autonomous Region in Muslim Mindanao
BAFPS	Bureau of Agriculture and Fisheries Product Standards
BARMM	Bangsamoro Autonomous Region in Muslim Mindanao
BPI	Bureau of Plant Industry
CDA	Cooperative Development Authority
CDI	Critical Degree of Interrelation
CENRO	Community Environment and Natural Resources Office
CNO	Crude Coconut Oil
CRA	Cost and Return Analysis
DCN	Derived Cetane Number
DRC	Dry Rubber Content
EU BAEP	European Union's Bangsamoro Agri-Enterprise Program
FGD	Focused Group Discussion
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GVA	Gross Value Added
IMF	International Monetary Fund
IRSG	International Rubber Study Group
ISO	International Organization for Standardization
KCCDMFI	Kasanyangan Center for Community Development and Microfinance Incorporated
KG	Kilogram
KII	Key Informant Interview
LARBECO	Lamitan Agrarian Reform Beneficiaries Cooperative
LFFA	Low Free Fatty Acid
LGU	Local Government Unit
MAFAR	Ministry of Agriculture, Fisheries, and Agrarian Reform
MBHTE-TESD	Ministry of Basic, Higher, and Technical Education – Technical and Skills Development
MCFARMCO	Malooong Canal Farmers Agrarian Reform Multi-Purpose Cooperative
MIMAROPA	Mindoro Occidental, Mindoro Oriental, Marinduque, Romblon, and Palawan
MNFIC	Major Non-Food and Industrial Crops Quarterly Bulletin
MOLE	Ministry of Labor and Employment
MOST	Ministry of Science and Technology
MRE	Malaysian Rubber Exchange
MSME	Micro, Small and Medium Enterprises
MT	Metric Tons
MTIT	Ministry of Trade, Investment and Tourism
NCR	National Capital Region
NGO	Non-Government Organizations

NR	Natural Rubber
NSIC	National Seed Industry Council
OPAg	Office of Provincial Agriculture
PCA	Philippine Coconut Authority
PIA	Philippine Information Agency
PRIA	Philippine Rubber Industries Association, Inc.
PRRI	Philippine Rubber Research Institute
PSA	Participatory Systems Analysis
RBD	Refined, Bleached and Deodorized
ROI	Return of Investment
RPMC	Rubber Price Management Committee
RTAC	Rubber Trading and Auction Center
SCARBIDC	Sta. Clara Agrarian Reform Beneficiaries Integrated Development Cooperative
SDG	Sustainable Development Goal
SOCCSKSARGEN	South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos City
SPR	Standard Philippine Rubber
SSF	Shared Service Facilities
TNA	Training Needs Assessment
TSR	Technically Specified Rubber
UA & P	University of Asia and the Pacific
USM	University of Southern Mindanao
UWARBMC	United Workers Agrarian Reform Beneficiaries Multipurpose Cooperative
VCO	Virgin Coconut Oil
WEE SAFE	Strengthening Agri-Fishery Enterprises through Women and Youth Economic Empowerment, Inclusive Business, and Climate Resilience
YTPI	Yokohama Tire Philippines, Inc.
ZamBaSulTa	Zamboanga City, Basilan, Sulu, and Tawi-Tawi
ZAMPEN	Zamboanga Peninsula

1.0 INTRODUCTION

1.1 BACKGROUND AND CONTEXT

The United Nations' sustainable development goal (SDG) is grounded on the vital principle of "leaving no one behind," which emphasizes a holistic approach to achieving sustainable development (UN, 2015). The primary goal is to eradicate poverty (SDG 1), followed by the goal to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture (SDG 2), and at the same time, achieve gender equality and empower all women and girls (SDG 5). In line with these thrusts, the WEE SAFE, a development project on "Strengthening Agri-Fishery Enterprises through Women and Youth Economic Empowerment, Inclusive Business, and Climate Resilience," is implemented aimed at transforming existing economic opportunities for women, youth, and indigenous people in the Bangsamoro Autonomous Region in Muslim Mindanao as a way of addressing the concerns of sustainable development in this part of the country.

The WEE-SAFE project covers two significant outcomes: One, vulnerable women, youth, indigenous people, and small-scale producers in the Agri-fisheries value chain access participate and benefit peacefully and somewhat from the economic opportunities through improved and inclusive Agri-fishery enterprises development in the BASULTA; Two, Agri-fishery enterprises increased productivity and commercial viability through integration of small-scale food producers, capacity building of women, youth, and indigenous people for enterprise productivity, and climate resilience policies, programs, and practices.

The Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) occupies the Sulu Archipelago and the provinces of Lanao del Sur and Maguindanao in central Mindanao. Basilan Province, with Lamitan City as its capital, is part of the BARMM.

Basilan is the largest northernmost island of the Sulu Archipelago, which includes about 400 islands between the Philippine islands of Mindanao and Borneo. Basilan Strait, about 17 nautical miles (31km) at its narrowest point, separates Basilan Island from the mainland of Mindanao and the port city of

Zamboanga. It has 11 municipalities and 210 barangays. In Lamitan, out of 45 barangays, 15 barangays are beneficiaries of Kasanyangan Center for Community Development and Microfinance Incorporated (KCCDMFI) program.

Basilan, a beautiful island in the Philippines, is known for its rich culture, stunning natural attractions, and delicious seafood dishes. It is a place of warm hospitality and vibrant festivals, offering a unique blend of tradition and flavors. Lamitan City, the capital of the province, is the headquarters of the Menzi Agricultural Corporation, which operates harvesting and processing facilities for the surrounding agricultural region. Essential local products include rubber, coconut, palm oil, and coffee. The province is dubbed as the "Fruit Baskets of the Philippines." The province is abundant in tropical fruits such as durian, lanzones, mangosteen, and rambutan, which are highly sought after for their sweetness and distinct flavors. The province produces a variety of crops, including rubber, coconut, corn, and rice, contributing to the region's economic growth.

Despite its challenging history, the province is actively working towards sustainable peace and inclusive development, with initiatives focusing on education, livelihood, and community empowerment. To realize this, a project on "Strengthening Agri-fishery enterprises through women and youth economic empowerment, inclusive business, and climate resilience (WEE-SAFE) is being co-implemented by KCCDMFI and OXFAM Pilipinas, supported by European Union's Bangsamoro Agri-Enterprise Program (EU BAEP) in the Philippines.

About 70% of the province's agricultural land is planted exclusively with coconut, rubber, and coffee. Other crops include palay, corn, cacao, cassava, African oil palms, and black pepper. The provincial waters are home to grouper, tuna, squid, octopus, and marlin.

In this context, a study using the value chain framework analyzes, plans, and implements interventions, upgrades strategies for increasing the productivity of rubber, coconut, vegetables, and fishery products, and empowers women, youth, and market players for enterprise development in Balisan, Sulu, and Tawi-Tawi.

Thus, the study's interest is to determine the strategy for providing support to increase productivity and income from different rubber—and coconut-based farming system models, including vegetable farming and fishing, in Lamitan, Basilan Province.

1.2 OBJECTIVES OF THE STUDY

The general objective of the study is to establish an in-depth value chain analysis of rubber, coconut, vegetables, and fish products in order to design appropriate intervention strategies to empower and enhance the productivity of women, youth, and other marginalized groups. Specifically, the study aims to:

1. Conduct industry profiling and market assessment of rubber, coconut, vegetable, and fish products;
2. Generate value chain mapping of coconut, rubber, vegetables, and fish, indicating women and youth involvement in the following:
 - key customers and their product requirements
 - key players in the chains and their specific roles
 - activities, processes, and cost along the chain
 - the flow of products, information, and payment along the chain
 - logistic issues
 - the external influences
3. Conduct financial analysis (cost and return, ROI) for each enterprise at the farm and community level;
4. Conduct participatory system analysis for identification of upgrading solutions by the farming community;
5. Identify opportunities and constraints/ gaps along the chain for policy recommendations of appropriate interventions, plans, and programs.

1.3 METHODOLOGY

1.3.1 Theoretical Framework

The efficiency and competitiveness of the four commodities, such as rubber, coconut, vegetables, and fish, both in the local and world markets, require not only enhancing the performance of a single segment or member of the commodity supply chain but, more importantly, that of the whole industry. The supply chain refers to the distribution channel of a product and the network of players, from sourcing raw materials to delivering finished products to consumers. Supply chain management aims to utilize and capitalize on strengths, overcome weaknesses, explore opportunities, and mitigate threats in the supply chain.

Supply Chain Management, as a systems approach, draws contributions from various disciplines and scrutinizes these areas to determine how the supply chain of these identified commodities can be developed to take advantage of the industry's economic potential.

A. Economic Efficiency

Economic efficiency occurs when the production of goods and services is maximized at the lowest possible cost and no player can be made better off without making other players worse off. This category consists of two theoretical underpinnings: a) Transaction Cost Economics and b) Agency Theory. Transaction cost refers to the cost associated with the exchange of goods and services, including the cost of acquiring information, negotiating and enforcing contracts, among others. Improving this area would mean minimizing transaction costs. Transaction costs are governed by four concepts: (1) bounded rationality, (2) opportunism, (3) asset specificity, and (4) information asymmetry. Bounded rationality asserts that rationality of individuals is bounded by the information they have, cognitive limitations of the minds, and the restricted amount of time available for decision-making. Opportunism is the notion that individuals oftentimes exploit a situation to their own advantage. Asset specificity, on the other hand, is a feature of an asset or investment that has a significantly higher value with a specific transacting relationship than

outside the relationship, which might have, to an extent, no salvage value. This feature creates a holdup scenario or a venue to seek rent among supply chain players. Lastly, information asymmetry is a situation where information is only available and accessible to some but not all supply chain players.

B. Business Relationship

To achieve coordinated delivery of the volumes of rubber, coconut, vegetables, and fish required by the market, the study will examine how to integrate players across these supply chains – from upstream producers to downstream distributors – for long-term benefits such as increased competitiveness and improved quality.

C. Operational Efficiency

Operational efficiency is achieved when the right arrangement and coordination of people and of processes employing improved technology, work closely together to enhance productivity and the value of the business, while driving down the cost of operations to a desired level.

The project shall focus on obtaining a thorough understanding of the entire processes and activities in the production, distribution and consumption aspects of rubber, coconut, vegetables and fish, and determine how these processes can be coordinated. Furthermore, it shall investigate how or why these processes or activities are being undertaken in relation to those of the other members in the supply chain. The project involves an in-depth analysis and understanding on production, distribution and marketing decisions by the various players in the industry.

D. Chain Performance Analysis

Supply chain performance can be analyzed in three-dimensional definition, which is effectiveness, efficiency, and responsiveness. While effectiveness is about “doing the right things”, efficiency is about “doing things right”. Supply chain effectiveness is concerned with the preference of the end-consumer and the major indicator is consumer satisfaction (Figure 1).

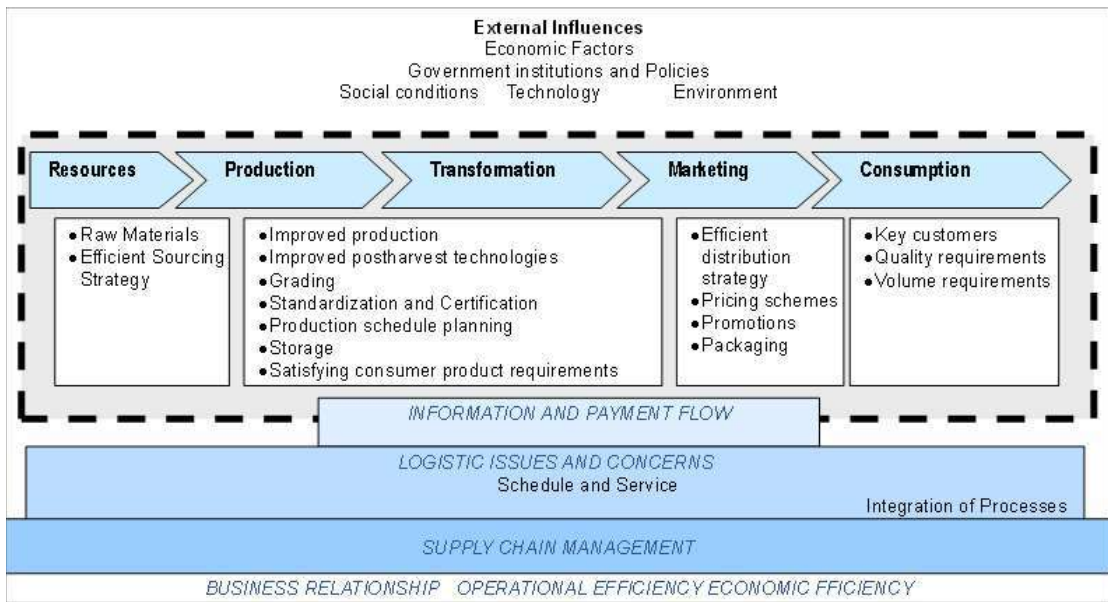


Figure 1. Agri-food supply chain mapping model

1.3.2 Geographical Coverage

The study covered the rubber, coconut, vegetable and fish producing barangays of Lamitan City province of Basilan to wit:



Figure 2. Map of Lamitan City indicating the barangay chosen

1.3.3 Data Collection

The study employed a mixed-methods research design, encompassing both qualitative and quantitative approaches. This design served as the blueprint for conducting the research. The quantitative component involved surveys administered to rubber, coconut, vegetable farmers, fisherfolk, traders, and processors of rubber and coconut in Lamitan City, Basilan Province, and neighboring areas. A set of standardized questionnaires was used. For the farmer survey, a quota sampling method was employed. Thirty farmer-respondents were chosen from each of the six top barangays, with half from small-scale farmers and half from members of cooperatives and associations, for a total of 120 respondents across the four commodities (rubber, coconut, vegetables, and fish). Five traders and two processors were also included in the survey. The survey data was supplemented by interviews with key informants (KIs) identified from among the industry's key players. Focused group discussions (FGDs) were conducted in Lamitan City. The interviews assessed farmers' production practices, specifically regarding postharvest handling and processing of rubber and coconut products. Similarly, the FGDs focused on the implementation of various government programs supporting the rubber, coconut, vegetable, and fish industries.

Table 1. Number of respondents for the survey in Basilan Province

Commodity	Survey		
	Farmers	Trader	Processors
Rubber			
Sta. Clara	1		
Malo-ong Canal	6	1	1
Ulame	5	1	
Tumakid	6		
Limo-ok	5		
Lumuton	7		
Lamitan		3	
Isabela City			1
Total	30	5	2

Coconut			
	Farmers	Traders	Processors
Sta. Clara	1		
Ulame	9		
Tumakid	10		
Limo-ok	10	1	
Lamitan		2	
Isabela City		2	
Total	30	5	0
Vegetable			
	Farmers	Traders	Retailer
Campo Uno, Sitio			
Valderosa	4		2
Malo-ong San Jose	5		2
Bohe Nange Proper	4		1
Sta. Clara	5	4	2
Baungus	5		1
Ulame	4		2
Binuangan		1	2
Calugusan	3		1
Total	30	5	13
Fish			
	Fisherfolks	Traders/Retailer	Processors
Malo-ong Canal	9		
Ulame	10	1	
Tumakid	9	3	
Luksumbang	2	1	
Total	30	5	0
Total:	120	33	2

1.3.4 Data Analysis

Data analysis was primarily descriptive, highlighting key insights from the surveys, KIIs, and FGDs.

Rapid appraisal activities, including initial surveillance and reconnaissance, were conducted to identify and document the status of rubber, coconut, vegetable and fishing areas and activities related to production, postharvest handling, trading, and processing of these products. These activities also assessed the current state of the industries and identified key problems or issues.

The research employed a value chain framework to identify key players, their linkages and impacts within the chain, and how postharvest practices affect their profits or losses. This approach analyzed the impacts on both upstream players (farmers) and downstream players (traders, processors, and stakeholders in related industries). The value chain approach also guided researchers in identifying sources of production, post-production, and marketing data.

Local government policies relevant to production and marketing were examined and reviewed to assess the appropriateness of policy interventions and implementation effectiveness in achieving quality of products. The analysis focused on two levels: 1) the adequacy of existing policy provisions, and 2) the evaluation of policy implementation, particularly regarding institutional capacity and linkages. Additionally, the analysis highlighted institutional arrangements, including the roles and behaviors of LGUs and other government agencies. It examined how governance affects policy implementation and, consequently, how policies achieve their goals. Focus group discussions and key informant interviews were conducted to assess the external factors and logistics issues affecting the industries.

Participatory Systems Analysis (PSA) was done as complementary tool for evaluating development programs in the community. It is designed to evaluate the relationships among the relevant elements or factors within the context of the problem being assessed. It is conducted to determine what factors could lead to the successful entry/participation of the poor men and women and the marginalized in specific value chains in rubber industry. It reveals which elements are probable starting points for project initiatives, and which ones may require supplementary investigation and better understanding.

The PSA exercises were carried out during the FGDs where participants were inquired exhaustively about the factors that contribute to the success of the rubber, coconut, vegetable and fishery industries in Basilan.

Following the procedures of Herweg and Steiner (2002) the ratings used were as follows:

- | | | | |
|----|---------------------|---|-----|
| a. | Strong influence | = | 2.0 |
| b. | Moderate influence | = | 1.0 |
| c. | Weak influence | = | 0.5 |
| d. | Very weak influence | = | 0.1 |

Each factor is assigned with the values between 2.0 to 0.1 after asking the question "Is the factor for instance, K&S influence the provision of another factor which is input subsidy? if the influence is strong then the assigned value is 2.0, but if the influence is very weak, then the assigned value is 0.1. The participants deliberated on this to come up with a consensus answer. After all factors have assigned values, the computation will follow. The active sum is computed which is the horizontal summation of the factors/elements whereas the passive sum is the vertical summation. The products of these two summations determine the degree of interrelationships between the factors/elements. On the other hand, the ratio between the active sum and passive sum is the activity ratio. The activity ratio signifies the position of the factors in the PSA quadrant. Factors with activity ratio less than one are placed to the left (West) of the PSA quadrant (Figure 2.12) while those greater than one is placed to the right (East). The dividing figure used to split the quadrant into north and south, termed as the critical degree of interrelation (CDI), is calculated as follows: $(\text{highest degree of influence}/2) + 30$. Factors with degree of interrelations greater than the CDI are placed north of the quadrant while those with lower degree of interrelations are placed south. Following these uncomplex rules, each factor can then be situated in the quadrant depending on their degree of interrelations and activity ratio. Each quadrant is labeled as follows:

- a. **Symptom** - A symptom is an element in the north-west quadrant. It is greatly influenced by other elements but may not have much power to change the system itself. Symptoms can be useful indicators of context changes, but development activities in this sector may only amount to a "treatment of the symptom, not the cause".

- b. Buffer** - A buffer is an element in the south-west quadrant. It is characterized by low importance in the context. It is unremarkable because it neither influences other elements much nor is it influenced much by others. Development activities in this sector are expected to have little impact on the context.
- c. Critical element** - A critical element is an element in the north-east quadrant. It is an accelerator or catalyst in the system. It changes many things quickly, but may also create many unexpected and undesired side effects. Development activities in this sector can be highly uncertain, and impacts may be unpredictable. Therefore, critical elements have to be treated very carefully. It is particularly important when formulating impact hypotheses for this sector.
- d. Motor or Lever** - A motor or lever is an element in the southeast quadrant. It is an active element with predictable impacts. This is the most interesting sector for development activities.

RESULTS AND DISCUSSION

Rubber

2.1 World Rubber Industry Profile

Rubber is an essential agro-industrial crop worldwide, especially in Southeast Asia and South Asia. Thailand has led in natural rubber production for the last five years. However, the COVID-19 pandemic has adversely affected the rubber industry, particularly natural rubber production, leading to a reduction in supply volume over the past two years. Based on the report of the Association of Natural Rubber Producing Countries (ANRPC), the world's natural rubber (NR) production recorded 13.842 million metric tons in 2021, which is 1.8% higher compared to 2020 production. The Philippines has a lower production volume but saw a notable increase with a 29% growth rate in 2021 (Table 2).

Table 2. Production of natural rubber in '000 MT

Countries	Quantity					Annual Growth Rate (%)			
	2017	2018	2019	2020	2021	2018	2019	2020	2021
Thailand	4,429	4,974	4,851	4,863	4,673	12.3	-2.5	0.2	-3.9
Indonesia	3,680	3,630	3,301	3,037	3,122	-1.4	-9.1	-8.0	2.8
Viet Nam	1,095	1,138	1,183	1,226	1,203	3.9	3.9	3.7	-1.9
Cote d' Ivoire	604	624	808	950	965	3.4	29.4	17.6	1.6
China	798	818	813	693	851	2.5	-0.7	-14.8	22.9
India	713	660	702	685	793	-7.4	6.4	-2.4	15.8
Malaysia	740	603	640	515	520	-18.5	6.1	-19.6	1.0
Cambodia	193	220	288	349	368	13.9	30.7	21.5	5.4
Myanmar	242	227	260	267	291	-6.3	14.7	2.9	8.8
Brazil	178	186	189	191	200	4.5	1.6	1.1	4.7
Laos	78	101	130	154	155	29.6	28.1	18.6	0.5
Guatemala	100	100	102	109	109	0.2	2.0	6.9	-0.3
Philippines	102	106	108	106	137	4.0	2.0	-2.1	29.6
Sri Lanka	83	83	75	78	78	-0.7	-9.5	4.6	-0.3
Bangladesh	21	23	23	22	25	7.1	2.2	-4.8	11.9
Papua New Guinea	6	6	6	6	6	0.0	0.1	-3.2	3.6
All Others	320	341	361	344	348	6.6	5.9	-4.7	1.1
World Total	13,381	13,838	13,838	13,594	13,842	3.4	0.0	-1.8	1.8

ANRPC Natural Rubber Trends and Statistics, January-February 2022

In terms of natural rubber share, Thailand accounts for about 34%, followed by Indonesia at 23% and the Philippines at 1%. Other countries contribute less than 1,000 MT to production (Figure 3).

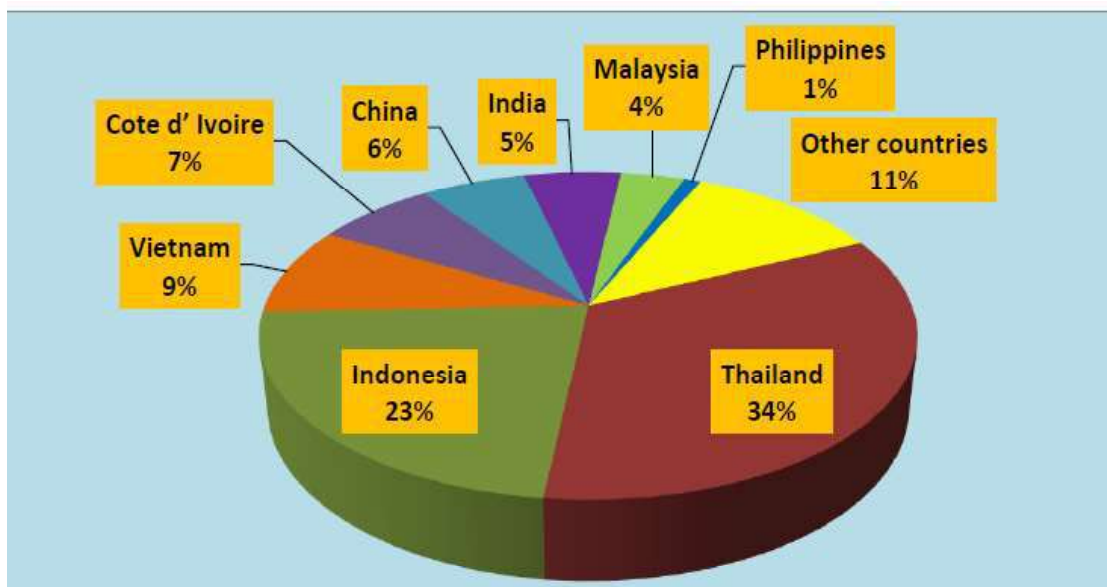


Figure 3. Global Consumption of NR - A

Source: ANRPC Natural Rubber Trends and Statistics, January-February 2022

2.2 World Annual Productivity Trend

In terms of annual yield, Vietnam has been consistently producing high yields among rubber-producing countries for the past ten years. As of 2021, it has recorded an annual productivity of 1.682 metric tons followed by India and Thailand with 1.571 metric tons and 1.434 metric tons, respectively. On the other hand, the Philippines is a country with one of the lowest annual rubber yields among rubber-producing countries. In fact, from 2017 to 2021, the annual yield of the Philippines ranged from 0.70 to 0.715 metric tons showing practically no improvement in productivity over the last five years. Worse, ANRPC projected that the annual productivity of the Philippines in 2022 will even go down to as low as 0.685 metric tons as reflected in Table 3.

Table 3. Annual average yield in MT

Year	Cambodia	China	India	Indonesia	Malaysia	Myanmar	Philippines	Sri Lanka	Thailand	Viet Nam
2013	1.086	1.261	1.675	1.082	1.400	0.763	1.121	1.645	1.499	1.728
2014	1.073	1.208	1.576	1.052	1.37	0.765	0.942	1.182	1.488	1.696
2015	1.14	1.117	1.471	1.036	1.410	0.755	0.851	0.978	1.517	1.676
2016	1.143	1.075	1.402	1.104	1.40	0.768	0.694	0.817	1.471	1.666
2017	1.136	1.073	1.498	1.205	1.45	0.776	0.700	0.809	1.449	1.676
2018	1.09	1.07	1.473	1.161	1.43	0.849	0.710	0.761	1.553	1.66
2019	1.148	1.055	1.439	1.025	1.46	0.797	0.710	0.658	1.483	1.669
2020	1.194	0.93	1.381	1.018	1.415	0.785	0.710	0.649	1.477	1.682
2021	1.186	1.099	1.571	1.040	1.42	0.685	0.715	0.633	1.434	1.682
2022	1.212	1.095	1.465	1.061	1.435	-	0.685	0.719	1.434	1.719

ANRPC Natural Rubber Trends and Statistics, January-February 2022

2.3 World Rubber Consumption

The same report released by the ANRPC indicates that the world consumption of NR has registered a strong growth of 8.5% in 2021 due to a better recovery observed in major consuming countries such as China, India, and the USA, which resulted in a growth in the world demand for rubber. The drivers of this increased consumption are:

Table 4. Consumption of natural rubber

Countries	Quantity					Annual Growth Rate (%)			
	2017	2018	2019	2020	2021	2018	2019	2020	2021
China	5,386	5,692	5,674	5,647	5,949	5.7	-0.3	-0.5	5.4
India	1,082	1,220	1,144	1,040	1,240	12.7	-6.3	-9.0	19.2
EU-27 & UK	1,236	1,231	1,191	1,029	1,150	-0.4	-3.2	-13.6	11.7
USA	958	987	1,003	806	925	3.0	1.7	-19.7	14.8
Japan	679	706	714	581	666	4.0	1.1	-18.7	14.7
Thailand	653	627	774	692	662	-4.0	23.5	-10.6	-4.3
Indonesia	619	626	640	598	615	1.1	2.3	-6.6	2.8
Malaysia	518+	542	545	543	528	4.6	0.5	-0.3	-2.7
Brazil	391	399	404	352	398	2.0	1.4	-12.9	13.2
Korea	384	367	354	298	333	-4.5	-3.5	-16.0	11.9
Viet Nam	214	225	230	247	330	5.1	2.2	7.6	33.4
Turkey	176	200	198	200	243	13.8	-0.9	0.8	21.5
Canada	125	139	140	101	128	11.1	0.6	-27.7	26.2
Russian Fed	118	125	127	112	125	6.4	1.2	-11.3	11.4
Others	811	832	790	710	764	2.6	-0.05	-0.1	0.07
World	13,350	13,918	13,928	12,957	14,057	4.3	0.1	-7.0	8.5

ANRPC Natural Rubber Trends and Statistics, January-February 2022

Consumption of NR by country, reflects the dominance of China as it continues to be the top user of natural rubber in the world garnering 42% of the total global consumption as shown in Figure 4. It is followed by India and EU-27 & UK at 9% and 8%, respectively. Other countries consume less than 8% of the global consumption.

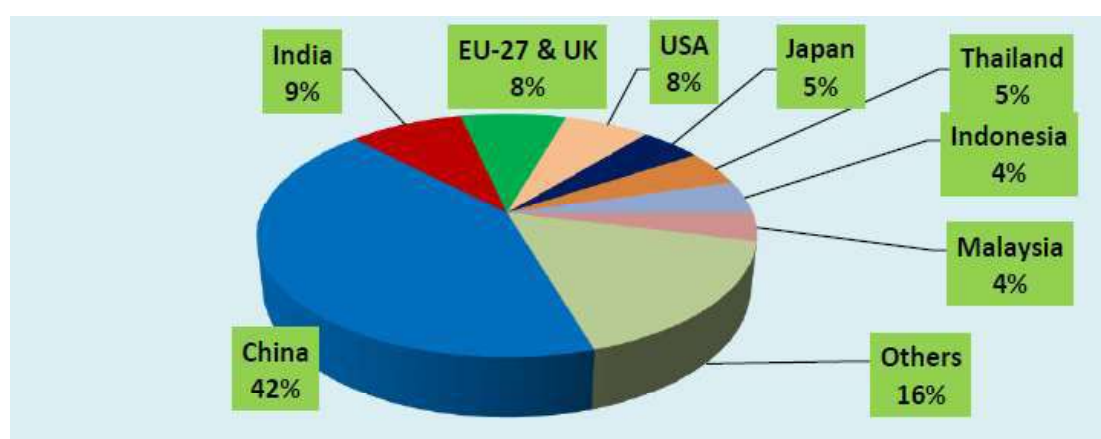


Figure 4. Global Consumption of NR - B

Source: ANRPC Natural Rubber Trends and Statistics, January-February 2022

2.4 World Projected Production and Consumption

Based on the 2020 report of the International Rubber Study Group (IRSG), there will be a surplus in NR production of an average of 132,500 metric tons annually from 2022 to 2025. It is projected that by 2026, production and consumption will equal 15.72 million metric tons. Shortage of NR supply is expected starting 2027 to 2029 due to a projected increase in global rubber market size driven by high demand from the automotive industry and the growing use of NR in footwear, industrial goods, construction, textiles, and other consumer products (Philippine Rubber Industry Roadmap 2022-2028).

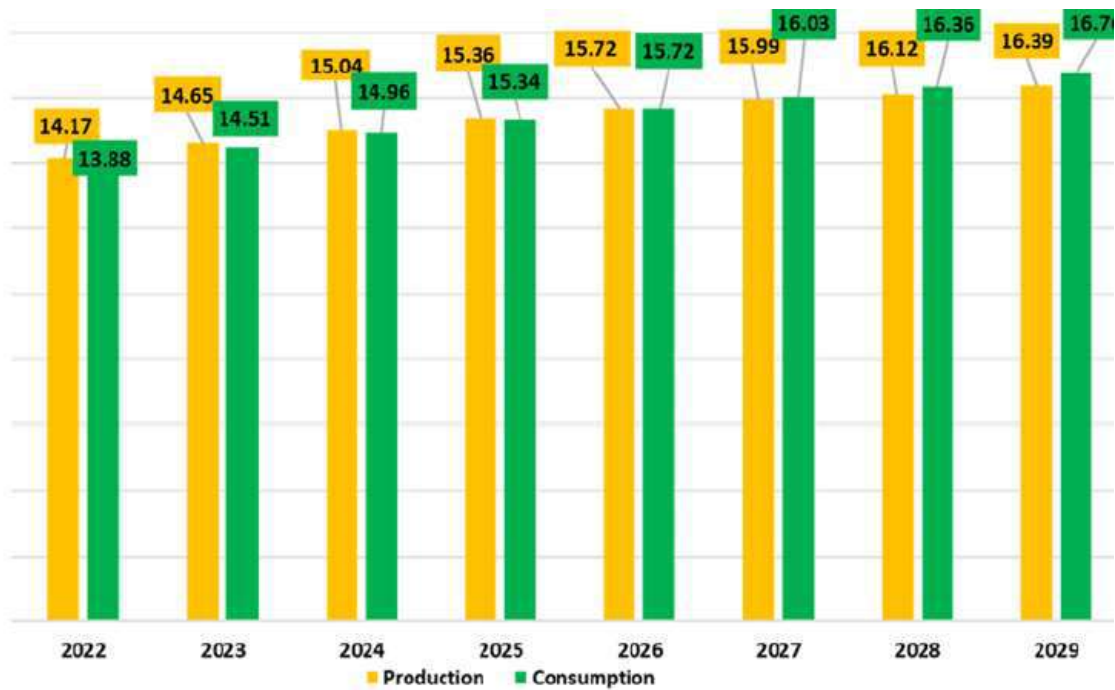


Figure 5. World Project Trends in Production and Consumption
Source: International Rubber Study Group (IRSG)

Rubber tires for vehicles are considered a highly demanded product of natural rubber. In previous years, demand for tires accounted for around 72 percent of global rubber demand, while the remaining 28 percent was used in products such as belts and hoses, thread and foam, and general rubber goods.

However, based on the analysis of Rubber Industry Analyst Mr. Jom Jacob, the projected demand for rubber will start to increase in 2025 by 260,000 metric tons, with an annual average increase of 870,000 metric tons over 4

years. This forecast is due to the improvement in the world economic outlook projected by the IMF and the growth of individual countries' GDPs (Philippine Rubber Industry Roadmap 2022-2028).

In 2022, the world witnessed a significant consumption of rubber, totalling approximately 29.7 million metric tons (divided between natural and synthetic types). China, as the top consumer, consumed a staggering 5.7 million metric tons, highlighting its dominant position in the global market, followed by India. These consumption patterns reflect broader economic trends and the strategic importance of rubber in key industries such as automotive, which remains the largest consumer of both rubber types for tire and tube production. The demand for rubber in manufacturing latex products, footwear, engineering components, belting, and hoses further illustrates its widespread utility.

The significant consumption of rubber in 2022 not only highlights the material's critical role across various industries but also prompts reflection on its production and environmental impact. As consumers and producers navigate these challenges, the quest for sustainable and innovative solutions could shape the future of the rubber industry, ensuring its relevance and viability for years to come.

China consumed the most natural rubber worldwide in 2022, at 5.7 million metric tons. This was followed by India and the United States, which consumed 1.3 million metric tons and one million metric tons of natural rubber that year, respectively. The outbreak of COVID-19 in 2020 caused a decrease in natural rubber consumption in many countries worldwide, but demand rebounded in 2021.

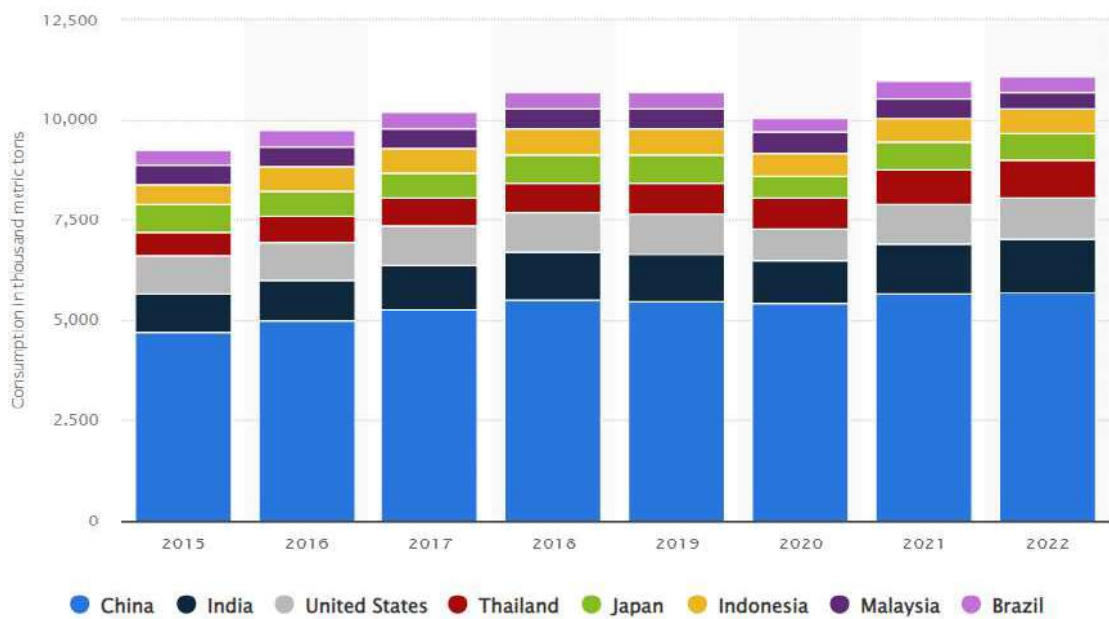


Figure 6. 2022 World natural rubber consumption
 Source: FAOSTAT, 2024

2.5 Market Assessment

The ANRPC recently brightened the outlook for the NR market despite uncertainties of post-pandemic economic recovery. The organization reported that based on the latest updates given by member-governments, the world supply of NR is expected to grow by 1.9% to 14.107 million tons in 2022 while demand is projected to hit 14.232 million tons, exhibiting a moderate increase of 1.2% this year. The ANRPC observed the following factors:

- a) The industry will experience a tight supply of NR in the coming months due to off-tapping season.
- b) The market improvement is driven by recovering global manufacturing activities, as well as positive growth in auto sales in major economies, and anticipated strong demand for gloves and other healthcare-related products.
- c) Post-pandemic economic recovery may be triggered by the decisions of some countries like Thailand and Malaysia to reopen their borders to boost their economies.

- d) Efforts by the Chinese government to stimulate its slowing economy include reducing its loan prime rate to 3.7% in January 2022 after a 5-point cut in December 2021.
- e) Surge in crude oil prices due to several factors such as war in Ukraine and the OPEC+ decision may influence the NR market.
- f) Despite the increase in the average weekly inventory level at the Shanghai Futures Exchange during the first two months of 2022 compared to the same period in 2021, the inventory of 240,000 tons remains lower than the pre-pandemic level of around 435,000 tons.

However, the ANRPC report also identified some short-term challenges that could hamper the NR industry's recovery:

- a) The Ukraine-Russia crisis has led to a further soar in global commodity prices. The crisis may consequently weaken global economic recovery following the sanctions imposed on Russia.
- b) Rising inflation driven by a substantial spike in crude oil prices could subsequently influence economic growth.
- c) The International Monetary Fund (IMF) and World Bank have issued lower economic growth projections for 2022.
- d) The expectation of an interest rate hike by the Federal Reserve in March 2022 could influence the market.
- e) The increase in the infectious rate of Covid-19 from the Omicron variant may hinder national or global economic recovery.

2.6 Supply Chain of Philippine Natural Rubber

In 2015, Dr. Rolando Dy of the University of Asia and the Pacific (UA&P) presented an analysis of the flow of natural rubber from processors to the end market. Figure 7 illustrates the movement of Philippine NR products in both the domestic and export markets. As an intermediate raw material, NR is marketed

locally to rubber-based product manufacturers located in industrial areas and export processing zones in Luzon or exported in raw (cup lump) form to Malaysia and in processed form (TSR/SPR) to China, Taiwan, Japan, Korea, India, and other countries.

The rubber manufacturers in the country produce tire and non-tire products which are sold locally and exported. Meanwhile, only three (3) rubber processing plants in the country can sell their products to Yokohama Tire Philippines (YTPI). This is because currently, only five (5) NR processors are ISO certified, which is the minimum requirement for supplying YTPI and the export market. YTPI is the single biggest user of SPR and the only car tire manufacturer in the country. Located in an export processing zone in Central Luzon, YTPI exports 93% of Yokohama Tires while only 7% of its production is distributed to dealers in the Philippines. While there are various processors and traders of cup lumps in the country, industry sources claimed that more than 50% of the country's NR production is exported in raw form to Malaysia, leaving some processing plants to operate at 50% to 60% capacity utilization.

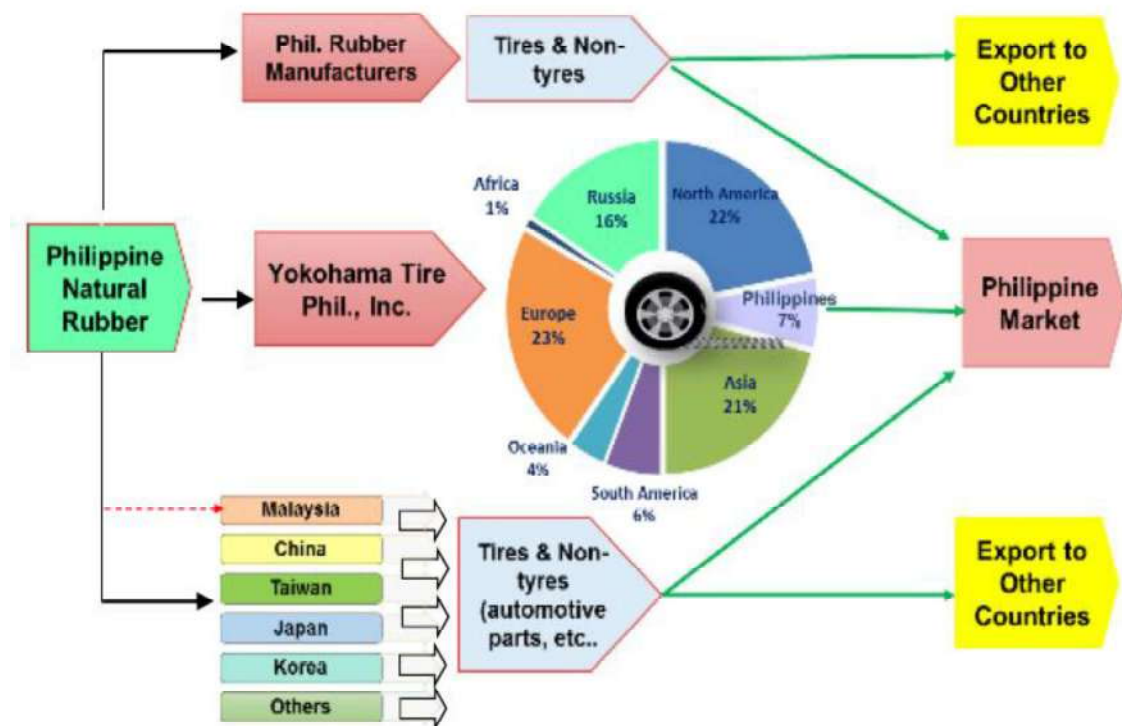


Figure 7. Philippine Natural Rubber Global Link
Source: Dr. Rolando Dy, PRIME 2015

2.7 Domestic Market

Currently, the total estimated domestic consumption of natural rubber by local manufacturers amounts to 35,000 metric tons. Yokohama Tires Philippines, Incorporated (YTPI) remains the biggest user of natural rubber sourcing 51% of its total consumption locally, while the remaining percentage is utilized by PRIA members and manufacturers located in the export processing zones.



QUICK FACTS

NR Annual Estimated Consumption of Local Manufacturers (MT)

Particulars	Est. Annual Consumption
Yokohama Tires Phil. Inc	18,000
PRIA Members	8,500
Non-PRIA Members	8,500
Total	35,000

Figure 8. Estimated Consumption of Local Manufacturers (MT)
Source: Mr. Elpidio Carlota of Philippine Rubber Industries Association, Inc. (PRIA)

2.8 The Philippine Rubber Industry Profile

In the Philippines, rubber is primarily grown in Mindanao, with a small portion cultivated in Luzon and Visayas. The Zamboanga Peninsula, SOCCSKSARGEN (South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos City) Region, BARMM, Davao Region, and Caraga Region are the top producing regions in Mindanao. Over the past ten years, the area planted for rubber is increasing. In 2023 around 233,010.54 hectares of land were planted with rubber (Table 5), and the top regions were the Zamboanga Peninsula, SOCCSKSARGEN, and BARMM, which contributed 44%, 25%, and 16%, respectively (Figure 9). Basilan province under BARMM has a total area of 36,962.00 hectares planted to rubber trees distributed among different municipalities, including the city of Lamitan; These regions' total production

accounted for 85% of the country's rubber production (PSA, 2024). Basilan province has rubber in an area of 36,962.00 hectares, the biggest area in Lamitan Agrarian Reform Beneficiaries Cooperative (LARBECO) and Sta. Clara Agrarian Reform Beneficiaries Integrated Development Cooperative (SCARBIDC).

Table 5. Area Planted to rubber by regions in the Philippines, 2014 to 2023 in hectareage

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Philippines	217686.86	222601.56	223283.17	226284.65	228943.63	229431.00	230723.01	239140.50	239647.82	373010.81
CAR	27.00	27.00	27.00	27.00	12.00	12.00	12.00	12.00	12.00	12.00
Region I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region II	122.00	203.00	210.00	305.00	305.00	275.00	275.00	275.00	275.00	275.10
Region III	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region IV-A	435.00	435.00	435.00	435.00	435.00	435.00	435.00	435.00	435.00	435.00
MIMAROPA Region	1766.25	1778.25	1876.00	1879.00	1879.00	1879.00	1879.00	1867.00	1763.00	1786.80
Region V	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Region VI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region VII	1018.00	978.00	966.00	966.00	966.00	966.00	966.00	1000.00	1000.00	1000.00
Region VIII	0.00	0.00	0.00	3.00	4.00	4.00	4.00	4.00	19.00	19.20
Region IX	86452.00	89837.00	90297.00	90918.18	91195.18	91312.00	91669.00	99088.00	99712.83	233010.54
Zamboanga del Norte	9037.00	12537.00	12599.00	13050.00	13307.00	13360.00	13403.00	15180.00	15781.00	16175.52
Zamboanga del Sur	6200.00	6070.00	6080.00	6250.18	6260.18	6260.00	6260.00	6263.00	6263.00	141069.54
Zamboanga Sibugay	70205.00	70220.00	70220.00	70220.00	70220.00	70220.00	70216.00	75742.00	75765.48	75765.48
Zamboanga City	1010.00	1010.00	1398.00	1398.00	1408.00	1472.00	1790.00	1903.00	1903.35	0.00
Region X	8876.31	8776.31	8776.21	8797.30	8797.45	8818.00	8818.01	8816.90	8767.89	8787.89
Region XI	8518.30	8872.00	8831.96	10421.17	10442.00	10502.00	10502.00	10449.60	10447.60	10478.82
Region XII	60516.00	60966.00	61026.00	61063.00	63423.00	63543.00	63961.00	64908.00	64940.00	64924.96
Region XIII	11837.00	12450.00	12519.00	12651.00	12666.00	12851.00	13111.00	13186.00	13176.00	13176.00
BARMM	38115.00	38275.00	38315.00	38815.00	38815.00	38830.00	39087.00	39095.00	39095.50	39100.50
Basilan	36000.00	36160.00	36200.00	36700.00	36700.00	36700.00	36957.00	36962.00	36962.00	36962.00

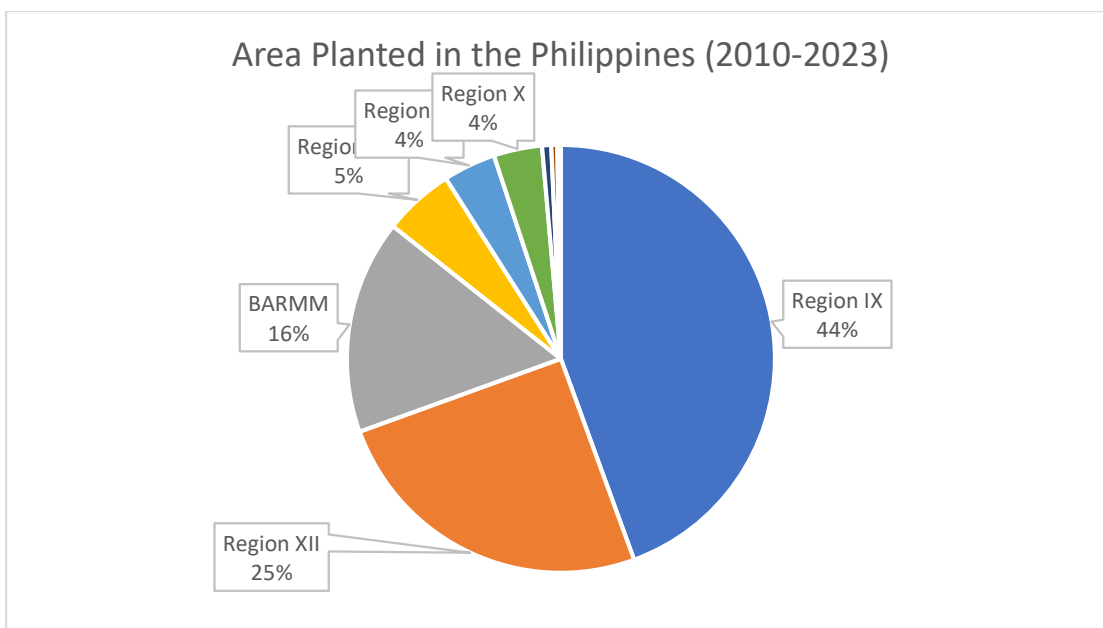


Figure 9. Area planted to rubber (2023)

Despite the fluctuations in cup lump production over the last ten years (2014-2023), Zamboanga Peninsula consistently remains the top producing region. In 2023, it produced 157,633.37 tons of cup lumps, followed by Region 12 with 111,711.01 tons and BARMM with 70,861.29 tons (Table 6). According to Figure 10, Region 9 contributes the most to the country's rubber production at 41%, followed by Region 12 at 35%, and then BARMM at 14%.

Table 6. Volume Production of cup lumps

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Philippines	453052 .48	398136 .64	362625 .97	406984 .45	423370 .90	431674 .76	422407 .10	430635 .74	415749 .65	378818 .13
CAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region II	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region III	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region IV-A	63.95	34.71	35.22	21.31	13.20	12.74	12.40	15.27	13.88	12.95
MIMAROPA Region	102.10	117.69	122.18	132.38	139.89	145.02	146.79	162.81	162.16	105.66
Region V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region VI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region VII	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region VIII	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Region IX	191609 .82	176771 .93	164413 .87	155718 .90	157493 .37	161830 .12	165695 .39	165434 .71	162575 .39	157633 .37
Zamboanga del Norte	20668 .34	21485 .49	21433 .15	20328 .70	21357 .98	22385 .05	22036. 95	23151 .41	23183 .91	23992 .16
Zamboanga del Sur	25775 .42	24900 .59	21953 .44	23097 .70	22574 .24	22299 .66	23136 .39	22624 .11	22151 .13	25530 .52
Zamboanga Sibugay	143084 .22	128280 .57	119011 .33	110259 .12	111457 .72	115006 .37	118378 .94	117313 .90	114836 .08	108110 .69
Zamboanga City	2081 .84	2105 .27	2015 .95	2033 .38	2103 .43	2139 .04	2143 .11	2345 .28	2404 .27	0.00

Region X	11872 .60	12141 .90	12402 .17	12964 .09	13377 .80	13760 .60	12415 .77	11740 .09	10248 .25	10148 .95
Region XI	10848 .94	11406 .87	11028 .15	11187 .42	11463 .35	11765 .87	12105. 25	12514 .85	12419 .70	12306 .52
Region XII	173976 .51	126264 .18	102376 .47	147480 .00	154671 .96	152724 .49	136726 .15	144414 .58	134387 .16	111711 .01
Region XIII	10509 .08	12006 .01	12845 .24	14192 .74	15616 .52	16751 .10	17628 .43	18078 .23	17484 .74	15962 .80
BARMM	54051. 33	59359 .16	59364 .09	65242 .25	70539 .04	74619 .66	77602 .84	78177 .53	78369 .33	70861 .29
Basilan	51716 .00	57519 .00	57596 .50	63517 .00	68796 .70	72847 .23	75836 .73	76433 .03	76628 .99	69391 .81

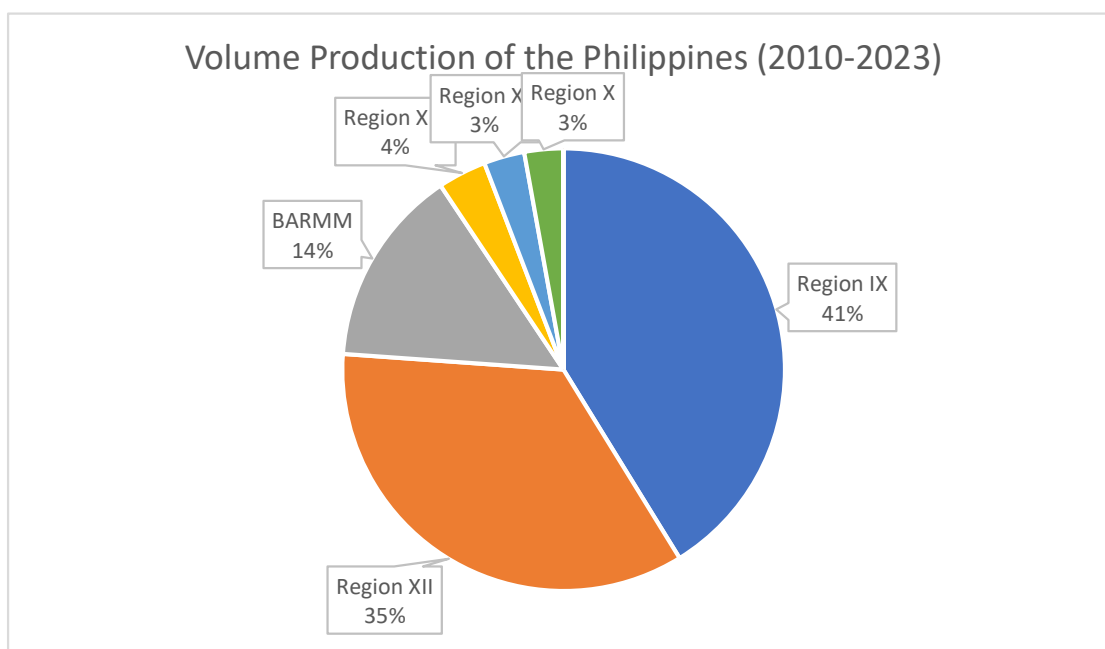


Figure 10. Volume Production of the Philippines (2010-2023)

Rubber is economically important in Asia, where latex rubberwood obtained from latex trees is used to make furniture and serves as the primary raw material for wood-based panels like particleboard and medium-density fibreboard. The rubber industry has continually been a source of new employment opportunities in the country, encompassing both the industrial and agricultural sectors. The industry generates employment and income not only within itself but also in other sectors of the economy. Beyond the economic benefits of rubber-based products, rubber trees play a vital role in erosion control, reforestation, and environmental preservation. As they are biodegradable and not petroleum-based, rubber-based farming systems reduce the risks associated with traditional farming and increase livelihood activities, leading to improved income and farmers' welfare.

2.9 Rubber Industry in Basilan

The rubber growers in Lamitan, Basilan are predominantly smallholders cultivating three hectares. Since most of the farmers in the area are smallholders, the income derived from rubber farming is mainly affected by different factors of production. Crop output is affected by climate change, disease outbreaks, and unpredictable weather conditions. Agricultural research and crop production statistics show that climate variability affects crop productivity.

With these, farmers usually look at other alternatives to adapt to climate variability. Some farmers engaged in diversified farming system strategies to minimize risk from farming. Farmers may benefit from diversification to mitigate various risks, including price risk, yield risk, input, and output market concerns. However, farmers need support in terms of farm input for intercrop for them to be assured of income and food supply at the household level. In Basilan, the Ministry of Agriculture, Fisheries, and Agrarian Reform (MAFAR), in collaboration with the Philippine Rubber Research Institute (PRRI) of the University of Southern Mindanao (USM) and the Rubber Artificial Intelligence project, has conducted monitoring and surveillance in rubber trees in Basilan Province in January 2023 due to reported incidence of pestalotiopsis leaf fall disease of rubber. The Office of the Local Government Office of the provincial Governor issued Resolution No. 2023-14” Declaring a State of Calamity in the Province of Basilan” resulting from the infestation of Pestalotiopsis Leaf Fall Disease in Basilan Province and considered an outbreak.

The rubber farmers are not ready for this abrupt acceleration of devastation to their source of livelihood wherein 12,600 planters and 35,000 tappers individual and factory workers, respectively, are severely affected and might lose their jobs, and an estimated P6.8 billion pesos will be lost if they remain untreated covering entire Basilan rubber plantations and other neighboring province including Zamboanga peninsula (Alipala, 2023).

Prevention of this disease might take place according to the experts by the following interventions provision of Fertilizers, Fungicides, Mist Blowers,

Aerial Drone for Aerial Spraying, and Additional Manpower like the hiring of personnel as Quarantine Officers assigned in Island Provinces to prevent invasive Insect Pests and Diseases affects the crops in our region.

Rubber farms mostly were composite of Agrarian Reform Communities of big cooperatives in Lamitan. Other farms are individual small hold average 3 hectares, planted to monocrop and currently affected by disease outbreak such as rubber leaf disease and root disease and weevil. Farmers adopted mitigating measures such as cleaning, use of herbicides/ pesticides and even burning or cutting of infected rubber trees. About 50% of the farms are infested by disease called pestalotiopsis leaf fall disease of rubber. However, some farms are 100% infested.

2.10 Characteristics of Rubber Farmers

Rubber farmers are mostly in their 50s, married, male, with household size of five and two children attending school. Majority (47%) are Bisaya and Zamboangueño (27%). Likewise, 90% of rubber farmers are engaged in rubber production of 3 hectares and below. The smallest farm is half hectare and the biggest is 24 hectares. The average number of trees is 550/ hectare planted to RRIM 600, and other clones. These farmers are mostly (93%) members of farming associations and cooperatives in their locality. Their memberships average 7 years but others have been cooperative members for 3 decades. They have been in rubber farming with an average of 13 years but others had the maximum of 30 years. Mostly are owners (86%) and only 4 farmers are tenant. As member of the cooperatives and associations, they were provided with farm inputs such as, vegetable seeds, fertilizer, cash incentives and livestock. Likewise, these farmers availed of training for production technology, input subsidy, cash assistance pest and disease assessment but not on marketing and on business enterprise.

Farmers solely dependent on rubber for their income earn an average of ₱8,375.72. But about 43% of them earns additional income of about ₱10,000 and below from other sources. Their average household expenses are ₱10,658.61 (Table 7). Hence, farmers income form rubber is not sufficient to

meet the family needs for food, medicine, and other family expenses. Most of the farmers (86%) are engaged in mono-cropping, only about 4% are engaged in multiple and intercropping. They received different forms of assistance but very few of them availed. Only 20% of the respondents availed of trainings on production technology, 16% of the input assistance for farm inputs, pest & disease assessment and input subsidy.

Table 7. Socio-economic profile of rubber farmers in Lamitan City, Basilan, 2024

Items	Mean	Frequency	Percentage
1. Age	51		
2. Household size	5		
3. Gender Male		24	80%
4. No. children in school	2		
5. Civil status		26	87%
6. Ethnicity			
Bisaya		14	47%
Zamboangueño		7	27%
7. Religion: Roman Catholic		21	70%
8. Education: High school grad		10	30%
College		5	15%
9. Monthly Income from Rubber	₱8,375.72		
10. Other sources of income	₱10,000	13	43%
11. Monthly expenses	₱10,658.61		
12. Members in Association/ Cooperative/ Organization		28	93%
13. No. years as member	7 years		

2.11 Characteristics of Rubber Traders

Rubber traders in Lamitan City are classified under contract buyer, consolidator and barangay trader. A contract buyer facilitates the marketing of rubber cup lumps or crumb rubber to either trader or consolidator. Their average age is 51 years old with educational background of high school graduate, college graduate and one finished graduate study. They have been in the

business of trading for an average of 15 years, though one trader has been in the business for 35 years. Only two traders are member of organization to wit: Bangsamoro Marketing Operations and Philippine Rubber Industries Association. Each trader can buy cup lumps or crumb rubber ranging from 10 tons to 20 tons/ day (Table 8).

Table 8. Socio-demographic profile of rubber traders in Lamitan City, Basilan, 2024

Items	Mean	Frequency	Percentage
1. Age	51		
2. Household size	4		
3. Gender: Male		3	50%
Female		3	
4. Civil status		6	100%
5. Ethnicity			
Bisaya		3	50%
Yakan		3	50%
6. Religion:		3	50%
Roman Catholic			
Islam		3	50%
7. Education:			
College Graduate		4	60%
College Undergraduate		2	40%
8. No. years in trading	15 years		
9. Classification:		2	33%
Local trader			
Contract buyer		3	50%
Consolidator		1	17%
10. Members in Association/ Cooperative/ Organization		2	33%
11. No. years as member	10 years		
12. Volume traded: Cup Lumps	10 MT- 20MT/ day		

2.12 Profile of Rubber Processors

In the entire province of Basilan, only two processors are engaged in rubber semi-processing: one in Lamitan City and one in Menzi, Isabela City. However, some rubber traders sold cup lumps to Malangas Processor. These processors have been in the business for about 30 years. The one in Maloong, Lamitan is a Sole Proprietorship while the processor in Menzi is owned by the United Workers Agrarian Reform Beneficiaries Multipurpose Cooperative (UWARBMC). Both companies are considered big in terms of assets with value of more than 100M. They are into semi processing of Standard Philippine Rubber (SPR) 20, SPR 5 L and SPR 5 R. Both produces between 2,000-3,600 bales per month. Menzi rubber processing plant buys the rubber cup lumps of the cooperative members while the processor in Lamitan buys from individual farmers in barangay Maloong Canal, Maloong San Jose, Ulame and Sta Clara. In the case of Cooperative, bidding is the process of choosing the buyer of their product. In the case of the other processor, the firm hires locator or agent to source out rubber cup lumps in the different barangays in Lamitan City and nearby municipalities.

2.13 Value Chain Map of Rubber Products

This section explores the various players involved in the rubber industry and their roles within the overall value chain. The rubber industry comprises a range of key players: suppliers of production and maintenance inputs for farmers, traders who handle cup lumps, operators of trading centers in strategic locations, processors who convert raw materials into TSR/SPR (crumb rubber), and finally, traders and exporters of finished natural rubber (TSR/SPR). These traders then sell the semi-processed rubber to manufacturers of tires, automotive parts, sports goods, and footwear, primarily located in Cebu and Manila. However, in the study area of Basilan, the value chain only extends to exporters of semi-processed rubber.

Hence, the value chain map of rubber in Basilan City is composed of budwood nursery operators before (but no longer operating this time), input suppliers of about 6 in the entire Basilan Province, and only 1 in Lamitan City,

rubber farmers who are members of the cooperative and other individual farmers, consisting of about 12,600, 6 local traders/ contract buyers, 2 consolidators and 1 processor. Basilan State College provided quality budded seedlings to farmers for free in the past, likewise, OPAg also distributed quality seedlings to rubber farmers. Rubber farmers are 90% small-hold owners cultivating between 2-3 hectares of rubber. Most, are Cooperative members - beneficiaries of LARBECO and SCARBIDC. The other 10 percent are individuals and corporations owning a bigger area of more than 3 hectares and a maximum of 30 hectares.

The rubber industry enablers in Basilan are the PRRI, MAFAR, MOLE, Provincial/City Agriculture Office (OPAg), MTIT, MOST, PRIA, and Basilan State College supporting the different chains from input supply to production, trading, and processing.

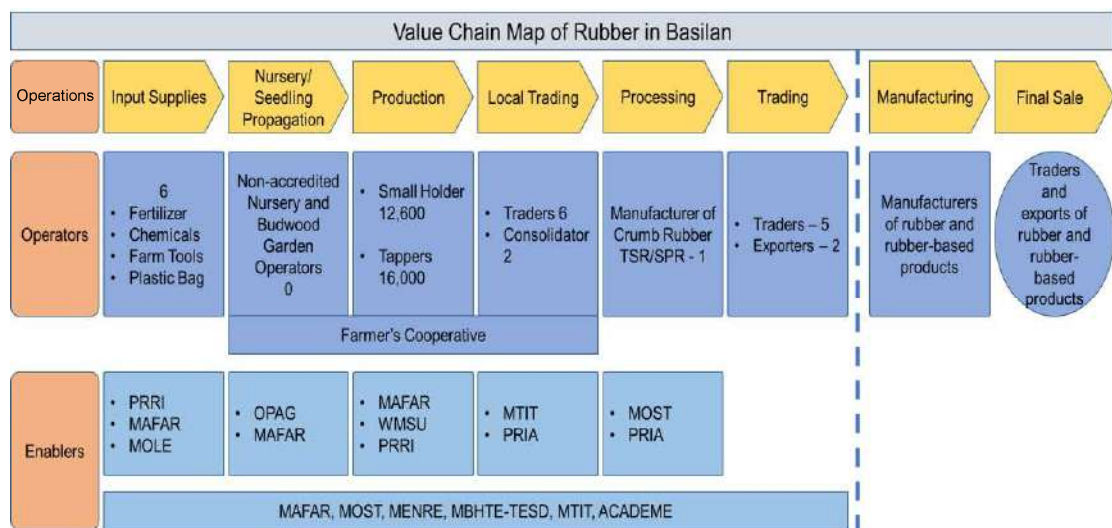


Figure 11. Value Chain Map of Rubber Products in Basilan

In Lamitan City, the rubber plantations are located in 6 barangays, and in every barangay, local traders or contract buyers are facilitating the selling of the cup lumps. Rubber farmers usually sell their products every 15 days. These local traders are in a network with consolidators and processors. In the case of Cooperatives, member beneficiaries are obligated to sell their cup lumps to the cooperative at ₱2.00 lower than the market price. This margin becomes the income of the cooperative for the interest of the cash advance made by the

cooperative members. The coop then sells the cup lumps to the consolidator at a price higher by ₱2.00 or more. Farmer beneficiaries sell an average of 800 kg per month to the cooperative for the harvest in 2.4 ha rubber farms. However, recently farmers can only harvest cup lumps at an average of 400 kg per month or 50% of their previous harvest due to the infestation of rubber disease in the plantation.

Currently, the cooperatives in Lamitan City in Basilan are unstable. This instability stems from poor management and conflicts of interest within the cooperatives. The principles of cooperativism are deteriorating, leading to a shift away from cooperative operations. There is even consideration of dividing the land among Agrarian Reform Beneficiaries (ARBs). Given these issues, rubber production is not stable.

Our assessment of the management practices of the existing 3 cooperatives are as follows:

SCARBIDC:

There is an existing management structure, but it is ineffective due to a lack of cooperation among members. Many members do not listen to management, especially if they do not support the current management team, believing that leadership changes have not brought any improvements. The management is unable to implement programs without the board's consent, and conflicts exist between management and the board.

LARBECO:

Management challenges exist; however, this cooperative has successfully distributed land to ARBs, indicating a successful agreement between management, the ARBs, and the board. There is a systematic process in place for producing and selling products both within and outside the cooperative.

MACFARMCO:

Management is generally effective, with a centralized consolidation of products through a bidding process. However, there have been issues with previous management.

Below are the supply chains from three different sources. Supply Chain 1 is a local trader that buys an average of 50 tons/day and sells his rubber to the Consolidator at a contract price. This local trader also extends cash advances to the farmers. His consolidator sells the rubber cup lumps to the exporter based in Davao City and also to the crumb processor in Malangas, Zamboanga Sibugay. The second supply chain sells cup lumps to the processor in Lamitan City and transports his crumb rubber to Manila and Cebu Manufacturers of rubber tires, sports products, footwear, and other rubber-based products. The third supply chain represents the cooperative that buys cup lumps of coop members and sells to processors and semi-processed products are transported to the manufacturers in Cebu and Manila.

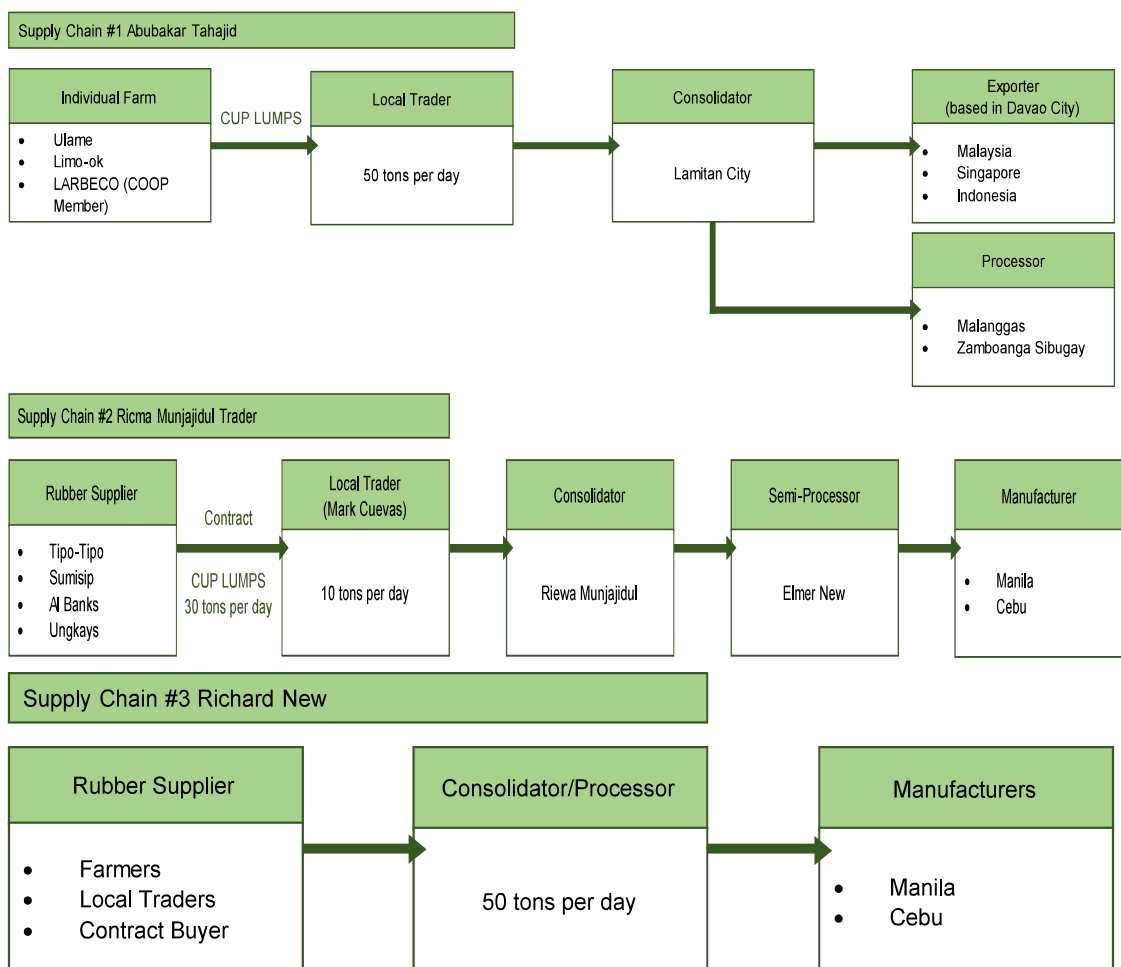


Figure 12. Supply Chain of Rubber in Lamitan City

2.14 Value Chain Key Players and their Product Requirement

In Lamitan City, the budwood nursery is located in Lamitan Agrarian Reform Beneficiaries Cooperative (LARBECO) but accordingly, this is not maintained at present, hence, there is no available budwood nursery operator in Lamitan and the entire Basilan Province. Rubber seedlings were also obtained from Basilan State College and OPAg. Currently, rubber farmers do not plant quality budded seedlings due to the absence of available quality budded seedlings in the area and likewise due to low buying price experience since 2011. Some farmers have to source planting materials from seedling nurseries in Zamboanga Sibugay.

The rubber farmers sell cup lumps to local traders found in the barangay and for cooperatives members, they sell their products to their cooperative at a lower buying price of ₱2.00 per kilogram. These local traders sell their rubber products to consolidators at a contract price or to processors located in Lamitan and Isabela City. One consolidator sells his product to Malangas, Zamboanga del Sur for semi-processing. The same consolidator also exports rubber products to Malaysia, Indonesia, and Singapore using the route in Davao City, the place of the exporter (Table 9).

Table 9. Rubber key players, customers and their product requirements

Key Players	Customers	Volume Requirement	Grade/Quality Specification
Budwood Nursery Operator (not existing)	Rubber Farmers smallholders and cooperative members	Not specified	Quality budded seedlings, and high yielding clones
Rubber Farmers	Local traders including cooperative trader and contract traders in the barangay	No limit UWARBMC: Farmers can deliver between 5,000 to 6,000 kilograms of latex per day, supported by 100 tappers.	15 days old cup lumps or higher coagulated with formic acid or through natural coagulation; free from dirt and other foreign matters.

Local Traders	Consolidators Processors	500 tons or more per month	Clean rubber with moisture content at 50%
Consolidator	Processors are millers of crumb rubber in Lamitan City, Isabela City, Zamboanga City and Malangas, Zamboanga Sibugay	United Workers Agrarian Reform Beneficiaries MPC- 3,600 MT annually; UWARBMC in Menzi, Isabela City operates at a capacity of 5 tons per day or 1,825 MT annually; EJN in Maloong: operates at an estimated 1,800 MT annually	Clean rubber with moisture content at 50%
	Exporter of cup lumps/ crumb rubber Based in Davao City	No limit	SPR 20 grade exported to Malaysia, Indonesia, Singapore
Processors	Manufacturers located in Cebu and Manila 1. Tires for motorcycle, bicycle 2. Sporting good, transmission belts, rubber conveyor, radiator and fuel hoses, rubber rings, gaskets, linings, bearing pads, OEM parts, tennis balls 3. Footwear – Rubber soles, sandals, boots	Not specified	Crumb rubber SPR 20; SPR 5

Exporters	Manufacturers of: 1 Tires – Car, motorcycle, bicycle 2 Automotive, industrial parts and sporting good, transmission belts, rubber conveyor, radiator and fuel hoses, rubber rings, gaskets, linings, bearing pads, OEM parts, tennis balls 3 Footwear – Rubber soles, sandals, boots 4 Latex –baby feeding nipples, balloons, medicine droppers, and hoses	Not specified	Crumb rubber SPR 20
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2.15 Key Players and their Roles

Indicated below are the corresponding roles of key players in the industry with the assumption that quality product for rubber is sustained. However, the industry is still beset with problems of adulterated rubber and the use of sulfuric acid for coagulation instead of formic acid which resulted in poor quality. The Department of Trade and Industry together with other concerned agencies and ZAMPEN RUBBER is advocating the use of clean coagulating containers and encouraging the use of formic acid to produce quality cup lumps and crumb rubber.

Table 10. Major key players and their roles in the industry

Major Players	Roles
Nursery budwood Operators	<ul style="list-style-type: none"> • Upgrade rubber bud wood • Propagate budded seedlings for farmers
Rubber Farmers	<ul style="list-style-type: none"> • Source quality planting materials and other inputs • Manage the entire production process • Responsible for harvesting latex and post-production activities • Coagulate latex in clean area free from soils and foreign materials using formic acid or through natural coagulation
Local Traders/ Assembler Traders	<ul style="list-style-type: none"> • Buy cup lumps straight from the farmers • Clean, dry and sort consolidated RDS • Supply to processors

Processors	<ul style="list-style-type: none"> Process RDS to alkali-treated chips, semi-refined and refined carrageenan for both domestic and international markets
Exporters	<ul style="list-style-type: none"> Export RDS chips, carrageenan chips, semi-refined and alkali-treated chips abroad

2.16 Activities/Processes and Costs

Rubber farmers perform clearing in the plantation by themselves due to the lesser income earned from rubber cup lumps. If they will hire laborers to do the clearing, they will be spending about ₱1,750.00 per hectare per month. Likewise, if they apply fertilizer, they will be spending about ₱2,131.90 per year (although conservative estimate). At present, they do not apply fertilizer due to high cost and minimal income. For tappers, the arrangement is 50% share of the income and that is equivalent to ₱13,692.50 share in one year with the of an average yield of 1,095.40 kg cup lumps sold at ₱25.00/kg (2022-2023), the total gross income is ₱27,385.00 per hectare per year.

Table 11. Activities involved in the production and marketing of rubber cup lumps and the cost per operation in Lamitan City

Activities	Performed by	Resources Needed	Average Costs per year in 1 ha farm
1. Farm clearing and maintenance	Farmers including wives, children and hired laborers	Farm tools and fertilizers	For hired labor @ 350.00/ day for 5 days per month is ₱1,750.00 Fertilizers/ chemicals is estimated at ₱2,131.90 or even more depending on the budget of the farmers
2. Tapping of latex	Men and women	Tapping knife, latex cup	Labor is 50% share of the income @ 1,095.40 kg / year priced at ₱25.00/ kg = ₱27,385.00 , hence the labor cost is ₱13,692.50
3. Collection of latex	Men (can be hired laborer)	pail	Labor included in the sharing arrangement
4. Coagulating latex	Men	Coagulating tank	Labor included in the sharing arrangement
5. Marketing of cup lumps	Men & Women	Transport vehicle	₱1,485.00 is as much as the traders pick-up rubber cup lumps and sold within the barangay

2.17 The flow of product, information and payment along the chain

There are three groups of product flow of rubber cup lumps based on the identified key players.

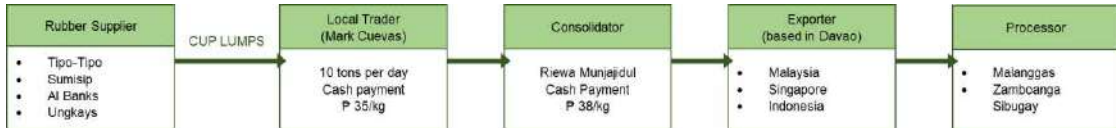


Figure 13. From individual small holders to traders, consolidator, processors

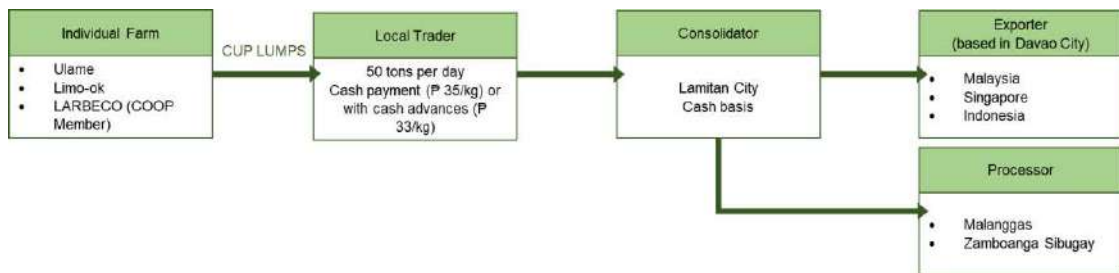


Figure 14. From individual farmers to local traders to consolidators to processors and exporter



Figure 15. From farmers, local traders and contract buyers to consolidators/processors to manufacturer

The price information flows from manufacturers down to farmers. Manufacturers determine the price, and this information is passed down to processors (as illustrated in Figure 16). The processors then inform the consolidators of the price. Once a contracted price is finalized between consolidators and traders, this contracted price becomes the basis for the buying price of rubber products and this information is then disseminated to individual farmers.



Figure 16. Price information flow among various stakeholders

2.18 Production Cost and Income of Rubber Farmer

Rubber farmers are selling cup lumps to traders every 15 days. Harvesting is every day however; each tree is tapped every other day. Hence, a single tree is being tapped 15 times a month. Farmers notice a big drop in the yield compared to previous years. Likewise, some farmers also reported high yields of up to 1,827.38 kg per hectare for plantations not affected by diseases. About 63% of the rubber farmers suffer from disease infestation thereby harvesting lesser yield almost half of those farms without disease infestation.

About 45% of these farmers apply fertilizer on the farm, the rest just leave their plantation without fertilization due to the high cost of inputs. The farmers claimed that income was just enough to sustain the needs of the family. Other costs are materials and supplies for coagulations, tapping knives, and containers. The labor component is 50% of the gross income of cup lumps. These are the current arrangement of tappers with the farm owner. The labor component covers farm clearing and maintenance, tapping of latex, hauling, coagulating, and transporting to the traders during marketing. The payment of labor is given every trading day that is twice a month.

Five farmers reported to have practice intercropping with rubber. One farmer planted mangosteen, two farmers planted coconut, one farmer planted banana and the other one planted different fruit trees such as Lanzones, and rambutan.

Aside from intercropping, 50% of the rubber farmers reportedly earn income from other sources for employment, merchandizing, miscellaneous, and remittance from abroad with an average income of ₱10,000 and below per month.

The production cost of rubber as monocrop is presented below to determine the income derived from it without any supplemental income from other crops. Based on 2022-2023, in one year a farmer earns about ₱9,825.10 net income solely from rubber per hectare. If the farmer also performs clearing, tapping, and other activities with the help of the members of his family, he will get higher income including incentives for his labor and management.

Table 12. Farming practices of rubber farmers in Lamitan City, Basilan

Information	Frequency	Percentage (%)
Types of farming Practices		
a. Monocropping	25	84
b. Intercropping	4	13
c. Multi cropping	1	3
Total	30	100
Crop Management Adopted		
a. Replanting	5	17
b. Pest & Disease Control	9	31
c. Fertilization	13	45
d. Farm clearing	2	7
Total	29	100
Farm infected by diseases		
a. Infected by rubber disease	19	64
b. Not infected	11	36
Total	30	100
Types of disease Infestation		
Rubber leaf Fall	13	68
Root Disease	2	11
Wood Weevil	4	21
Total	19	100
Disease mitigating measures		
Monthly clearing	15	50
Use of herbicides/ Pesticides	7	23
Burning Cutting of infected rubber trees	5	16.6
Others, specify brushing/ yearly planting	3	10.0
Total	30	100

While monocropping of rubber generates an average yearly income of ₱9,825.10, farmer is assured of additional income if other crops are planted. This average income is very low compared to other areas in BARMM precisely due to the presence of *pestalotiopsis* in rubber. A study on the “Productivity from the different rubber-based farming system models in Cotabato” in 2016, showed that income of farmers increased with the presence of other intercrop such as cacao, banana and coconut. Rubber is more productive when it is integrated to coconut compared to banana and cacao. In terms net income of rubber based as a crop, with coconut a higher income is generated at ₱126,978.00/year while rubber and banana the income is ₱106,074.68 and for rubber and cacao the income is ₱88,354.13. This implies that the farmers' income increases with the different rubber-based farming systems compared

to the monocropping system. The farmers' income did not solely depend on rubber production but also other income from other crops grown. As their income increases, they were able to support the needs of their families. Lastly, this study could be a basis for the farmers to possibly adapt to this kind of farming system to increase income and lessen the risks from farming. It could also be a basis for the policymakers to plan for future agricultural development in the area.

Table 13. Cost and return of rubber cup lumps produced by farmer/ ha/ year

Item	Value per unit
Income	
Cash Income	₱ 27,385.00
(a) Total Cash Income	₱ 27,385.00
Noncash Income	
(b) Total Noncash Income	
(c) Total Income (a) + (b)	₱ 27,385.00
Cost	
Cash Cost	
Variable Cash Costs	
Labor Cost	₱ 13,692.50
Materials/Supplies	₱ 2,131.90
Transportation cost	₱ 1,485.00
(d) Total variable cost	₱ 17,309.40
Fixed Cash cost	
Land Tax	₱ 250.50
(e) Total Fixed Cash cost	₱ 250.50
(f) Total Cash Costs (d) + (e)	₱ 17,559.90
Net Income [(c) - (f)]	₱ 9,825.10
Return on Investment	56%

2.19 Participatory Systems Analysis (PSA)

The PSA exercises were carried out during the FGDs where participants were inquired exhaustively about the factors that contribute to the success of the rubber industry in Basilan. The participants that include rubber farmers, cooperative board of directors, managers, and traders identified as many factors that were eventually combine into eight factors. The factors were then arranged in a matrix (Table 14) and the degree by which a factor influences another factor was analyzed. Below are the factors of success in rubber industry identified by the participants:

Code	Factors
K&S	Knowledge & skills in rubber farming
IS	Input subsidy in rubber
CF	Credit Facility
TA	Technical Assistance in farming and marketing
MI	Market Information including pricing
IF	Infrastructure facility support
PHF	Post-harvest Facility
P	Policy in support to the rubber industry

Following the procedures of Herweg and Steiner (2002) the ratings used were as follows:

a.	Strong influence	=	2.0
b.	Moderate influence	=	1.0
c.	Weak influence	=	0.5
d.	Very weak influence	=	0.1

Results of the analysis showed that the factors that fall under the motor quadrant are those of technical assistance, market information including pricing information, and credit facilities (Figure 17). These are vital in addressing the concerns of the different chains in the rubber industry as these will provide predictable impacts.

Currently, almost 80% of the farms are affected by Pestalotiopsis Leaf Fall Disease and farmers are claiming low productivity of latex up to 50% compared to the yield in previous years. The PRRI personnel already visited and assessed the infested area and appropriate intervention is needed before

the entire area will be affected. Hence technical assistance is very vital in disease cure and elimination. The second factor is market information in terms of the pricing and quality standards of rubber required by the processors and exporters. The price of rubber in the world market is volatile, some precautions and preparation on how to get the right price needs to be disseminated to the farmers. This can be done through the help of the Ministry of Trade, Investment and Tourism. Credit facilities are also very crucial in providing opportunities for affected families in the rubber industry. They can use the funds to adopt diversified farming such as the production of short-season crops like vegetables, cassava, or high-value crops that will provide additional income to the farmers. Wives can also participate in earning by engaging in small business in the area such as retailing or cooking.

On the other hand, the factors that fall under the critical quadrant are input support, and knowledge and skills. This would mean that while precautionary measures are considered, this will give positive results if handled properly. Factors under the critical quadrant have the probability of giving unpredictable results and therefore, these require extra caution in providing these interventions as these may create side effects. Input subsidy if not given to the right farmers, cannot impact the rubber industry. This supports the claims of some farmers that the input subsidy did not reach them. Likewise, Knowledge and skills indicated that farmers still need more technology in producing rubber. This includes the right tapping techniques and coagulation method to produce quality and clean rubber free from dirt and adulterations.

Policy and post-harvest facility factors were symptoms. They can be useful indicators of context changes, but development activities in this sector may only amount to a "treatment of the symptom, not the cause". This implies that policies are not directly addressing the needs or support of rubber key players in the industry. Likewise, post-harvest facilities also did not directly address to the improvement of rubber products.

Infrastructure facility is a buffer. It is characterized by low importance in the context. It is unremarkable because it neither influences other elements

much nor is it influenced much by others. Development activities in this sector are expected to have little impact on the context.

Table 14. Relationships between different factors affecting the Rubber Industry

ELEMENTS	1 K&S	2 IS	3 CF	4 TA	5 MI	6 IF	7 PH F	8 Policy	Active Sum (AS)	Degree of Interaction (ASxPS)
1 K&S		1	1	1	1	0.5	0.5	2	7	38.5
2 IS	1		0.1	1	0.5	1	2	2	7.6	41.8
3 CF	0.5	0.5		1	1	1	1	1	6	33.6
4 TA	1	1	1		1	0.5	0.5	1	6	36
5 MI	0.5	0.5	0.5	1		0.5	1	2	6	33
6 IF	0.5	0.5	1	0.5	0.5		1	1	5	27.5
7 PH F	1	1	1	1	0.5	1		1	6.5	45.5
8 Policy	1	1	1	0.5	1	1	1		6.5	65
Passive Sum (PS)	5.5	5.5	5.6	6	5.5	5.5	7	10		
Activity Ratio AS/PS	1.27	1.38	1.07	1.00	1.09	0.91	0.93	0.65		
Rating System: Strong influence= 2.0, Moderate influence=1.0, Weak influence=0.5, Very weak influence= 0.1										

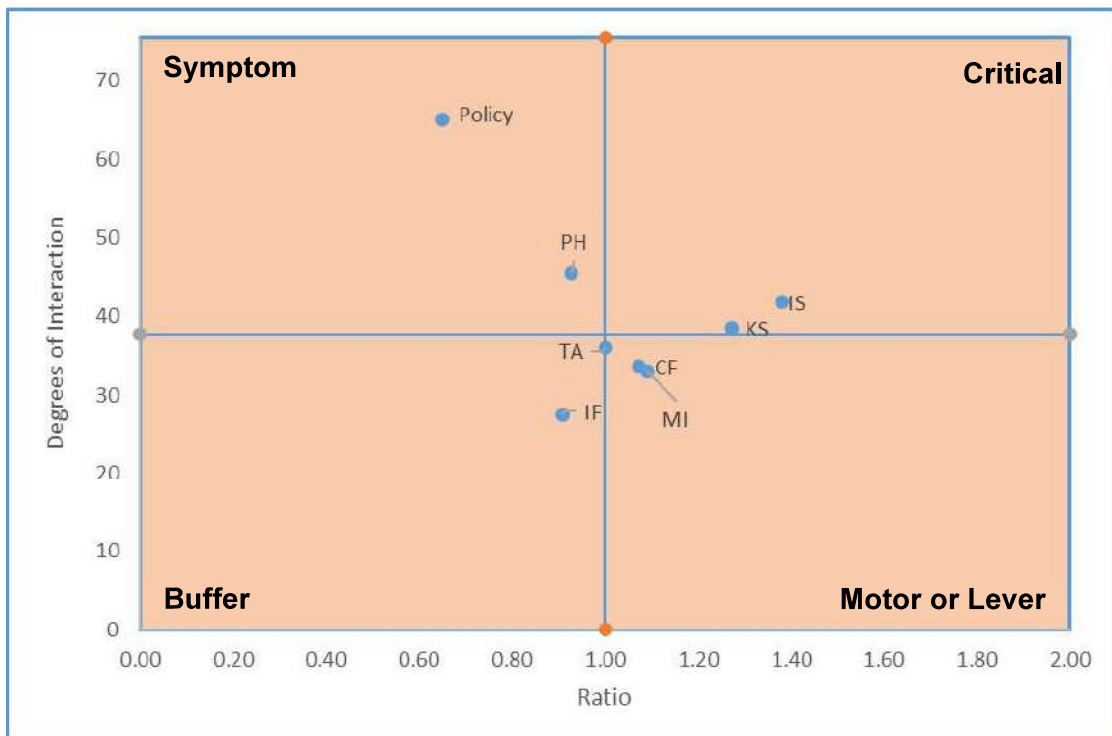


Figure 17. PSA Motor Quadrant for Rubber

2.20 Opportunities and Constraints

Opportunities are facilitating factors that may contribute to the development of the rubber industry in Basilan and the entire country. Constraints are the factors that hinder the growth and competitiveness of the industry. While there are challenges plaguing the industry during the last several years particularly the upstream sector, there are also potentials for business expansion and development. In fact, some of the constraints identified can even be transformed into business opportunities for MSMEs in rubber-producing areas like Basilan. However, one of the most pressing concerns of the industry is the lack of policy supports and specific institution to serve as anchor in the efforts of both government and the private sector to develop the industry. Below is the opportunities and constraints of rubber industry in Basilan.

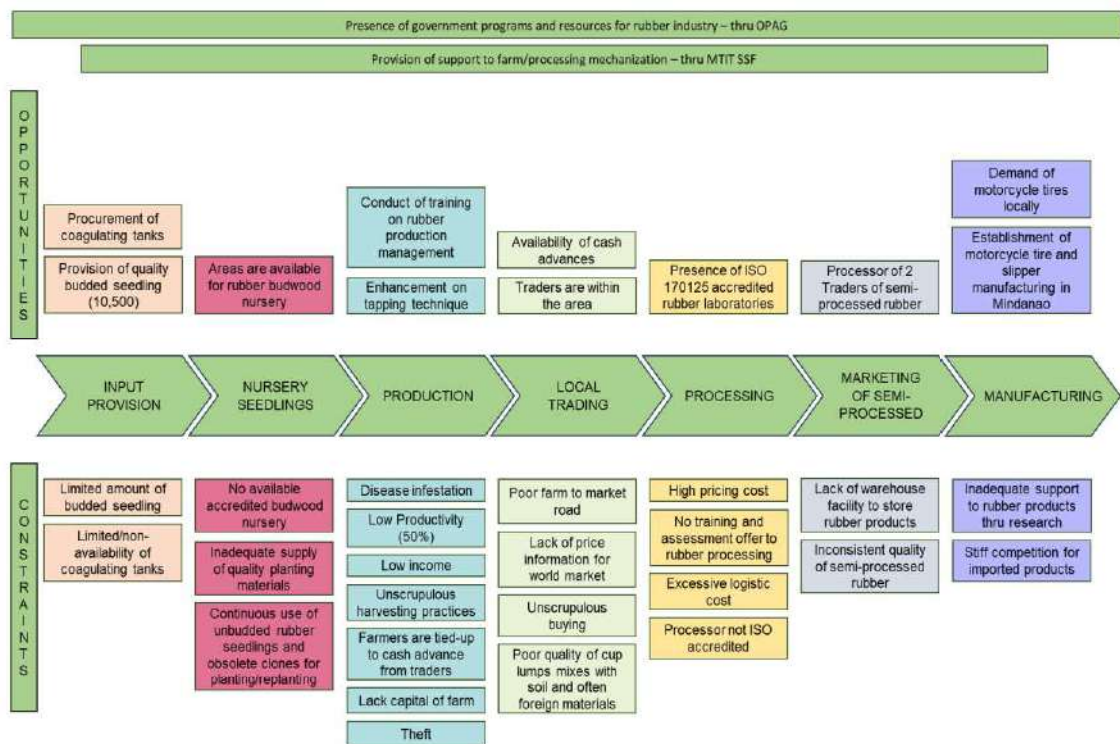


Figure 18. Opportunities and Constraints in the rubber industry in Basilan

Input Provision

Seedlings

Office of the Provincial Agriculture reportedly distribute about 10,800 quality seedlings to farmers in Basilan Province, however with the available areas suited for rubber, still more seedlings are needed with high yielding clones. Accredited budwood nursery is recommended for quality seedlings.

Budwood Nursery

At present, the provision of quality budded seedlings is limited due to the absence of accredited rubber budwood nursery. In the past, LARBECO used to have their own budwood nursery which also cater to other rubber farmers, but they were not able to sustain the operation, and at present, Basilan State College in Lamitan City maintain rubber budwood garden but on limited capacity for instructional purposes.

Root Trainer Technique

Department of Agriculture in region 9 also successfully implemented the use of root trainer planting technique as an alternative to the traditional rubber nursery which used polybag. Rubber seedlings produced in root trainer produce large number of lateral roots into the well-aerated potting medium. The vertical ridges provided in the container wall direct these lateral roots downwards and thus prevent their circular growth within the container. As a result, the enhanced production of lateral roots influences growth of the rubber plant positively during the juvenile phase.

Production

Advocacy on Good Agricultural Practices and Tapping Techniques

In terms of enhancing production capability of farmers, they still need advocacy on Good Agricultural Practices (GAP) including right tapping techniques to avoid damage trees. Good Agricultural Practices (GAP) for Natural Rubber was developed by the Bureau of Agriculture and Fisheries

Product Standards (BAFPS) and had been approved by the Secretary of the Department of Agriculture in 2019. The development of GAP for Natural Rubber aims to assist farmers and processors to provide assurance on the quality of raw and semi-processed rubber products that will enhance competitiveness of natural rubber for domestic use and international trade. It also aspires to help increase productivity and income, and ensures compliance to relevant national legislations, proper use of natural resources and promotion of sustainable agriculture. These initiatives inculcated the needed knowledge, skills and desirable attitudes geared towards the increase in production and productivity transforming into best practices.

Likewise, PRRI already disseminated the adoption of rain guard utility model, a technology to safeguard latex during rainy season. This will be of great help to the farmers but training and advocacy is important to provide the right knowledge and skills to them. This will be a good entry for helping farmers produce quality latex.

Disease Control Measures

At present, rubber farmers are saddled with the problem of disease infestation, affecting about 64% of the plantation with rubber leaf fall or Pestalotiopsis caused by the fungus Pestalotiopsis microspore, triggers leaf fall and the eventual death of rubber plant. Initial efforts made by PRRI in collaboration with MOST and MAFAR already been undertaken. This is in coordination with the provincial government of Basilan for the swift execution of control measures. Under a one-year treatment plan, the rubber trees will undergo mist fogging, drone aerial spraying of fungicide, fertilization and weed management. This resulted to low production of latex up to 50%.



Unscrupulous Harvesting and coagulating rubber

It's recommended to educate farmers on proper tapping and coagulation techniques, emphasizing the use of clean tanks or containers. Currently, some farmers use unclean, earthen molds for coagulation, resulting in cup lumps contaminated with soil and impurities.

Local Trading

While local traders offer a convenient option for farmers by facilitating marketing and providing cash advances at contract prices, farmers often lack awareness of prevailing world market prices and other market information that can influence local buying prices. The Ministry of Trade, Investment and Tourism (MTIT) can play a crucial role in providing this market information to farmers.

Poor road conditions in remote areas pose an additional challenge to rubber trading. Furthermore, the presence of uncleanly coagulated rubber creates opportunities for unscrupulous buying practices by some traders. Additionally, the use of non-accredited weighing scales can lead to unclear weight measurements for cup lumps, disadvantaging farmers.

Processing Facilities

Processing facilities in Basilan are not ISO accredited. However, MTIT reportedly provides them with weighing scales under the SSF program. Despite this, processing costs remain high due to excessive logistical expenses. Training on appropriate processing techniques and plant assessments are still needed.

Marketing of Semi-processed rubber

Marketing of semi-processed rubber faces constraints due to the lack of proper storage facilities and inconsistent product quality. Traders grapple with low prices and sometimes resort to storing their products in warehouses while waiting for better offers from manufacturers.

2.21 Strategic Interventions

The rubber industry in Basilan Province faces significant challenges. This document proposes specific interventions based on the Performance System Analysis (PSA) results and identified opportunities and constraints.

Input Supply Scheme

- **Free Farm Inputs:** Local Government Units (LGUs), the Ministry of Agriculture, Fishery and Agrarian Reform (MAFAR), and the Philippine Rubber Research Institute (PRRI) will collaborate to provide free fertilizers and chemical controls as part of a recovery program for affected rubber plantations.
- **LGU Seedling Distribution:** Existing LGU initiatives for distributing high-quality seedlings will continue, with expansion plans for identified plantation areas in collaboration with PRRI. This program should also include essential inputs like fertilizers and pest/disease control chemicals.

Nursery Seedlings Propagation

- **Rubber Nursery Establishment:** Rubber nurseries will be established to produce high-yielding clones for replacing senile trees. Cooperatives can partner in this project, focusing on multiplying high-yielding clones like RRIM-900, 2000, 3002, and PB-350/359 series, as recommended by the Zamboanga Peninsula Rubber Industry Cluster Team.
- **Advanced Seedling Techniques:** The Department of Agriculture Region 9 (DA-9) will collaborate with PRRI to introduce root trainer and precision grafting techniques for faster production of high-quality rubber planting materials. Root trainers promote better root development in seedlings, leading to healthier and more vigorous young rubber plants.
- **Plant Nursery Accreditation and Certification:** DA's Bureau of Plant Industry (DA-BPI) strategy of plant nursery accreditation and plant material certification will be expanded. This involves using the three approved National Seed Industry Council (NSIC) clones, intensifying nursery accreditation efforts, and strengthening budwood garden certification.

Production Scheme

Most rubber plantations, both from individual small farms and cooperatives, suffer from disease infestation, senile trees, and climate change impacts. These factors have caused a significant reduction in latex yield, dropping by nearly 50% compared to previous years. Interventions will focus on improving existing farms with development potential.

a. Improvement in the rubber production areas

- **Disease Control:** PRRI, the Ministry of Science and Technology (MOST), the Ministry of Trade, Investment and Tourism (MTIT), and academic research institutions will collaborate to implement effective and practical solutions for disease control in affected areas.
- **Short-Term Crop Support:** To support farmers during disease recovery, production of short-term crops like vegetables, cassava, and sweet potato will be encouraged.

- **Technology Adoption and GAP Training:** New and innovative technologies alongside Good Agricultural Practices (GAP) will be introduced to enhance rubber product quality and productivity.
- **High-Yielding Clone Advocacy and Quality Improvement Seminars:** Advocacy programs will promote the use of high-yielding clones, while quality improvement seminars will target areas with good potential for rubber tree development.
- **Rain Guard Adoption:** The use of rain guards on rubber trees will be encouraged to protect latex during the rainy season.

b. Practice diversified farming in the rubber plantations

- **Intercropping:** Planting high-value crops like coffee, cacao, pineapple, banana, cassava, or other vegetables within existing rubber plantations can maximize land use and generate additional income.
- **New Farming Systems:** MAFAR, PRRI, and academic institutions will collaborate to introduce new farming systems that increase farm productivity and income for farmers. This might include providing planting materials and livestock for breeding purposes. The Zampen native chicken, a local genetic resource well-adapted to the region's climate, has the potential to be raised under rubber plantations using forages and other local feed sources.
- **Investment Opportunities for Cooperatives:** Cooperatives with sufficient land area can explore partnerships with companies interested in planting high-value crops. This can create employment opportunities for farm families, including wives and youth, while generating income for the cooperatives.
- **Diversified Farming Advocacy and Training:** Training and advocacy programs will be implemented to educate farmers about the benefits of diversified farming and encourage them to explore additional income streams. This will involve engaging farm families, particularly wives and children who are not in school.

Marketing Scheme

Rubber Trading and Auction Centers (RTACs) or locally known as “Bagsakan Centers” serve as a venue for farmers, traders and consolidators to transact business under the supervision of the local government units (LGUs). Currently, there are fifty-six (56) RTACs in the country of which 17 centers are located in Zamboanga Peninsula and 39 in North Cotabato Province, but not one in Basilan Province.

Proposed Interventions:

- **Establishing Bagsakan Centers:** The Ministry of Trade, Investment and Tourism (MTIT) can establish Bagsakan Centers in Basilan to assist farmers with marketing challenges, such as unfair pricing and weighing practices by traders. These centers will have calibrated scales, a bidding system, and LGU representatives present to oversee transactions.
- **Shared Service Facility (SSF) Project:** MTIT's SSF project provides essential equipment for marketing activities in Bagsakan centers, including weighing scales, coagulating tubs, tanks, and aging tanks, to support organized farmers in the region.
- **Rubber Price Management Committee (RPMC) Participation:** Basilan should consider joining the existing RPMC. This committee, composed of representatives from various stakeholders, analyzes rubber price trends, calculates daily/weekly price references, and disseminates them to key areas. The reference price is displayed at Bagsakan centers during trading days and helps monitor practices within these centers.
- **Combating Rubber Adulteration:** MTIT and PRRI can collaborate on programs to raise awareness and reform practices related to rubber adulteration and inappropriate coagulant use, which lead to low Dry Rubber Content (DRC).
- **Market Linkages:** DTI and the Ministry of Trade, Investment and Tourism (MTIT) of the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) can collaborate with private stakeholders to establish market linkages between rubber producers across Mindanao.

Natural Rubber Price Reference:

- **Price Transparency:** DTI disseminates a daily natural rubber price reference to all its provincial offices and Negosyo Centers, which is also posted at Bagsakan centers. This reference price is based on the Malaysian Rubber Exchange (MRE) Seller's Offer Price for SMR 20 (accessible at www3.lgm.gov.my/mre), adjusted for currency exchange, administrative costs, and a fixed milling cost.
- **Dissemination and Negotiation:** The reference price, calculated for a dry rubber content of 50%, is distributed to relevant government agencies and LGUs, who then share it with farmers and traders through Bagsakan centers. While the reference price serves as a guide for bidding, the actual selling price is still subject to negotiation between buyers and sellers based on the quality of the cup lump.

Benefits for Farmers:

Farmers believe the reference price system empowers them by:

- Providing a benchmark based on global market prices, preventing traders from significantly undercutting buying prices.
- Offering a basis for negotiation with traders, who previously dictated prices.

By implementing these interventions, Basilan's rubber industry can benefit from improved market transparency, fairer pricing practices, and stronger bargaining power for farmers.

3.0 SUMMARY OF FINDINGS

The Decline of the Philippine Rubber Industry

The Philippines' natural rubber production has been declining for the past decade, making it one of the lowest annual yielders among rubber-producing countries. From 2017 to 2021, the Philippines' annual yield stagnated between 0.70 and 0.715 metric tons, while neighboring countries like Vietnam, Thailand, India, Malaysia, and Indonesia are top producers, yielding between 1.4 million and 1.7 million tons annually. The Philippines contributes only 1% to the global market, compared to Thailand's 34% and Indonesia's 23%. This highlights the need for significant investment and support to develop the Philippine rubber industry.

Global Market Outlook

The Association of Natural Rubber Producing Countries (ANRPC) reported an 8.5% increase in global natural rubber consumption in 2021, driven by economic recovery in major consumers like China, India, and the USA. China alone consumes 42% of the world's natural rubber. A shortage is expected between 2027 and 2029 due to projected growth in the global rubber market, fueled by the automotive industry and increasing demand for rubber in footwear, industrial goods, construction, textiles, and other consumer products. This presents a potential opportunity for the Philippine economy if it invests in rubber development programs.

Market Assessment and Challenges

The global natural rubber supply is expected to grow moderately by 1.9% to 14.1 million tons in 2022, while demand is projected to reach 14.2 million tons. This growth reflects improvement in global manufacturing activities, positive auto sales in major economies, and anticipated strong demand for gloves and other healthcare products. However, the Ukraine-Russia war may disrupt this recovery through rising global commodity prices and potential weakening of the global economy due to sanctions on Russia. Additionally, world demand for natural rubber is influenced by crude oil prices, its substitute.

Rubber Production in Mindanao

Mindanao is the primary producer of rubber in the Philippines, with Zamboanga Peninsula leading the way, followed by SOCCSKSARGEN (South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos City) and BARMM (Bangsamoro Autonomous Region in Muslim Mindanao), contributing 44%, 25%, and 16% of national production, respectively. Basilan province, within BARMM, has 36,962 hectares dedicated to rubber plantations. Region 9 (Zamboanga Peninsula) produces 41% of the country's total rubber, followed by Region 12 (SOCCSKSARGEN) at 35% and BARMM at 16%. Increased support for Mindanao, where small farmers cultivate most of the rubber, is crucial.

Challenges Faced by Basilan Rubber Farmers

Lamitan, Basilan, is dominated by smallholder rubber growers, mostly agrarian reform beneficiaries cultivating three hectares or less. Their income is heavily affected by factors like disease outbreaks and unpredictable weather. About 66% of rubber farms suffer from disease outbreaks. The Provincial Governor's Office declared a state of calamity due to the devastating effects of Pestalotiopsis Leaf Fall Disease, resulting in a 50% decline in yield for many farmers. Urgent action is needed to save remaining plantations and improve the livelihoods of rubber farmers.

The Rubber Supply Chain and Enabling Factors

The rubber supply chain relies on support from various stakeholders, including government agencies, farmers' associations, non-government organizations (NGOs), cooperatives and private entities. However, the current focus of NGOs and private entities is on financing for family provisions and small livelihood enterprises, neglecting the need for investment in productive rubber farming operations.

The existing rubber cooperatives are no longer active stakeholders in the rubber industry due to management problems. The cooperatives are currently unstable. This instability stems from poor management and conflicts

of interest within the cooperatives. The principles of cooperativism are deteriorating, leading to a shift away from cooperative operations. There is even consideration of dividing the land among Agrarian Reform Beneficiaries (ARBs). Given these issues, rubber production is not stable.

Critical Gaps in the Supply Chain

A critical gap exists in the absence of accredited budwood gardens, forcing reliance on the limited capacity of Basilan State College's laboratory for seedlings. High-yielding clones need to be propagated and distributed to replace senile trees in productive areas. In the past, the cooperatives maintained budwood gardens but at present these are no longer existing due to lack of interest to expand plantation as the result of low buying price.

Socioeconomic Status of Rubber Farmers

Rubber farms are predominantly monoculture, with an average annual net income of ₱100,508.64 (US\$1,930) or ₱8,375.72 (US\$160) per month. The average yield is 10,954 kg, but disease-affected farms experience a 50% reduction. Furthermore, approximately 86% of rubber farmers rely solely on rubber income, lacking diversification with other crops or livestock for additional income. Vegetables and other food crops they cultivate are primarily for home consumption.

Pest and Disease Control Practices

Current pest and disease control measures include farm clearing, herbicide and pesticide application, and burning

4.0 RECOMMENDATIONS

Input Supply Scheme

- **Disease Recovery Program:** Provide fertilizers and chemical controls to affected rubber plantations through LGUs, MAFAR, and PRRI to support recovery programs.
- **Seedling Distribution and Expansion:** Continue LGU efforts to distribute high-quality seedlings for expanding plantation areas. Include essential inputs like fertilizers and pest/disease control measures. Partner with PRRI to identify suitable areas for expansion.
- **Financing for Disease Control:** Encourage a financing scheme to facilitate the purchase of inputs necessary for controlling disease infestation.

Nursery Seedling Propagation

- **High-Yielding Clone Production:** Establish nurseries focused on producing high-yielding rubber clones like RRIM-900, 2000, 3002, PB-350, and 359 series to replace senile trees. Cooperatives can participate in this initiative.
- **Advanced Seedling Techniques:** Implement root trainer and precision grafting technologies in collaboration with DA-9 and PRRI for faster production of high-quality planting materials.
- **Plant Nursery Accreditation:** Adopt DA-BPI's nursery accreditation and plant material certification strategy by expanding existing budwood gardens and strengthening these programs.

Production Scheme

- **Disease Control:** Implement effective disease control measures in affected areas with assistance from PRRI, MOST, MAFAR, and academic institutions.
- **Supporting Recovery:** Provide support to rubber farmers recovering from disease infestation by promoting the cultivation of short-term crops like vegetables, cassava, and sweet potato.

- **Technology Adoption and GAP Training:** Advocate for the adoption of new technologies and Good Agricultural Practices (GAP) to enhance both rubber product quality and productivity.
- **High-Yielding Clone and Quality Improvement Seminars:** Conduct seminars on using high-yielding clones and quality improvement techniques in suitable areas.
- **Rain Guard Adoption:** Encourage the use of rain guards on rubber trees to potentially improve latex collection.

Diversified Farming Practices

- **Intercropping:** Promote intercropping to maximize land use under rubber plantations by planting high-value crops like coffee, cacao, pineapple, banana, cassava, and vegetables.
- **New Farming Systems:** Introduce new farming systems to increase farm productivity and income. Provide planting materials and livestock for breeding through collaboration with MAFAR, PRRI, and academic institutions. Promote the Zampen native chicken as a potential source of income generation under rubber plantations.
- **Investment Opportunities for Cooperatives:** For cooperatives with sufficient land, explore partnership opportunities with companies interested in planting high-value crops. This can create jobs for farm families (wives and youth).
- **Diversified Farming Advocacy and Training:** Conduct advocacy and training programs to educate farmers about the benefits of diversified farming and its income potential. Involve farm families, particularly wives and youth, to encourage their participation.

Marketing Scheme

- **Bagsakan Centers:** Establish MTIT-managed "Bagsakan Centers" to provide a venue for fair transactions between farmers, traders, and consolidators under LGU supervision.

- **Shared Service Facility (SSF):** Utilize DTI's SSF project to equip Bagsakan centers with essential marketing equipment like weighing scales, coagulating tubs, tanks, and others.
- **Rubber Price Management Committee (RPMC) Participation:** Participate in the RPMC to analyze rubber price trends, compute daily/weekly price references, and disseminate them for farmer reference.
- **Combating Rubber Adulteration:** Implement programs, in collaboration with MTIT and PRRI, to raise awareness and discourage practices like rubber adulteration and using inappropriate coagulants, which result in low Dry Rubber Content (DRC).
- **Market Linkages:** Establish market linkages among rubber stakeholders in Mindanao with the collaboration of DTI, BARMM-MTIT, and private stakeholders.
- **Price Reference Education:** Educate small farmers on using the calculated price reference as a basis for negotiating with traders. Emphasize that the actual selling price ultimately depends on negotiation and cup lump quality.

The implementation of these recommendations requires genuine support from both the government and private sectors. Small farmers face significant challenges due to limited resources, knowledge, skills, and access to effective marketing systems. PhilRubber has outlined specific plans and programs in collaboration with various stakeholders in the industry. Political will and effective policies are crucial to provide the necessary support for the entire rubber industry value chain, from upstream production to mid-stream processing and downstream sales. This comprehensive approach is essential to develop an inclusive, globally competitive, and resilient rubber industry that can provide sustainable benefits to all stakeholders, including small farmers, women, and youth in remote areas of Zamboanga Peninsula (ZAMBASULTA).

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RESULTS AND DISCUSSION

Coconut

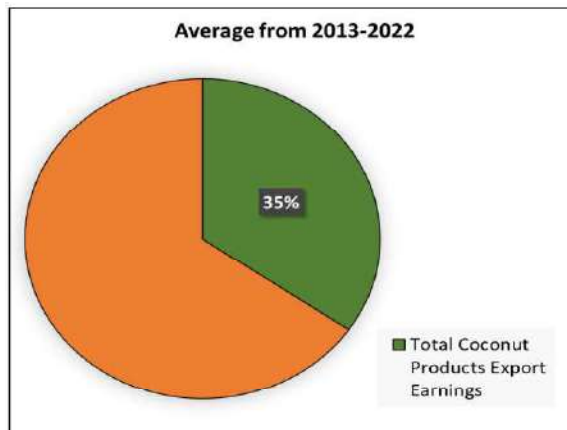
6.1 Global Market Trends

The coconut industry plays a critical role in the agricultural export sector of the nation, contributing significantly to its overall share. According to a 2022 report, the industry's monetary contribution to agricultural exports has reached a substantial USD 3.2 billion, representing approximately 43% of the total agricultural exports.

The increase in the price of Crude Coconut Oil (CNO) was triggered by the geopolitical tensions between Russia and Ukraine in 2022, coupled with the temporary restriction on palm oil from Indonesia. However, the subsequent lifting of the ban on Indonesian palm oil facilitated its entry into the global market, thereby stabilizing the supply of vegetable oil. Consequently, the copra market witnessed a downward trajectory as a consequence of the prevailing global price trends, yet there was a notable increase in the volume of coconut oil recorded during the final quarter of 2022. Notably, there was also an upsurge in the supply of palm kernel oil from May to November 2022, as highlighted in the DA-PCA Briefer of 2023. These economic dynamics led to a decline in the demand for coconut and its by-products in the international market. The early months of 2023, particularly January and February, witnessed a significant reduction in both the volume and value of coconut exports, encompassing various products such as copra meal (87.8%), coconut oil (47%), and oleochemicals (54.7%). The reported downturn in coconut export items in 2023 was primarily attributed to the decrease in the export volume of CNO.

6.1.1 Exports Volume and Value

The coconut industry assumed a significant role in the agricultural exports of the nation, with a contribution of 35% to the overall agricultural exports, representing 43% of the total exports revenue in 2022 (Figure 19). Among the top 10 exports in terms of volume were crude coconut oil, copra meal, and desiccated coconut, whereas the top 10 exports in terms of value included commodities such as CNO, DCN, and RBD oil.



CPMT/PCA, 2022

Figure 19. Coconut industry share to the total agricultural exports

Table 15 illustrates the leading 10 coconut products exported based on their volume. Coconut crude oil, the primary ingredient for refined coconut oil, holds the top position in both volume and value, whereas coconut methyl ester secures the tenth spot.

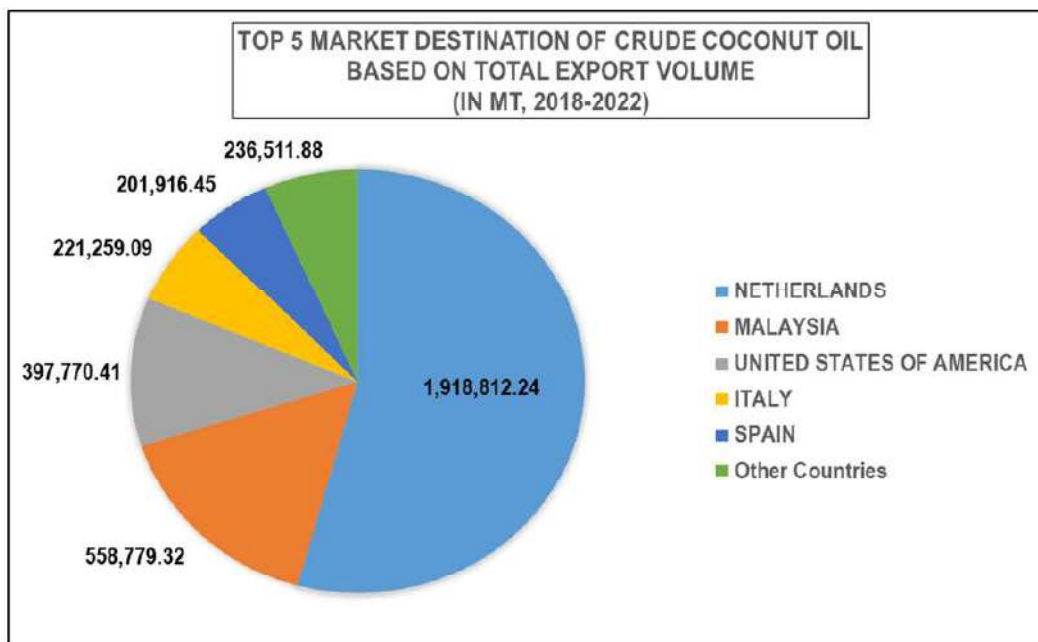
Table 15. Top 10 Exported Coconut Products in terms of volume (MT) CY 2022

Commodity	Volume (MT)	Volume (FOB USD)	Market Share (%) in terms of volume	Rank in terms of volume	Rank in terms of value
Crude Coconut Oil	862,038.72	1,368,532,088	35.86%	1	1
Copra	352,936.54	62,878,342	14.685%	2	9
Meal/Cake					
RBD Oil	184,564.23	339,898,348	7.68%	3	3
Desiccated Coconut	156,955.79	369,974,022	6.53%	4	2
Coconut	139,692.	122,140,651	5.81%	5	6
Water	34				
Cochin Oil	138,365.56	223,903,256	5.76%	6	4
Coco Peat	90,342.89	-	3.76%	7	-
Activated Carbon	79,726.58	154,880,321	3.32%	8	5
Coconut Shell	78,607.45	-	3.27%	9	-
Charcoal					
Other fractions of Coconut Oil	42,044.48	80,754,593	1.75%	10	8
VCO	-	91,989,937	1.05%	-	7

Source: CTPMT, PCA-2022

6.1.2 Export Destination of Crude Coconut Oil

The 2022 Coconut Trade Performance and Market Trends Report by the Department of Agriculture has delineated the primary five market destinations for crude coconut oil produced in the Philippines (see Figure 20). Leading the market importers of Philippine coconut crude oil is the Netherlands, followed by Malaysia in second place. Spain holds the least significant market share in the Philippine export market for crude coconut oil.



Source: CTPMT, PCA, 2022

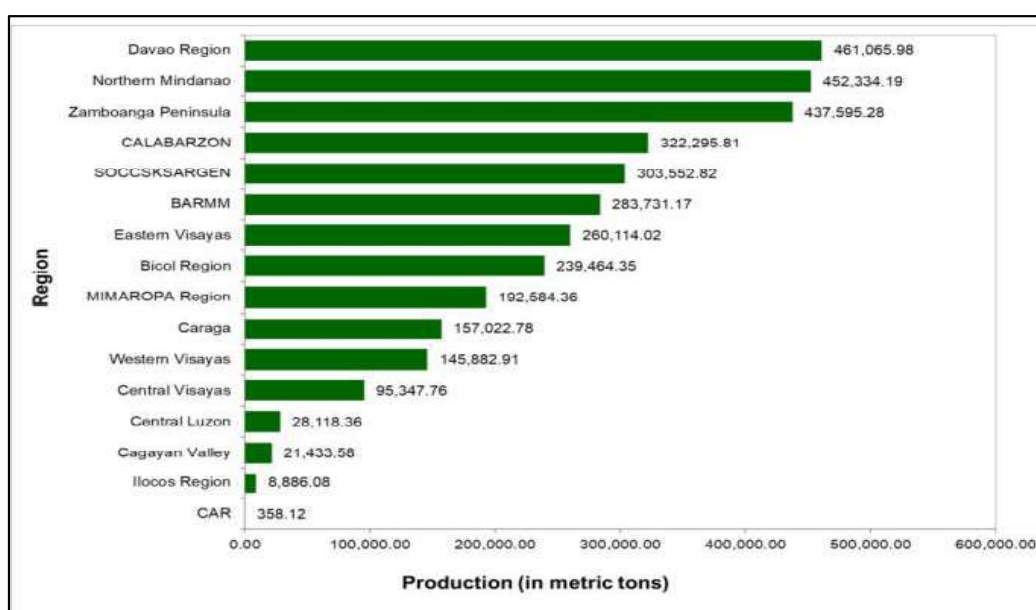
Figure 20. Top five countries listed as market destinations of Philippine-produced coconut crude oil from 2018 to 2022.

6.2 The Philippine Coconut Industry Profile

6.2.1 Coconut Production

The coconut industry is a crucial element of the agricultural sector in the Philippines, with 69 provinces out of 82 actively involved in its cultivation. Encompassing a total of 3.62 million hectares, this sector provides livelihood to around 2.5 million farmers. The data from the 2023 Major Non-Food and Industrial Crops Quarterly Bulletin (MNFIC) report revealed that the coconut cultivation area from January to June 2023 spanned 3.62 million hectares.

According to the Crops Production Survey (PSA, 2023), the coconut (with husk) production during April to June 2023 amounted to 3.41 million MT, showing a 1.5% annual growth compared to 2021. Particularly noteworthy is the significant production of 461.07 thousand MT in Davao, which constituted a 13.5% share of the total coconut production in the country. Northern Mindanao followed closely in the second position, producing 452.33 thousand MT, equivalent to a 13.3% share. The Zamboanga Peninsula secured the third spot, contributing 437.60 thousand MT and holding a 12.8% share in the overall coconut production while BARMM contributed 283.73 MT comparable to 8.32% share.



(Source: Major Non-Food and Industrial Crops Quarterly Bulletin – April-June 2023)

Figure 21. Distribution of Coconut Production by Region from April– June 2023

6.2.2 Coconut Consumption

The Philippines ranked as the leading consumer of coconut oil worldwide in 2023, consuming a total of 695,000 MT (Shahbandeh, 2024). The average annual consumption of coconut per capita in the Philippines from 2012 to 2022 is presented in Table 16.

Table 16. Philippine Average Annual Coconut Consumption per capita

Year	UT per capita (kg/yr)
2012	8.22
2013	7.82
2014	7.36
2015	7.25
2016	6.69
2017	6.74
2018	6.96
2019	6.88
2020	6.66
2021	6.68
2022	6.69

Source: PSA Openstat, 2023

The data presented in table 16 indicates that in 2012, the mean annual per capita coconut consumption stood at 8.22 kilograms (kg). Nevertheless, a downward trend in per capita consumption is evident from 2013 (7.82 kg) to 2016, where it dropped to 6.69 kg. The year 2017 saw a marginal increase to 6.74 kg, continuing to 6.96 kg in 2018. However, a slight decrease occurred in 2019 to 6.88 kg, further declining to 6.66 kg by 2020. In 2021, a slight rise to 6.68 kg was observed, with the average annual per capita coconut consumption remaining relatively stable at 6.69 kg in 2022. Overall, fluctuations in coconut consumption per capita were noted over the years, with a pronounced declining pattern observed in the last 12 years until 2022.

Several factors could account for this downward trend in coconut consumption per capita. As suggested by Popkin (2006), a global shift in dietary preferences among consumers may lead to alterations in the consumption of certain food categories, including coconut-based products. If coconut products are perceived as high in saturated fats and associated with health concerns, consumption might dwindle due to altered consumer perceptions, thereby influencing consumption patterns. Financial capacity is another crucial factor. Greenlaw et al. (2022) highlighted that variations in income levels or price fluctuations can impact consumption trends. Hence, an increase in the cost of coconut products could lead to reduced consumption. Moreover, issues of availability and accessibility play a significant role. Turner et al. (2012) underscored the importance of ecosystem services, particularly in cultivation.

The study suggests that disruptions in cultivation due to environmental factors or disturbances in distribution channels can lead to reduced supply, increased prices, and ultimately, decreased consumption. Additionally, the substitution of coconut products with alternatives based on consumer preferences could contribute to the decline in coconut consumption. This shift may stem from changes in consumer dietary choices (Popkin, 2006) or variations in income levels (Greenlaw et al., 2022), affecting the affordability and availability of coconut products to consumers.

It is crucial for policymakers and stakeholders in the coconut industry to comprehend the drivers behind the declining trend in coconut consumption. This understanding is essential for formulating policies and strategies to address the challenges and opportunities arising from the decreasing coconut consumption in the sector.

6.3 Coconut Industry in Basilan

The coconut industry plays a significant role in the economy of Basilan province, as it does throughout much of the country. Basilan, a province in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), benefits from the coconut industry in several ways. Coconut farming and related industries provide livelihoods for many residents of Basilan. The province's tropical climate and fertile soil are conducive to coconut cultivation, making it a primary agricultural activity. The coconut industry contributes to the local economy through the sale of coconuts, copra (dried coconut meat), coconut oil, and other coconut-based products.

Furthermore, coconut farming creates employment opportunities for people in rural areas of Basilan. From planting and harvesting to processing and marketing, various stages of the coconut value chain provide jobs for local residents, thus helping alleviate poverty and improve living standards.

The Philippines is one of the world's leading coconut producers, and Basilan contributes to the country's overall coconut exports. Coconut products such as copra, coconut oil, and desiccated coconut are exported to international markets, generating revenue for the province and the country.

While coconut farming remains a traditional practice in Basilan, efforts are underway to diversify and add value to coconut products. This includes initiatives such as producing virgin coconut oil (VCO), coconut sugar, coconut water, and other value-added products. Diversification helps farmers capture higher-value markets and increase their income.

Like in other parts of the Philippines, the coconut industry in Basilan faces challenges such as aging coconut trees, low productivity, pests and diseases, and fluctuating market prices. However, there are also opportunities for innovation and improvement, including the adoption of modern farming techniques, investment in processing facilities, and value chain development.

6.3.1 Characteristics of Coconut Farms

Lamitan City's represents a mix of traditional methods and modern agricultural practices, reflecting the region's rich agricultural heritage. Situated in a tropical climate, the city claims huge coconut plantations, where fertile soil and abundant rain create a perfect environment for cultivating high-quality coconuts.

However, in 2013, the entire Basilan province faced a formidable challenge – a widespread infestation of Cocolisap, a destructive pest documented by the Philippine Coconut Authority (PCA). This infestation severely impacted the coconut industry, prompting the PCA to order large-scale culling of trees. Copra production dropped, forcing many farmers to switch to rubber farming for income. Traders and major copra consolidators were also forced to stop operations due to the declining supply.

Despite this setback, the coconut industry in Lamitan City and Basilan province has shown remarkable resilience. Over time, the Cocolisap threat subsided, and by 2018, conditions were favorable enough for replanting coconut trees. Currently, the industry is undergoing a period of revival, with ongoing efforts to restore productivity and revitalize the sector.

6.3.2 Characteristics of Coconut Farmers

Coconut farmers are mostly in their 50s, married, male, with a household size of five and two children attending school. The majority are Bisaya (33%) and Zamboangueño (27%). Coconut farmers are primarily engaged in copra production on farms of 2.4 hectares and below, with the smallest farm being 1.4 hectares and the biggest being 5 hectares. Most of these farmers (93%) are members of farming associations and cooperatives in their locality. Their memberships average 11 years, but some have been members for as long as 3 decades. They have an average of 23 years of experience in coconut farming, with a maximum of 40 years for some. The vast majority (87%) are farm owners, with only 4 farmers being tenants.

As members of the cooperatives and associations, they were provided with farm inputs such as vegetable seeds, fertilizer, and cash incentives. The cooperatives and associations also provided training for farm management, production technology, and financial literacy, but not on marketing and business enterprise.

Farmers are solely dependent on coconut for their income, earning an average of ₱6,402.67 per quarter. However, about 43% of them earn additional income of about ₱10,000.00 and below from other sources. Their average household expenses are ₱12,378.64. Therefore, farmers' income from coconut is not sufficient to meet the family's needs for food, medicine, and other family expenses. Most of the farmers (47%) are engaged in intercropping, while only about 26.5% are engaged in multiple and monocropping. They received different forms of assistance, but very few availed of them. Only 43% of the respondents availed of training on production technology and farm management.

Table 17. Socio-economic profile of coconut farmers in Lamitan City, Basilan, 2024.

Items	Mean	Frequency	Percentage %
1. Age	55		
2. Household size	5		
3. Gender Male		21	70%
4. No. children in school	2		
5. Civil status Married		25	83%
6. Ethnicity Bisaya		10	33%
Zamboangueño		8	27%
7. Religion: Roman Catholic		17	57%
Islam		13	43%
8. Education: College graduate		11	37%
High school graduate		5	15%
9. Quarterly Income from Coconut	₱6,402.67		
10. Other sources of income	₱10,000.00	14	43%
11. Monthly expenses	₱12,378.64		
12. Members in Association/ Cooperative/ Organization		28	93%
13. No. years as member	11 years		
14. No. of Years in Farming	23 years		
15. Tenurial Status: Owned		26	87%
Tenant		4	13%

6.3.3 Characteristics of traders

Copra traders in Lamitan City are categorized as contract buyers, consolidators, and barangay traders (local or cooperative). Contract buyers act as middlemen, facilitating the marketing of copra from barangay traders to consolidators. The average copra trader in Lamitan City is 56 years old and has either a high school or college diploma, with one trader boasting 35 years of experience. Three traders belong to organizations such as the Bangsamoro

Marketing Operations and the Philippine Coconut Authority Association. Individual traders can buy copra between 5,000 kg and 25,000 kg per day. In contrast, cooperative traders typically purchase 1,512 kg per day.

To secure a steady supply, copra traders often facilitate the granting of cash advances to coconut farmers to cover expenses during harvesting and copra processing. In return, farmers are obligated to sell their copra to the traders who granted them cash advances. This practice ensures a high volume of copra purchased within a specific period.

On the other hand, cooperative traders require their members to sell their copra exclusively to the cooperative. A ₱2.00 price difference is set: ₱1.00 goes to the cooperative, and the remaining ₱1.00 serves as a patronage incentive for members, distributed at the end of the year.

Table 18. Socio-demographic profile of rubber traders in Lamitan City, Basilan, 2024.

Items	Mean	Frequency	Percentage %
1. Age	56		
2. Gender :			
Male		3	60%
Female		2	40%
3. Civil status			
Married		5	100%
4. Ethnicity			
Zamboangueño		3	60%
Yakan		2	40%
5. Religion:			
Roman Catholic		4	60%
Islam		1	20%
6. Education:			
College graduate		2	40%
College Undergrad		1	20%
High School		1	20%
Undergrad			
Elementary		1	20%
Graduate			
7. No. years in trading	21 years		
8. Classification:			
Contract buyer		5	100%
9. Members in Association/ Cooperative/ Organization		3	60%
10. Volume traded:			
Copra	5,000 kg- 25,000 kg/ day		

6.3.4 Characteristics of Consolidators

Copra consolidators, all located in Zamboanga City, are large companies with subsidiary buying stations that act as satellites for processors in Roxas, Zamboanga del Norte, Gingoog, Misamis Oriental, and General Santos City.

6.4 Mapping the Value Chain

This section outlines the various industry operators' contributions to the entire coconut and coconut product value chain. The industry comprises key players, ranging from suppliers of production and maintenance inputs for farmers, copra traders, crude coconut oil processors, and refined edible oil manufacturers. In the case of the study area which is Basilan, the key players present are only up to copra traders.

Hence, the value chain map of coconut in Basilan City is composed of 16 nurseries established by the PCA under project-based programs, and 7 from OPAG. There are about 6 input suppliers in the entire Basilan Province and only 1 in Lamitan City. The chain also includes coconut farmers who are members of cooperatives and other individual farmers, consisting of about 30,000, and 5 local traders/contract buyers. Between 2017 and 2022, PCA BARMM and OPAG distributed a total of 1,074,530 free, high-quality coconut seedlings to farmers impacted by the cocolisap infestation. Coconut farmers are primarily smallholders, cultivating farms between 1 and 3 hectares. Most are members of various organizations, associations, and cooperatives in Lamitan City. The remaining 10% are individual farmers with larger farms, ranging from 3 to a maximum of 5 hectares. The coconut industry enablers in Basilan are the Philippine Coconut Authority – Bangsamoro Autonomous Region in Muslim Mindanao (PCA-BARMM), Ministry of Agriculture, Fisheries and Agrarian Reform, (MAFAR), Ministry of Basic, Higher, and Technical Education - Technical and Skills Development (MBHTE – TESD), Ministry of Trade, Investment, and Tourism (MTIT), Provincial/ City Agriculture Office (OPAG), and Ministry of Science and Technology (MOST), supporting the different chains from input supply to production, and trading.

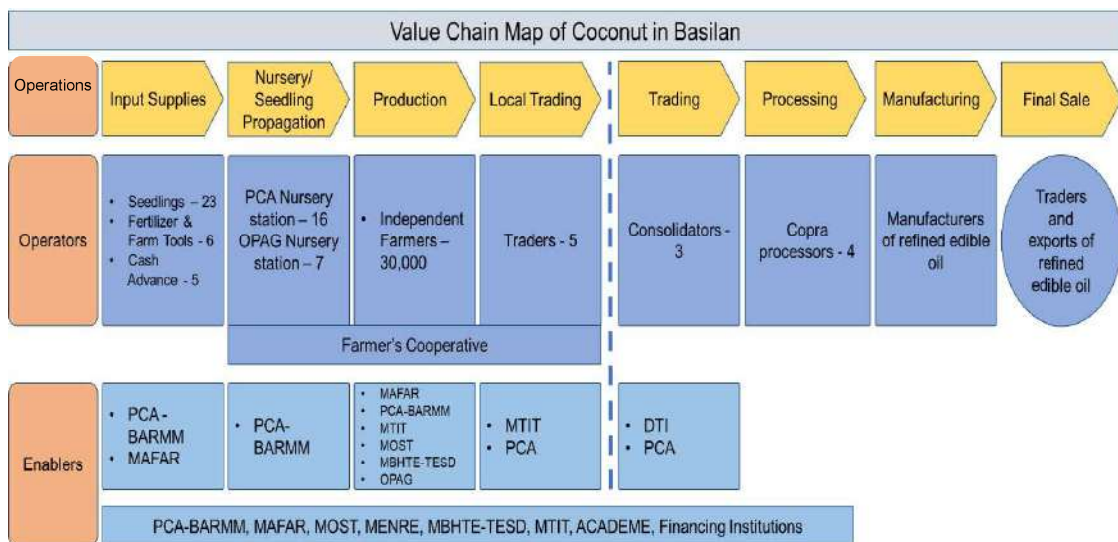


Figure 22. Value Chain of Coconut in Basilan Province

Coconut farms are situated in four barangays of Lamitan City. Local traders facilitate the sale of copra within each barangay. Coconut farmers typically sell their products quarterly. Local traders connect with contract traders, who then connect with consolidators or processors.

For cooperatives, member-beneficiaries are obligated to sell their copra to the cooperative at a price ₱ 2.00 lower than the market price. This price difference becomes the cooperative's income, with a portion returned to the farmers as an incentive for their patronage. On average, farmers with farms ranging from 1 to 5 hectares sell 630.50 kilograms of copra per quarter to local traders or contract buyers

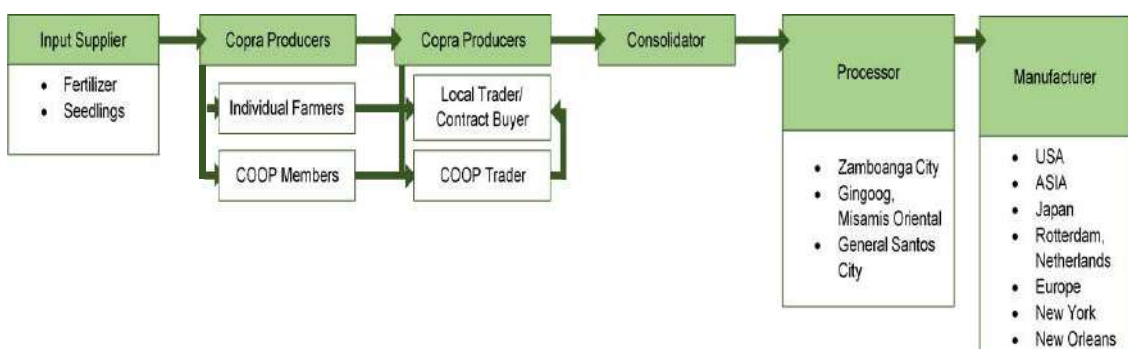


Figure 23. Supply Chain of Copra in Lamitan City

6.4.1 Value Chain Key Players and their Product Requirement

To ensure a steady supply of high-quality coconut seedlings, the PCA-BARMM and OPAG strategically rents farms from individual farmers in Lamitan City that serves as nursery stations. These stations focus solely on cultivating hybrid seedlings to replace coconut farms affected by the 2013 coccolisap infestation. Basilan Province is currently in the stage of recovery from this destructive pest.

Coconut farmers sell their copra to local traders in the barangay. Cooperative members sell their products to their cooperative at a lower buying price of ₱2.00 per kilogram. These local traders then sell their copra to consolidators at a contract price or to processors located in Zamboanga City. One consolidator ships his product to either the processing plant in Gingoog, Misamis Oriental, or the processing plant in General Santos City, based on demand and instructions from the head office. The other consolidator ships his copra products to the processing plant in Roxas, Zamboanga del Norte (Table 19).

Table 19. Value Chain Key players and their product requirement

Key Players	Customers	Volume Requirement	Grade/Quality Specification
Coconut Nursery Stations	Coconut Farmer	Not specified	Quality seedlings Appropriate fertilizers
Coconut farmers	Local traders and contract traders in the barangay	No limit	- No Moisture content requirement and additional deduction of 1kg per sack is imposed - Absence of molds
Local Traders	Contract traders	No limit	- No Moisture content requirement and additional deduction of 1kg per sack is imposed - Absence of molds

Contract buyers	Consolidators in Zamboanga City	Depending on the contracted volume	<ul style="list-style-type: none"> - Reduction of 5% Net dash weight and discount factor (Discount factor will depend on the Moisture content of the copra) - 6% - 13.9% allowable Moisture content - Color Light Brown Copra - Preferred Sun-dried copra but accepts smoked dried
Consolidator	Processors are millers of copra from Zamboanga City, Roxas, Zamboanga del Norte, Gingoog, Misamis oriental, and General Santos City.	Depending on the contracted volume and the size of the storage area	<ul style="list-style-type: none"> - 6% - 13.9% allowable Moisture content (Based on PCAAO No. 02 S. 2003 – copra moisture discount table - Color Light Brown Copra - Preferred Sun-dried copra but accepts smoked dried - No presence of mold and overcooked copra
Processors	Manufacturer for domestic (Zamboanga City) and Export (USA, Asia, Europe, Japan, Rotterdam, Netherlands, New York, and New Orleans)	Not specified	<ul style="list-style-type: none"> - Low Free Fatty Acid (LFFA) - Allowable FFA 3% - 3% below FFA Premium price - 3% above FFA penalty on the price depending on the FFA %
	1. Refined edible Oil 2. Animal feeds		<ul style="list-style-type: none"> - Low Mosh Moah - Mosh 2ppm - Moah 20ppm
Manufacturers	Different countries around the world	Not specified	<ul style="list-style-type: none"> - Low Free Fatty Acid (LFFA) - Allowable FFA 3%

	1.Refined edible Oil		- 3% below FFA Premium price - 3% above FFA penalty on the price depending on the FFA % - Low Mosh Moah - Mosh 2ppm - Moah 20ppm
Distributors/ Retailers	Household consumers	Not specified	Quality edible oil
	1.Refined edible Oil		
Consumers	Household consumption	As needed	Quality edible oil
	1.Refined edible Oil		

Source: Survey Report 2024

6.4.2 Key Players and their Roles

Despite the ongoing recovery from the cocolisap infestation that devastated copra production, Basilan's coconut industry is laying the groundwork for a sustainable future. Key players across the industry are playing crucial roles in this effort, as outlined below (Table 20). The Ministry of Agriculture, Fisheries and Aquatic Resources (MAFAR), along with other relevant agencies, are spearheading the industry's revival by promoting the widespread planting and distribution of high-yield hybrid coconut seedlings. These initiatives, coupled with the provision of essential farming supplies, aim to empower Basilan's coconut farmers and reignite the province's copra production.

Table 20. Key Players and their Roles

Major Players	Roles
Nursery Operators	<ul style="list-style-type: none"> • Upgrade coconut seedlings • Propagate hybrid seedlings for farmers • Source quality planting materials and other inputs • Manage the entire production process
Coconut Farmers	<ul style="list-style-type: none"> • Responsible for harvesting coconut and post-production activities • Process coconut to copra through smoke-drying or sundrying.
Local Traders/ Contract Traders	<ul style="list-style-type: none"> • Buy copra straight from the farmers • Clean, and dry consolidated copra • Supply to processors
Processors	<ul style="list-style-type: none"> • Process copra to crude oil or cochin oil, both domestic and international markets
Manufacturers	<ul style="list-style-type: none"> • Buy crude oil/ Cochin oil from processors • Transform crude oil/ cochin oil to refined edible oil
Distributors/ Retailers	<ul style="list-style-type: none"> • Buy refined oil from manufacturers • Sell refined oil to consumers
Consumers	<ul style="list-style-type: none"> • Buy refined oil from distributors/ retailers • Consumes refined oil

Source: Survey Report 2024

6.4.3 Activities/Processes and Costs

Coconut farmers perform clearing in the farms by themselves due to lesser income earned from copra. If they will hire laborer to do the clearing, they will be spending an average of ₱15,786.00 per year. Likewise, if they apply fertilizer, they will be spending an average of ₱3,690.00 per year. At present, farmers rarely apply fertilizer due to high cost and minimal income and hopes free inputs from PCA-BARRM, OPAG and other institutions. For copra labor, the arrangement is 50% share of the net income of the farmer.

Moreover, coconut farming is divided by gender roles: men handle the farm, while women take charge of marketing copra, a vital role that extends to managing the farm's finances. They are responsible for budgeting and ensuring the profitability of the farm, contributing significantly to the family's well-being.

Table 21. Activities involved in the production and marketing of copra and the cost per operation in Lamitan City

Activities	Performed by	Resources Needed	Average Costs per year in 1 ha farm
1. Farm clearing and maintenance	Farmers including wives, children and hired laborers	Farm tools and fertilizers	For hired labor ₱38,720.00
2. Harvesting of coconut from tree/ "sungkit"	Men (can be hired laborers)	Sungkit,	Output-based .50cents per nut
3. Picking hauling of harvested coconut fruit to processing area/ "tapahan"	Men (can be hired laborer)		Output-based .50cents per nut
4. Dehusking of coconut	Men (can be hired laborer)	Dehusker	
5. Slicing of coconut	Men (can be hired laborer)	Bolo	
6. Cooking of Coconut meat	Men (can be hired laborer)	Tapahan, Coconut husk as firewood	
7. Scrapping of coconut meat	Men (can be hired laborer)	scrapper	Labor included in the sharing arrangement
8. Re-cooking of coconut meat	Men (can be hired laborer)	Tapahan, Coconut husk as firewood	labor
9. Sacking of copra	Men (can be hired laborer)	Sack, strawless rope	
10. Hauling of copra from farm to barangay road	Men (can be hired laborer)	Motor, carabao/cow with sled	
11. Transportation from barangay road to trader	Men (can be hired laborer)	Transportation vehicle	₱550.00
12. Marketing/ selling	Farmer and Wives	Transportation vehicle	₱1,452.00

Source: Survey Report 2024

6.4.4 The Flow of Product, Information and Payment along the chain

The chain of copra production involves the flow of products, information, and payments among various stakeholders, from farmers to end-users. Copra production begins with farmers cultivating coconut trees and harvesting coconuts for copra production. After harvesting, farmers extract the copra, the dried kernel of the coconut. The copra is then sun-dried or smoke-dried to reduce moisture content. Once dried, the copra is packed into bags or containers for transportation to local traders down to the manufacturers.

Information flows between farmers, local cooperatives or traders, and processing facilities. Farmers can access information on best agricultural practices, market prices, weather forecasts, and other relevant factors from agricultural extension services, cooperatives, or government agencies. Local cooperatives or traders often serve as intermediaries, providing market information, transportation logistics, and support services to farmers.

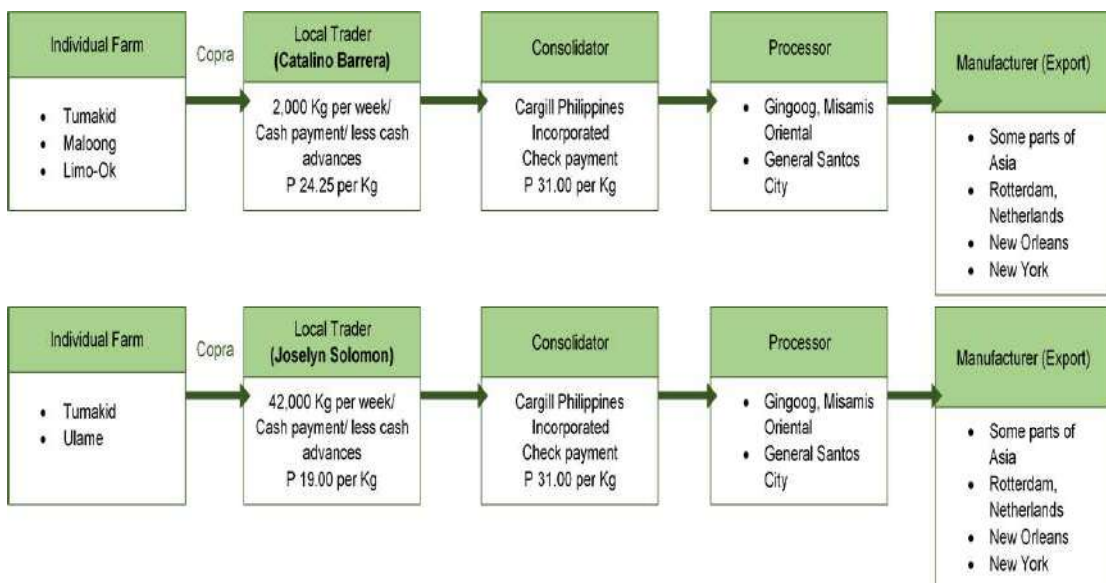
Meanwhile, information regarding product specifications, quality control, pricing, and orders flows between processing facilities, wholesalers, retailers, and end-users.

At processing facilities, the copra is then processed to extract coconut oil. The copra is crushed to extract the oil, which is then refined, bleached, and deodorized to produce refined coconut oil (RBD coconut oil). Refined coconut oil is packaged into various containers for distribution to wholesalers, retailers, and manufacturers.

Wholesalers purchase coconut oil in bulk quantities from processing facilities and distribute them to retailers such as supermarkets, grocery stores, and specialty shops. Retailers then sell coconut oil directly to consumers.

Payments flow along the chain from buyers to sellers, as shown in Figure 24. Due to lack of capital, individual farmers practice obtaining cash advances from traders to cover labor and other expenses during copra processing. In return, copra produced will be sold to the traders who provided the cash

advance. The traders will deduct the advanced amount from the total sales proceeds. Traders employ this practice to acquire high volume of copra products and maintain good relations with their clients. Additionally, this ensures they can fulfill the volume required in their contracts with consolidators. The contract between traders and consolidators assures traders of a steady copra price and the volume they must supply to the consolidators. Once traders fulfill the contracted volume, payment is issued by check, allowing them to enter another contract with the consolidator at the agreed price. The consolidators, acting as subsidiary buying stations for processors, forward the purchased copra to the processing plant. Once processed into crude oil and/or cochin oil, this is exported and sold to contracted coconut oil manufacturers. Payment for this refined product is made via bank transfer or check. Manufacturers receive payment from wholesalers or buyers, who in turn receive payment from retailers. Finally, retailers receive payment from consumers.



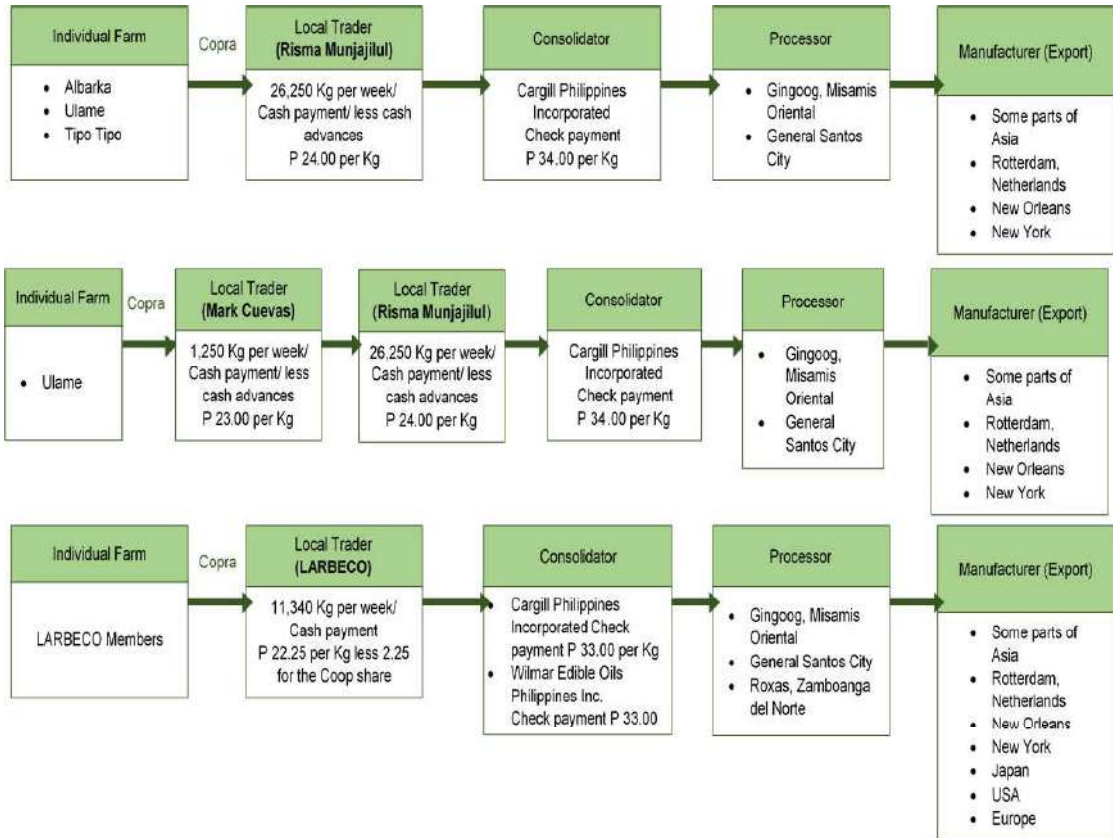


Figure 24. Payment Flow along the chain from buyers to sellers

The price information of copra is based on the world market. Manufacturers determine the price, and this information is passed down to processors (as illustrated in Figure 25). The processors then inform the consolidators of the price. Once a contracted price is finalized between consolidators and traders, this contracted price becomes the basis for the buying price of copra and this information is then disseminated to individual farmers.



Figure 25. Price Information Flow among Various Stakeholders

Throughout the chain, various stakeholders may also engage in contracts, negotiations, and financial transactions to facilitate the smooth flow of products and payments. Additionally, regulatory bodies may oversee aspects

of production, processing, quality control, and trade to ensure compliance with standards and regulations.

6.5 Cost and Return Analysis

Coconut farmers harvest and sell their copra to traders every quarter, averaging a yield of 630.50 kg per quarter. Additionally, farmers process the nut shells into charcoal. They sell this charcoal at an average price of P200.00 per sack, generating additional income for some. Others opt to use charcoal for their household consumption.

Aside from copra and charcoal processing, value-adding for other waste products is not practiced in the farm area. Value-adding could help farmers increase their income. This presents an opportunity for PCA BARMM, MTIT, MBHTE-TESD and other institutions to develop a capacity-building program for farmers, focusing primarily on value-adding waste products.

Coconut farmers apply fertilizer only when they receive free inputs (ammonium sulfate, potassium chloride, and common salt) from PCA BARMM, OPAG, and other agencies. Due to the high cost of these inputs, they often leave their plantations unfertilized in the absence of subsidies.

Nine farmers reported practicing monocropping, eleven practiced intercropping with various crops like rubber, cassava, coffee, banana, eggplant, cucumber, and squash, and ten practiced multi-cropping with combinations including cassava, banana, coffee, mangosteen, rubber, cucumber, and sweet potato.

Aside from farming, 70% of coconut farmers reportedly earn additional income from various sources such as wages from other jobs, business income, or other sources, with an average monthly income of ₱10,000 or less.

A cost and return analyses were conducted per cropping system on an annual basis, with results focusing on monocropping as presented in Table 22. In Lamitan City, farmers typically sell their copra to either barangay traders or directly to town traders. The estimated per-cropping copra sales in Lamitan City

amount to ₱80,823.89, with a net income of ₱14,641.50 and a Return of Investment (ROI) of 22%.

Costs of production encompass various expenses such as materials and supplies, transportation, rentals, labor costs for picking and collecting, and land revenue tax (considered as fixed cash cost). Activities involved in the production process include coconut picking, collecting, hauling, dehusking, splitting, scooping, drying, and sacking.

Harvesting activities usually follow a 50-50 sharing scheme on the net income between the farmer and laborer of copra processing. However, labor costs associated with picking and collecting matured coconuts are excluded from this arrangement, resulting in additional labor expenses and subsequently reducing the income for the farmers.

In light of these factors, it's crucial for farmers in Lamitan City to consider optimizing their harvesting practices and negotiating fairer terms with laborers to enhance their profitability and sustainability in coconut farming.

Table 22. Average Cost and Return Analysis for Farm Level (Monocrop) in Lamitan City, Basilan Province, 2024

Item	Value per unit
Income	
Cash Income	78,152.22
(a) Total Cash Income	78,152.22
Noncash Income	2,671.67
(b) Total Noncash Income	2,671.67
(c) Total Income (a) + (b)	80,823.89
Cost	
Variable Cash Costs	2,800.00
Labor Cost	20,406.67
Materials/Supplies	1,706.56
Transportation cost	1,100.00
Rentals	1,483.33
(d) Total variable cost	27,496.56

Fixed Cash cost	1,192.50
(e) Total Fixed Cash cost	1,192.50
(f) Total Cash Costs (d) + (e)	28,689.06
Variable Noncash Costs	37,113.33
(g) Total Variable Noncash Costs	37,113.33
Fixed Noncash Costs	380.00
(h) Total Fixed Noncash Costs	380.00
(i) Total Noncash Costs (g) +(h)	37,493.33
(j) Total cost [(f) +(i)]	66,182.39
Net Income [(c) - (j)]	14,641.50
Gross Margin (Income Above Variable)	
Cost [(c) – (d) – (g)]	16,214.00
Return on Investment	22 %

Similarly, the Cost and Return analyses per cropping system on an annual basis for intercropping were precisely conducted (Table 23). Results clearly demonstrate that farmers who adopt intercropping practices earn substantially higher estimated sales income, amounting to ₱68,833.64, with a commendable net income of ₱25,110.89 and ROI of 56%. This stands in glaring contrast to the practice of monocropping.

Intercropping, a method where farmers cultivate multiple crops simultaneously on the same plot of land, proves to be a strategic approach for augmenting agricultural yields and profitability. By diversifying their crops, farmers not only mitigate risks associated with fluctuations in market prices and environmental conditions but also optimize land utilization, soil fertility, and resource allocation.

Table 23. Average Cost and Return Analysis for Farm Level (Intercropping) in Lamitan City, Basilan Province, 2024

Item	Value per unit
Income	
Cash Income	43,170.00
Cash Income Intercrop	25,663.64
(a) Total Cash Income	68,833.64
Noncash Income	960.00
(b) Total Noncash Income	960.00
(c) Total Income (a) + (b)	69,793.64
Cost	
Variable Cash Costs	
Labor Cost	10,033.33
Materials/Supplies	1,877.17
Transportation cost	650.00
Rentals	1,500.00
(d) Total variable cost	14,060.50
Fixed Cash cost	1,180.67
(e) Total Fixed Cash cost	1,180.67
(f) Total Cash Costs (d) + (e)	15,241.17
Variable Noncash Costs	29,241.58
(g) Total Variable Noncash Costs	29,241.58
Fixed Noncash Costs	200.00
(h) Total Fixed Noncash Costs	200.00
(i) Total Noncash Costs (g) +(h)	29,441.58
(j) Total cost [(f) +(i)]	44,682.75
Net Income [(c) - (j)]	25,110.89
Gross Margin (Income Above Variable)	
Cost [(c) – (d) – (g)]	26,491.56
Return on Investment	56%

On the other hand, the Cost and Return analyses reveal that farmers engaged in multicropping achieve even more impressive results (Table 24). Their sales income stands at a remarkable ₱98,318.89, with a substantial net income of ₱37,079.67 and an ROI of 60%, surpassing both monocropping and intercropping practices.

Multi-cropping, a farming technique where farmers cultivate several different crops simultaneously on the same plot of land, emerges as a highly lucrative and sustainable approach. This method not only diversifies revenue streams but also enhances soil health, reduces pest and disease pressure, and promotes biodiversity.

The superior performance of multi-cropping underscores its potential as a transformative strategy for maximizing agricultural productivity and profitability. By harnessing the synergies between different crops and leveraging their complementary growth patterns, farmers can unlock greater value from their land while minimizing risks and resource inputs.

The superior performance of multi-cropping in terms of sales income and net profit underscores its efficacy as a sustainable farming strategy, particularly in the context of Lamitan City. Encouraging and supporting farmers to adopt multi-cropping can lead to profound improvements in food security, economic resilience, and environmental sustainability within the region. Therefore, promoting the adoption of multi-cropping practices represents a promising avenue for fostering a more prosperous and resilient agricultural sector in Lamitan City and the entire Basilan province.

Table 24. Average Cost and Return Analysis for Farm Level (Multi-cropping) in Lamitan City, Basilan Province, 2024

Item	Value per unit
Income	
Cash Income	58,191.11
Cash Income Multi-cropping	38,007.78
(a) Total Cash Income	96,198.89
Noncash Income	2,120.00
(b) Total Noncash Income	2,120.00
(c) Total Income (a) + (b)	98,318.89
Cost	
Variable Cash Costs	
Labor Cost	16,920.00
Materials/Supplies	7,486.22
Transportation cost	1,700.00
Rentals	300.00
(d) Total variable cost	26,406.22
Fixed Cash cost	1,053.00
(e) Total Fixed Cash cost	1,053.00
(f) Total Cash Costs (d) + (e)	27,459.22
Variable Noncash Costs	33,780.00
(g) Total Variable Noncash Costs	33,780.00
Fixed Noncash Costs	
(h) Total Fixed Noncash Costs	
(i) Total Noncash Costs (g) +(h)	33,780.00
(j) Total cost [(f) +(i)]	61,239.22
Net Income [(c) - (j)]	37,079.67
Gross Margin (Income Above Variable)	
Cost [(c) – (d) – (g)]	38,132.67
Return on Investment	60%

6.6 Participatory Systems Analysis (PSA)

The conduct of Participatory Systems Analysis (PSA) exercises took place during focus group discussions (FGDs). Participants were thoroughly questioned regarding the factors that shape their involvement in the coconut industry. The data collected was subsequently structured into a matrix (Table 25) to facilitate the assessment of the extent to which one factor influences another. Subsequent to this assessment, the participants highlighted the following factors as pivotal for achieving success in the coconut industry:

Code	Factors
K&S	Knowledge & skills in rubber farming
IS	Input subsidy in rubber
CF	Credit Facility
TA	Technical Assistance in farming and marketing
MI	Market Information including pricing
IF	Infrastructure facility support
PHF	Post-harvest Facility
P	Policy in support to the rubber industry

Following the procedures of Herweg and Steiner (2002) the ratings used were as follows:

a.	Strong influence	=	2.0
b.	Moderate influence	=	1.0
c.	Weak influence	=	0.5
d.	Very weak influence	=	0.1

The analysis identified Input Support (providing necessary resources such as quality seedlings and fertilizers), Infrastructure and machinery/equipment support, Post-Harvest Facilities, and Credit Facilities as key drivers of success (Figure 26). These factors directly address challenges faced by various coconut industry segments and have clear, predictable benefits.

For example, a recent report (2013) by the PCA highlighted a critical issue - Cocolisap infestation across Basilan province, impacting the entire industry structure, including Lamitan City. While brought under control by 2018, some areas still struggle. To address this and similar challenges, supplying

high-quality seedlings and fertilizers (input support) can significantly boost farmer productivity. Additionally, infrastructure, equipment, and post-harvest facilities could enhance productivity, profitability, and sustainability, ensuring the long-term viability of their agricultural enterprises. Finally, access to credit facilities allows farmers to cover daily farm expenses, essential for long-term success.

On the other hand, factors like Technical Assistance in farm management, Knowledge & Skills, and Policy in support of the coconut industry fall under the critical element quadrant. While these elements aim to solve problems, they require careful management to achieve positive outcomes. Interventions in this area can be complex and have unintended consequences if not handled effectively.

Market information is considered a buffer element. It has a low impact on the overall context because it doesn't significantly influence other elements or vice versa. Development activities in this sector are expected to have minimal impact on the broader agricultural landscape.

This highlights the importance of well-designed policies, effective capacity building to enhance the knowledge and skills of farmers, and providing technical assistance in good agricultural practices. Investing in farmer education and skill development is crucial to ensure they can effectively utilize these resources and navigate potential challenges.

Table 25. Relationships between different factors affecting the Coconut Industry

ELEMENTS	1 K&S	2 IS	3 CF	4 TA	5 MI	6 IF	7 PH F	8 Pol	Active Sum (AS)	Degree of Interaction (ASxPS)
1 K&S		1	0.1	1	1	1	0.5	1	5.6	30.8
2 IS	1		2	0.5	0.5	0.5	0.1	1	5.6	28.56
3 CF	0.5	0.5		0.5	0.5	1	1	0.5	4.5	19.35
4 TA	1	1	1		.5	1	1	1	6	33
5 MI	0.5	0.1	0.1	0.5		0.5	0.1	0.5	2.3	9.2
6 IS	1	0.5	0.1	1	0.5		1	1	5.1	26.01
7 PH F	1	1	0.5	1	0.5	0.1		1	5.1	23.97
8 Policy	0.5	1	0.5	1	1	1	1		6	36
Passive Sum (PS)	5.5	5.1	4.3	5.5	4	5.1	4.7	6		
Activity Ratio AS/PS	1.02	1.10	1.05	1.09	0.58	1.00	1.09	1.00		

Rating System: Strong influence= 2.0, Moderate influence=1.0, Weak influence=0.5, Very weak influence= 0.1

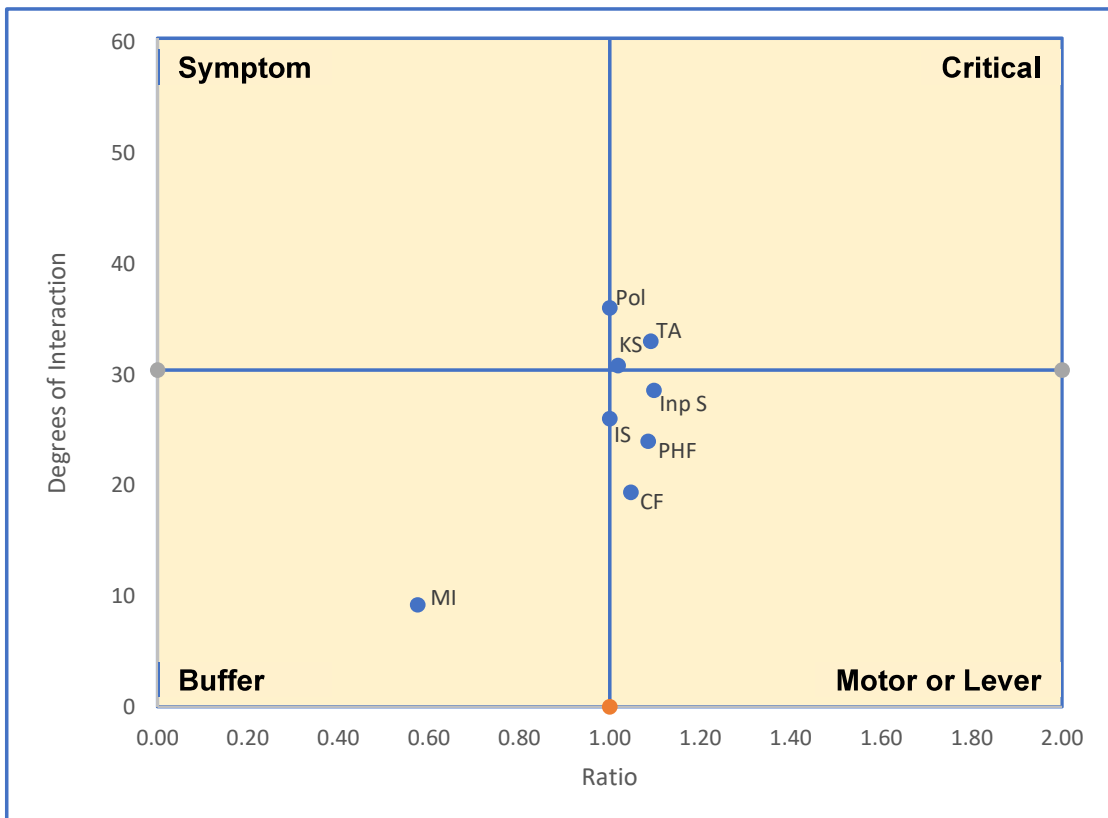


Figure 26. PSA Motor Quadrant for Coconut

6.7 Opportunities and Constraints

Constraints are elements that hinder the progress and competitiveness of the coconut industry. Conversely, opportunities serve as enablers that can enhance its growth. Despite the challenges encountered by the upstream sector in recent times, there exists the potential for expanding business operations. In fact, some constraints can even be transformed into business opportunities for MSMEs (Micro, Small, and Medium Enterprises) in coconut-producing areas.

Nevertheless, a crucial limitation lies in the inadequate policy backing and a specialized entity to spearhead the industry's advancement efforts from both governmental and private sectors. The evaluation of constraints and opportunities commences with a thorough analysis carried out through survey interviews with stakeholders at different levels, such as farmers, traders, consolidators, processors, and manufacturers within the coconut domain. These results were subsequently validated and enhanced via Focus Group Discussions and Key Informant Interviews, involving primary stakeholders deeply involved in the coconut industry (Figure 27).

Constraints:

Limited access to farm inputs: This can include high costs of fertilizers, pesticides, and quality seedlings, hindering farmers' ability to properly maintain and improve their crops.

Persistent pest infestations: Outbreaks like cocolisap can significantly reduce yields and cause widespread damage.

Low productivity: Factors like aging trees, inadequate crop management practices, and lack of access to new technologies can contribute to lower output.

Lack of post-harvest facilities: This can lead to spoilage, lower quality copra, and reduced profits for farmers.

Fluctuating market prices: Unstable coconut prices make it difficult for farmers to plan effectively and secure stable income.

Inadequate farming practices: Traditional methods may not be optimized for yield or efficiency.

Insufficient power supply: Frequent power outages and brownouts disrupt the production process, leading to losses, product quality issues, and decreased output.

Opportunities:

Continuous subsidy programs for farm inputs: Making essential supplies more affordable can empower farmers to invest in their farms and improve yields.

Investment in post-harvest facilities: Building and improving drying facilities, storage units, and processing plants can minimize waste, enhance copra quality, and increase farmer profits.

Capacity building programs for farmers: Providing training on modern farming techniques, crop management strategies, and business skills can significantly improve farm productivity and profitability.

Establishment of local processing plant: Establishment of a local copra processing plant can increase the value of coconut products through processing, generating income and employment opportunities for the local population

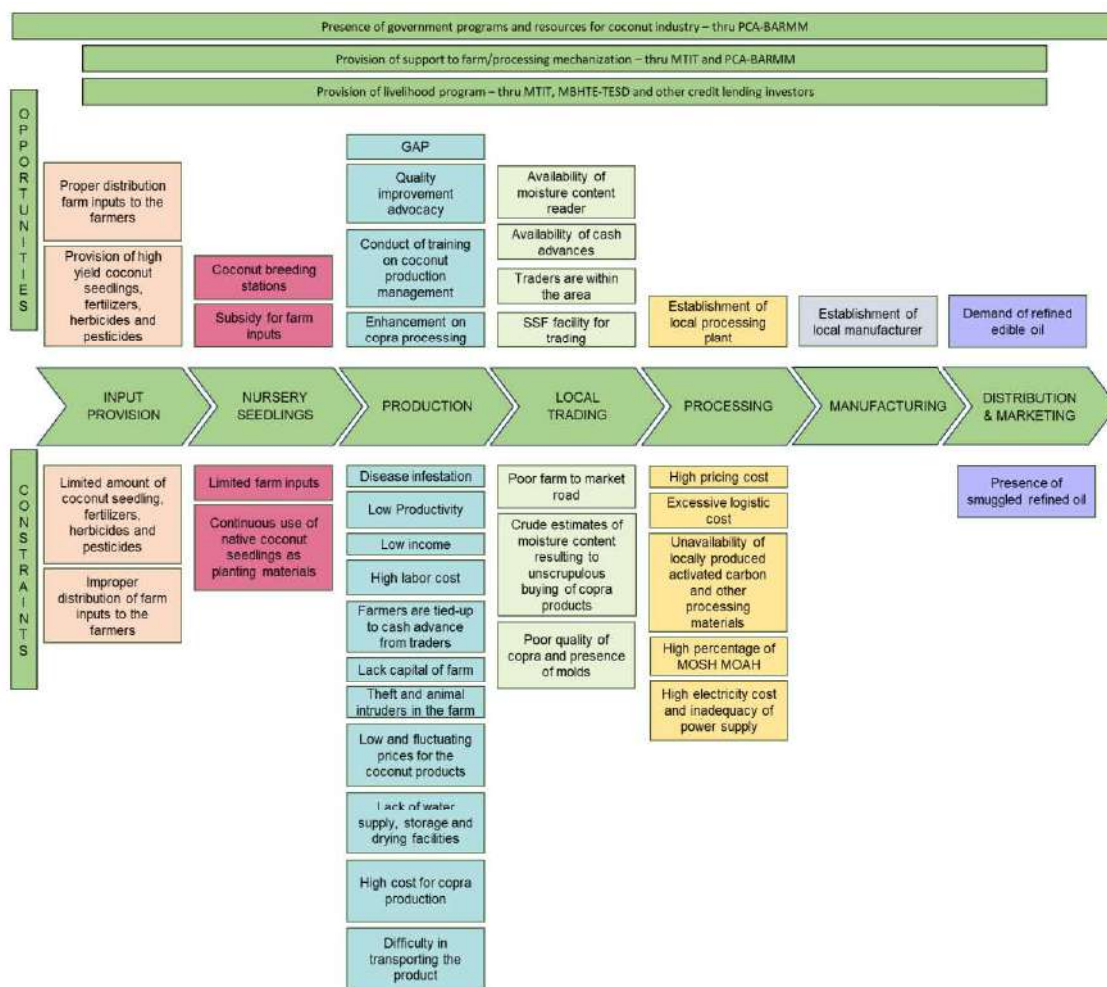


Figure 27. Opportunities and Constraints on Copra Production in Lamitan City, Basilan Province

6.8 Strategic Interventions

Significant changes across the entire coconut value chain, from cultivation to finished products, are imperative to strengthen copra production in Lamitan City and the entire Basilan province.

Based on the results of the Performance System Analysis (PSA), a tool used to assess strengths and weaknesses in a production system) and the identified opportunities and constraints, the following development strategies per node are proposed for collaboration between government agencies and industry leaders:

6.8.1 Input Supply Scheme

Provision of farm inputs

To ensure the long-term viability of the coconut industry, the Philippine Coconut Authority (PCA) should prioritize the consistent provision of high-quality planting materials, fertilizers, and essential pest and disease control solutions, particularly for small-scale farmers, with close monitoring to ensure these farm inputs reach the intended recipients.

6.8.2 Nursery Seedlings

Strengthen the partnership on the establishment of Coconut Nursery Stations

In 2013, the entire Basilan province faced a devastating challenge – a widespread infestation of Cocolisap, a destructive pest documented by the Philippine Coconut Authority (PCA). This infestation severely impacted the coconut industry, prompting the PCA to order large-scale culling of trees. This also affected the nursery stations in the province, resulting in a stoppage of operations.

Over time, the Cocolisap threat subsided, and by 2018, conditions were favorable enough for replanting coconut trees. The PCA-BARMM and OPAG have established nursery stations in strategic locations in the province to ensure the availability of quality seedlings as planting materials.

The establishment of coconut nurseries for quality coconut seedlings is a crucial step in reviving ongoing efforts to restore productivity and revitalize the sector. Building on the establishment of coconut nurseries for quality seedlings, this initiative can be strengthened through partnerships with the Cooperatives. The cooperatives with experience in plant propagation can play a vital role in this project by producing and supplying high-yielding varieties to affected farmers in Basilan province.

6.8.3 Production Scheme

Increase promotion efforts for fertilizer usage and encourage adherence to Good Post Harvest Practices.

The Philippine Coconut Authority (PCA-BARMM), in collaboration with the Ministry of Agriculture, Fisheries, and Agrarian Reform (MAFAR), should intensify efforts in promoting the utilization of fertilizers within coconut-growing regions. Extensive evidence showcases that the application of fertilizers significantly enhances coconut productivity compared to scenarios where fertilization is absent. Thus, it is vital for the PCA to sustain its assistance to farmers by ensuring a consistent supply of fertilizers while diligently monitoring the implementation and impact of farming practices among beneficiaries.

Furthermore, there is a demanding need to strengthen advocacy aimed at encouraging farmers to embrace good post-harvest practices in copra processing. Through strategic partnerships with the Ministry of Trade, Investment, and Tourism (MTIT) and copra processors, the PCA-BARMM should facilitate capacity-building initiatives targeting coconut farmers, specifically focusing on post-harvest techniques. Alongside, concerted efforts should be made to raise awareness among farmers regarding the quality standards preferred by copra processors. By equipping farmers with the necessary knowledge and skills and promoting compliance to industry standards, these collaborative endeavors can significantly enhance the overall quality and marketability of copra products.

Enhance efficient agricultural practices.

Farmers may show interest in adopting good agricultural practices (GAP) if they witness concrete evidence of increased production and income resulting from these practices. The saying "seeing is believing" holds true for farmers, as they need first-hand experience to the benefits of such methods to fully appreciate them. Therefore, it is recommended that the PCA-BARMM establishes model farms within each district, providing visible examples for coconut farmers to observe and follow.

Despite the majority of farmers possessing tertiary education, it is practical to acknowledge that while they may have technical knowledge, they often require guidance on the implementation of GAP. This features the essential role of the PCA-BARMM in providing ongoing support beyond occasional provision of resources like salt and seedlings. Effective monitoring is essential in ensuring the successful adoption of GAP. To facilitate this, collaborative efforts between the PCA-BARMM the MAFAR, and Local Government Units are necessary. Through coordinated action, these entities can provide comprehensive support and guidance to farmers, thereby promoting sustainable agricultural practices and enhancing overall productivity in the coconut sector.

Provision of copra drying facilities

Establishing copra drying facilities in every district holds significant potential to enhance both the productivity and quality of copra output. As a strategic intervention, research and development initiatives aimed at the creation of such drying facilities should be prioritized by the PCA-BARMM. This prioritization ensures that stable purchasing prices for copra, beneficial to farmers, can be achieved through improved processing infrastructure.

Moreover, the prevalent practice of relying on rough estimates for determining moisture content reduction during copra transactions warrants elimination. A robust policy mandating traders and consolidators to utilize moisture readers for accurate assessment of copra moisture content must be strictly enforced. This measure is crucial for ensuring equitable evaluation of copra quality and establishing standardized moisture content levels in line with the specifications required by copra processors. By instituting these measures, fairness in assessment and consistency in quality standards can be maintained across copra trading processes, thereby benefiting both farmers and stakeholders in the industry.

Strengthen efforts to promote pest and disease control

It is vital to educate farmers about pest and disease management and their consequences on copra production. The PCA-BARMM should intensify its efforts in disseminating information through campaigns focused on pest and disease management. Additionally, the PCA-BARMM should extend support to farmers affected by the coconut scale insect (cocolisap) outbreak by continuously helping them in replanting coconut trees in their farm areas. The responsibility of the PCA-BARMM goes beyond merely providing seedlings; it extends to ensuring that these planting materials are utilized appropriately and effectively planted in designated areas. Therefore, ongoing monitoring and assistance are essential components of the PCA-BARMM's mandate in facilitating sustainable coconut farming practices.

Diversified Farming Practices

Coconut production is a valuable source of income, but the extended intervals between harvests can create financial strain. Diversifying the coconut farm offers a powerful solution to bridge these income gaps and create a more resilient and profitable operation.

This approach involves integrating various crops or activities alongside the existing coconut trees. By strategically utilizing the space beneath and between the palms, farmers can maximize land use, boost overall farm productivity, and promote sustainable practices.

Cropping Systems:

Intercropping: Plant shade-tolerant crops under the coconut trees. This could include:

- **Food crops:** Vegetables (eggplant, leafy greens), root (crops cassava, seet potato, ginger, turmeric), legumes (mungbean, peanuts)
- **Cash crops:** Coffee, cacao, pepper (black, white)
- **Fruit trees:** Banana, papaya (dwarf varieties)

Livestock Integration:

- Raise small livestock that can be managed within the coconut farm.
Options include:
 - Poultry (chickens, ducks) – for meat and egg production
 - Goats, sheep – for meat and additional income
 - Utilize livestock manure as organic fertilizer for crops.

Value-added Products:

- Explore processing coconut products on-farm or through cooperatives.
This could involve:
 - Virgin coconut oil production
 - Desiccated coconut
 - Coconut vinegar
 - Coco peat (growing medium) from coconut husks

In any types of intercropping, livestock integration and value-adding of coconut products, women and youth can actively participate in production and marketing to enhance family income.

Promote farmers' participation in established farmer Associations or Cooperatives.

In the current setting, farmer organizations remain fragmented, with only a minority of farmers holding official membership within these entities. This fragmentation significantly weakens the collective bargaining power of farmers, particularly concerning their ability to access loans. The occurrence of cash advances from traders and consolidators could potentially be lessened if farmers were able to secure credit or loans through farmer organizations.

One of the primary difficulties to membership in these organizations is the strict admission policies they enforce. The basics for joining are often overly inflexible, creating barriers that discourage farmers from pursuing membership. For instance, the Cooperative Development Authority (CDA) imposes strict guidelines for the formation of cooperatives by groups of farmers. Frequently, these criteria are challenging to fulfil, leading many farmers to abandon the idea of establishing a cooperative.

A strategy to incentivize farmers to form cooperatives or join farmer organizations involves a comprehensive review of existing guidelines. By introducing flexibility and considering the challenges faced by farmers in meeting certain criteria, organizations can enhance their appeal and encourage greater participation. This approach acknowledges the practical realities confronted by farmers and seeks to create a more accessible pathway to membership and cooperative establishment.

Provide training and empowerment for farmers, the wives and children of the farmer with the aim of developing entrepreneurial skills.

It is imperative to provide empowerment to farmers, as well as their spouses and children who are engaged in agricultural activities, by positioning them as entrepreneurial actors of their farmland. This involves equipping them with a comprehensive comprehension of financial management in conjunction with the day-to-day farm operations. Currently, efforts led by institutions such as PCA-BARMM and MAFAR are focused on enhancing the expertise of coconut farmers, encompassing a wide range from innovative technological advancements to effective pest control and the dynamic shifts in the industry.

Nevertheless, conventional training sessions are insufficient in ensuring the sustainable integration of knowledge. The establishment of robust feedback mechanisms post-training is crucial in validating the practical utilization of newly acquired information and technologies. Subsequent sessions, involving diverse participants from different barangays, play a critical role in developing ongoing education and cooperation.

Moreover, the implementation of a thorough Training Needs Assessment (TNA) within the farming community before the initiation of such sessions is imperative. This strategic approach ensures that the content and delivery method echo with the specific requirements of farmers, as their needs might differ from the assumptions made by trainers. This practical measure ensures that interventions are precisely custom-made to address the real challenges and aspirations of the farming community.

Improvement of Farmer's Financial Literacy and Access to credit

Accessing credit or loans from lending institutions poses a significant challenge for farmers, primarily due to the requirement of formal farmer organizations for eligibility. Unfortunately, the landscape of farmer organizations in the country is currently fragmented, hindering the formation of organized groups. Even when cooperatives are established, they often struggle to attract members as the direct benefits of joining are not always apparent. Typically, cooperatives serve as consolidators rather than directly supporting farmers at the production level. In our interviews with organizations like SCARBIDC and LARBECO, it became clear that their focus is more on long-term goals, such as eliminating middlemen or consolidators from the supply chain.

Furthermore, our observations revealed a troubling trend: many farmers find themselves in a risky financial situation where their monthly expenses exceed their income. This imbalance forces farmers to seek out loans from lending institutions or local investors to meet their financial needs. This reliance on loans further worsens the financial strain on farmers, creating a cycle of debt that is difficult to break.

Addressing these challenges requires a complex approach. Firstly, there is a pressing need to streamline and strengthen farmer organizations, ensuring that they are able to effectively represent the interests of their members and provide tangible benefits. This may involve providing support and resources to help these organizations become more efficient and inclusive.

Secondly, initiatives should be implemented to improve farmers' financial literacy and management skills. This would empower them to make informed

financial decisions and reduce reliance on loans. These initiatives could include seminars and training programs, workshops, and access to financial counseling services, with a specific focus on women as they often manage the family finances.

Additionally, efforts to increase access to affordable credit and loans for farmers are essential. This could involve partnerships between government agencies, lending institutions, and agricultural organizations to develop tailored financial products and services that meet the specific needs of farmers.

By addressing these issues, we can create a more equitable and sustainable financial environment for farmers, enabling them to prosper and contribute to the growth and development of the agricultural sector.

6.8.4 Marketing Scheme

Advocacy on Business Registration and Strict Implementation of Business Permit Policy

There is a pressing requirement to enhance the enforcement of business registration and permits, along with the corresponding consequences for non-compliance. Rigorous enforcement measures must be put in place, and offenders should face appropriate penalties. Registering businesses can contribute significantly to monitoring copra product pricing and production. By mandating registered businesses to submit monthly production reports to relevant agencies, authorities can effectively track and manage copra-related activities. This proactive approach ensures transparency and accountability within the industry, ultimately benefiting stakeholders and promoting fair practices.

Use of Moisture Reader

The PCA-BARMM, in partnership with educational institutions and other relevant organizations, should spearhead the development of a moisture reader to ensure consistent copra quality and standardize the moisture content deduction process in copra production. This integration could eliminate the

crude methods currently practiced in the trading industry for moisture content reduction. This advancement would not only contribute to enhanced productivity but also lead to increased income for farmers.

Furthermore, concerned agencies should conduct consultations with traders, consolidators, and processors to develop a policy for fairer pricing of copra for farmers who follow the standard copra processing protocols, thereby ensuring the quality of copra products. Such coordinated efforts are essential for promoting fair compensation for farmers and incentivizing compliance with quality standards in copra production.

7.0 SUMMARY OF FINDINGS

The coconut industry plays a significant role in the economy of Basilan province. This report details various aspects of the industry, including its contribution to the national and local economy, challenges faced by farmers, and opportunities for improvement.

In terms of economic contribution, coconut is a major agricultural export in the Philippines, and Basilan contributes to the national exports of copra, coconut oil, and other products. The industry has faced challenges like the cocolisap infestation that devastated coconut farms in 2013, along with ongoing concerns such as low productivity, fluctuating market prices, and limited access to financing and technical assistance.

The industry is recovering from the cocolisap infestation, with government initiatives promoting replanting and providing high-quality seedlings. However, high input costs, fluctuating market prices, limited access to financing, a decline in global copra prices, and the 50-50 sharing scheme for copra processing labor further restrict profitability. Moreover, technical assistance is limited.

There are efforts to revitalize the industry through replanting coconut trees, promoting diversification (e.g., virgin coconut oil, coconut sugar), and value-addition that can offer higher margins for farmers. Most coconut farmers

in Basilan are smallholders cultivating farms between 1 and 5 hectares. They typically practice intercropping with other crops. Studies have shown that intercropping generates higher income for farmers compared to monocropping (coconut only).

In the value chain of coconut, various players are involved, such as input suppliers, farmers, traders, consolidators, processors, wholesalers, retailers, and consumers. Men are predominantly involved. Men manage the physical farm, while women handle the crucial role of marketing copra, the dried coconut product. This extends to their responsibility for the farm's finances, including budgeting and ensuring profit. This financial management by women significantly contributes to the overall well-being of the family.

In terms of payment along the chain, individual farmers practice obtaining cash advances from traders due to lack of capital, in return, copra produced will be sold to the traders who provided the cash advance and the cash advance made will be deducted from the total sales proceeds of the farmers. This practice is done by traders to acquire high volume of copra products and maintain good relations with their clients. Additionally, this ensures that traders can fulfill the volume required in their contracts with consolidators. Eventually, a contract between traders and consolidators assures traders of a steady copra price and the volume they must supply to the consolidators. Once a contract has been fulfilled, payment will be made through check and they can enter into another contract with the consolidator. The consolidators, acting as subsidiary buying stations for processors, forward the purchased copra to the processing plant. Once processed into crude oil and/or cochin oil, this is exported and sold to contracted coconut oil manufacturers. Payment for this refined product is made via bank transfer or check. Manufacturers receive payment from wholesalers or buyers, who in turn receive payment from retailers. Finally, retailers receive payment from consumers.

On the other hand, price information is based on the world market, the price is then determined by the manufacturers and is disseminated down to processors. Processors inform the price to consolidators and this information is

passed down to traders. Individual farmers are the last key players to know the price information.

Participatory Systems Analysis identified factors crucial for marginalized individuals to engage in the coconut industry. Input subsidies, infrastructure support, post-harvest facilities, and credit facilities were recognized as key drivers for success. While, Technical Assistance in farm management, Knowledge & Skills, and Policy in support of the coconut industry are the critical element that require careful management to achieve positive outcomes. Additionally, Market information was considered a buffer element.

Meanwhile, limited farm inputs, pest infestations, low productivity, lack of post-harvest facilities, fluctuating prices, and inadequate farming practices are the constraints that hinder the development of the industry. Conversely, opportunities for the continuous subsidy of farm inputs, investing in post-harvest facilities to enhance copra processing, and capacity building to enhance farm management and increase productivity were identified.

Finally, the cooperative policies, government regulations, peace and order, weather/environmental conditions, and market information's are the external factors that affect operations and success of the coconut enterprise.

Overall, by addressing the challenges and implementing strategies for improvement, Basilan's coconut industry can become a sustainable and thriving producer of high-quality coconut products, empowering both established farmers and marginalized individuals.

8.0 RECOMMENDATIONS

8.1 Input Supply Scheme

- The Philippine Coconut Authority (PCA) should ensure a consistent supply of essential farm inputs like high-yielding planting materials, fertilizers, and pest control solutions, particularly for small-scale farmers. Close monitoring should be implemented to prevent diversion and ensure these resources reach intended recipients.
- Reinvigorate partnerships with cooperatives experienced in plant propagation. These cooperatives can establish and manage coconut nursery stations, ensuring a steady supply of high-quality seedlings for Basilan farmers.

8.2 Production Scheme

- The PCA-BARMM, in collaboration with the Ministry of Agriculture, Fisheries, and Agrarian Reform (MAFAR), should intensify efforts to educate farmers on the benefits of fertilizer use and proper post-harvest practices for copra processing.
- Partner with the Ministry of Trade, Investment, and Tourism (MTIT) and copra processors to conduct training programs on effective post-harvest techniques and quality standards.
- Establish model farms within each district to demonstrate the benefits of Good Agricultural Practices (GAP) and inspire wider adoption among coconut farmers.
- Prioritize research and development initiatives for establishing copra drying facilities in every district. This will improve copra quality and potentially lead to more stable purchasing prices.

- Implement a policy requiring local traders to use moisture readers for accurate copra moisture content assessment. This ensures fair evaluation and consistent quality standards.
- The PCA-BARMM should intensify educational campaigns on pest and disease management for coconut trees.
- Provide ongoing support to farmers affected by outbreaks like cocolisap, including replanting assistance and monitoring to ensure proper planting practices.
- Encourage intercropping with shade-tolerant crops like vegetables, legumes, coffee, or fruits to maximize land use and generate additional income between harvests.
- Explore livestock integration (poultry, goats, sheep) for meat and egg production, with manure used as organic fertilizer.
- Promote on-farm processing of value-added coconut products like virgin coconut oil, desiccated coconut, or coco peat.
- Review membership requirements for farmer organizations to be more inclusive and accessible.
- Encourage greater farmer participation by highlighting the benefits of collective bargaining power, access to loans, and knowledge sharing.
- Provide training programs for farmers on the utilization of new technologies; and for women involved in coconut farming, on financial management and marketing strategies.
- Conduct Training Needs Assessments (TNAs) to tailor training programs to the specific needs and challenges faced by the farming community.

8.3 Marketing Scheme

- Implement stricter enforcement of business registration and permits for copra traders and processors. This ensures transparency and facilitates monitoring of copra production and pricing.
- Collaborate with educational institutions to develop standardized moisture readers for accurate copra moisture content assessment, replacing current unreliable methods.
- Establish a policy, through consultations with stakeholders, for fairer pricing of copra that meets quality standards. This incentivizes farmers to comply with good practices and receive better compensation.

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RESULTS AND DISCUSSION

Vegetable

10.1 World Vegetable Industry Profile

Asia is the leading vegetable producer in the world, accounting for 78% of total volume produced in 2019. Among its regions, East Asia (54.5%) ranks first mainly driven by China, while Southeast Asia (4.2%) ranks third as shown in Figure 28 (FAOSTAT 2019).

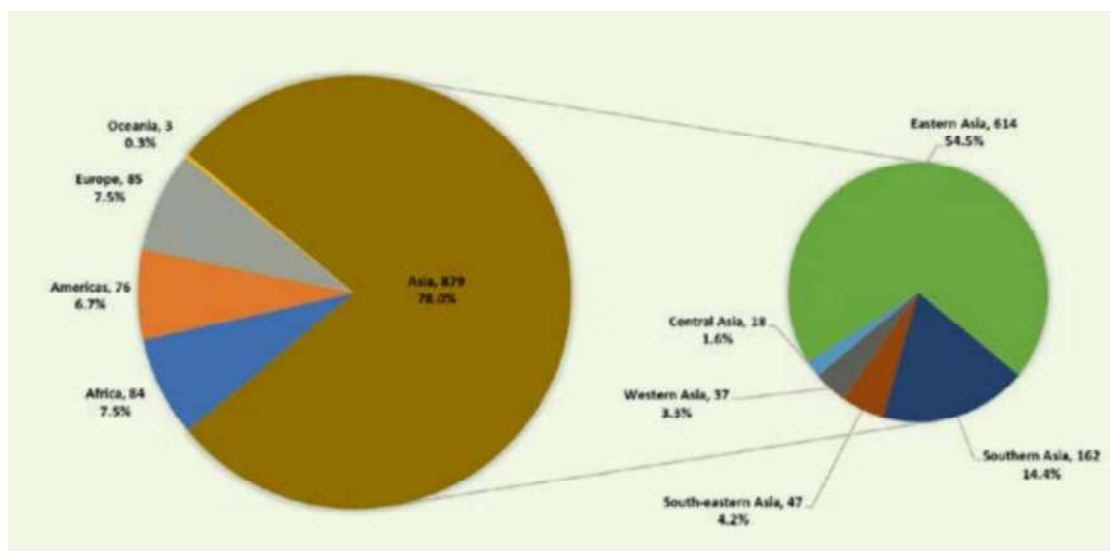


Figure 28. World Vegetable Production Volumes and Share by continents, 2019 (FAOSTAT 2019)

Figure 29 and 30 shows the vegetables primary production in the world. China is the top primary producer in 2021 and 2022 with 602 million metric tons and over 616 million metric tons of vegetables produced, respectively, that accounts for 52.18% of the world's vegetable primary production in 2021. The Philippines ranks 22nd in vegetable production in 2021 with a primary production volume of 6,658,946 million metric tons.

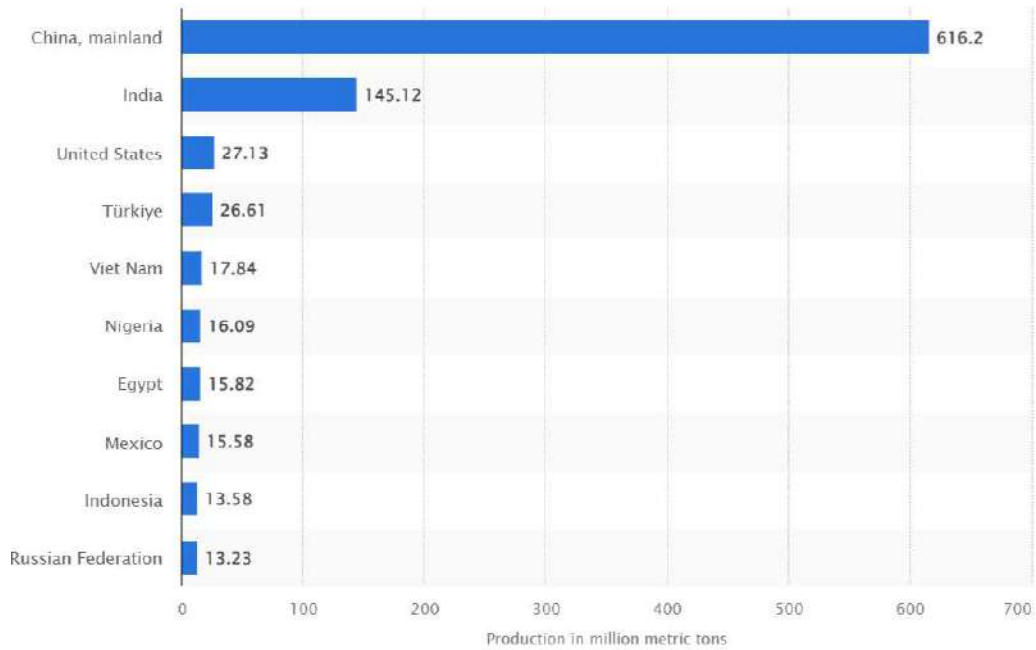


Figure 29. Leading producers of fresh vegetables worldwide in 2022 (in million metric tons).



Figure 30. Vegetables primary production worldwide by country in 2021.

It is shown in Table 26 that despite the large area of 675,426 hectares devoted to vegetable production in the Philippines, second to Vietnam with the highest production area of 870, 532 hectares in 2019, its production volume is only 5.58 million tons while Vietnam had 15.34 million tons (FAOStat 2010-2019). This data shows that for every hectare, 8.26 tons is produced in the Philippines while Vietnam produced 17.56 tons per hectare. In terms of yield per hectare, Malaysia is the most productive with 22.84 tons per hectare. The vegetable yield in the Philippines is lagging behind compared to Vietnam (17.56 t/ha), Myanmar (13.22 t/ha), and other countries (FAOStat 2010-2019). The disparity of the vegetable production data of the Philippines compared to its South East Asian counterparts implies that there are issues and concerns that needs to be addressed for improved vegetable production in the country, in terms of yield per unit area. The value chain analysis is a very useful tool to identify mechanisms that will optimize vegetable productivity and sustainability among vegetable stakeholders along the value chain.

Table 26. Fresh vegetables: Area planted, production and yield, by country, 2019

Region/ Country	Area (ha)	Ave % Growth	Production (t)	Ave % Growth	Yield (t/ha)	Ave % Growth
World	21.94M	2.09	311.82M	2.08	14.21	-0.004
SE Asia	2.29M	3.74	29.15M	5.48	12.75	1.565
Vietnam	873,532.00	11.53	15.34M	12.55	17.56	1.028
Timor-Leste	8,721.00	0.85	27,154.00	2.40	3.11	1.528
Thailand	91,090.00	-3.49	1.10M	0.20	12.04	4.046
Singapore	1,277.00	3.16	23,446.00	2.39	18.36	-0.495
Philippines	675,426.00	2.20	5.58M	2.13	8.26	-0.062
Myanmar	291,708.00	1.74	3.86M	1.44	13.22	-0.301
Malaysia	30,740.00	2.29	702,215.00	5.82	22.84	3.322
Lao PDR	174,892.00	3.99	1.53M	7.35	8.73	2.550
Indonesia	31,980.00	-6.50	322,740.00	-6.37	10.09	0.139
Cambodia	105,768.00	2.47	678,526.00	2.54	6.42	0.047
Brunei	523.00	-19.21	430.00	-19.15	0.82	0.068

Source: FAOStat, *2010-2019

The world vegetable market is dominated by China consistently producing more than half (52.4%) of total volumes in 2019 followed by India

(11.7%) and the USA (2.7%). The Philippines, on the other hand, currently ranks 20th in the world at 0.6% share (Table 27).

Table 27. Top vegetable producing countries, 2019

Rank	Country	Production			Area (ha)	Yield (MT/ha)
		Volume (MT)	Share (%)	AAGR*		
1	China	590,676,143.0	52.4	2.9	25,164,183.0	23.5
2	India	132,026,555.0	11.7	4.0	8,483,717.0	15.6
3	USA	29,999,514.0	2.7	-1.9	849,758.0	35.3
4	Turkey	25,338,974.0	2.2	1.8	747,417.0	33.9
5	Viet Nam	16,966,279.0	1.5	10.4	1,020,612.0	16.6
6	Nigeria	16,670,642.0	1.5	3.9	4,350,890.0	3.8
7	Egypt	15,419,841.0	1.4	-1.8	636,001.0	24.2
8	Mexico	15,226,085.0	1.3	4.2	681,630.0	22.3
9	Russia	14,153,617.0	1.3	1.0	575,034.0	24.6
10	Spain	13,259,340.0	1.2	1.6	323,960.0	40.9
20	Philippines	6,977,857.0	0.6	1.8	801,861.0	8.7

Source: FAOSTAT, *2010-2019

In the Philippines, the leading vegetable producer is Northern Mindanao as shown in Figure 27 (PSA 2024) producing 195.25 thousand metric tons of cassava. This is followed by Central Luzon producing 121.12 thousand metric tons of onion and ampalaya fruit. While Ilocos, CAR, and eastern Visayas produced 73.74 thousand metric tons, 35.24 thousand metric tons, and 15 thousand metric tons of vegetables, respectively.

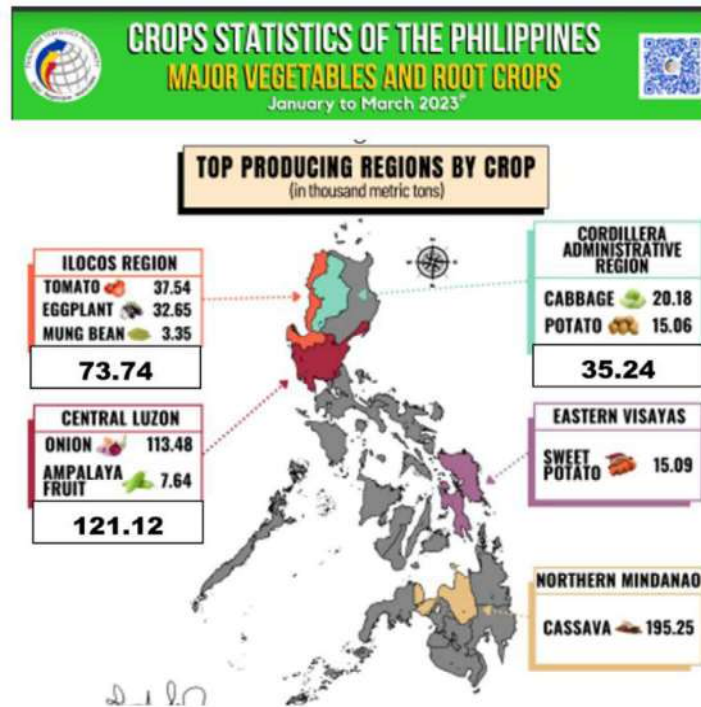


Figure 27. Major Vegetables and Root Crops in the Philippines

The vegetable industry is classified based on the location of cultivation namely, highland and lowland. Table 28 shows the top ten vegetables produced in the country within the last ten years (PSA, 2024). Cassava is the leading vegetable produced in the country from 2014-2023 with an average annual production volume of 4.77 million metric tons in 402,789.43 hectares contributing a production volume of 58.85% and 50.32% of the area planted in the country. It is followed by sweet potato with an average annual production volume and area planted of 534, 814.66 metric tons and 85,495.95 hectares, respectively.

Data presented in Tables 29 and 30 shows that cassava is also the leading vegetable produced in Region IX (Zamboanga Peninsula) and Basilan followed by sweet potato. In the Philippines, cassava contributes 58.85% of the average annual volume (metric tons) of vegetables produced and 50.32% of the area (ha) planted while in Region IX (Zamboanga Peninsula) and Basilan, it contributes 64.91% and 99.37% of the volume of vegetables produced, respectively. It appears that vegetable production in Basilan is concentrated on cassava and less than 1% for other vegetables. This data suggests that

vegetable production in Basilan is not sufficient for the needs of the populace, therefore, vegetable supply in Basilan is sourced outside Basilan.

Table 28. Top ten (10) vegetables produced in the Philippines from 2014-2023 (PSA, 2024)

RANK	COMMODITY	VOLUME (mt)	%	AREA (ha)	%
1	Cassava	4,765,359.88	58.85	402,789.43	50.32
2	Sweet Potato/Camote	534,814.66	6.60	85,495.95	10.68
3	Eggplant	240,421.26	2.97	21,538.66	2.69
4	Tomato	218,635.03	2.70	16,211.87	2.03
5	Squash Fruit	203,239.83	2.51	12,937.02	1.62
6	Onion (mature bulb)	202,773.55	2.50	17,864.71	2.23
7	Onion, Bermuda	164,662.41	2.03	13,873.90	1.73
8	Cabbage	125,176.94	1.55	8,036.06	1.00
9	Potato	112,961.45	1.39	7,449.89	0.93
10	Stringbeans	112,908.54	1.39	13,854.96	1.73
TOTAL		6,680,953.59	82.50	600,052.45	74.96
ALL VEGETABLES		8,097,667.46	100%	800,472.93	100%

Table 29. Top ten (10) vegetables produced in Region IX (Zamboanga Peninsula), average annual production volume and area (ha) planted from 2014-2023 (PSA, 2024)

RANK	COMMODITY	VOLUME (mt)	%	AREA (ha)	%
1	Cassava	156,117.3	64.91	11,267.80	55.52
2	Sweet Potato/Camote	25,988.68	10.80	2,360.55	11.63
3	Squash Fruit	6,272.569	2.61	541.73	2.67
4	Tomato	6,008.456	2.50	399.35	1.97
5	Ampalaya Fruit	5,357.504	2.23	601.99	2.97
6	Eggplant	4,670.415	1.94	501.98	2.47
7	Swamp Cabbage/Kangkong	3,993.059	1.66	558.76	2.75
8	Bottle Gourd/Upo	3,374.811	1.40	335.08	1.65
9	Stringbeans	2,653.197	1.10	499.71	2.46
10	Malunggay leaves	2,565.83	1.07	-	-
TOTAL		217,001.8	90.22	17647.67	86.96
ALL VEGETABLES		240,528.69	100%	20293.46	100%

Table 30. Top ten (10) vegetables produced in Basilan, average annual production volume (mt) and area (ha) planted from 2014-2023 (PSA 2024).

No	Commodity	Volume (mt)	%	Area Planted (ha)	%
1	Cassava	518,575.62	99.37	31,386.20	97.01
2	Sweet Potato/Camote	914.26	0.18	663.8	2.05
3	Banana Blossom	419.85	0.08	-	
4	Swamp Cabbage/Kangkong	355.19	0.07	11.72	0.04
5	Camote tops	213.71	0.04	-	-
6	Jackfruit young	193.76	0.04	-	-
7	Bottle Gourd/Upo	181.65	0.03	16	0.05
8	Squash Fruit	163.61	0.03	13	0.04
9	Green papaya	140.49	0.03	-	-
10	Black Pepper	118.53	0.02	50	0.15
TOTAL		521,276.702	99.89	32,140.72	99.34
ALL VEGETABLES		521,861.013	100	32,353.551	100

Table 31. Average annual production volume (mt) and area planted with of vegetables in the Philippines, Region IX (Zamboanga Peninsula), and Basilan from 2014- 2023. (PSA 2024)

No.	Vegetables	Production volume (mt)/year			Area (ha) Planted/year		
		Philippines	ZamPen	Basilan	Philippines	ZamPen	Basilan
1	Cassava	4,765,359.88	156,117.30	518,575.60	402,789.43	11,267.80	31386.20
2	Sweet Potato/ Camote	534,814.66	25,988.68	914.26	85,495.95	2,360.55	663.80
3	Eggplant	240,421.26	4,670.41	86.69	21,538.66	501.98	18.06
4	Tomato	218,635.03	6,008.45	26.77	16,211.87	399.35	10.40
5	Squash Fruit	203,239.83	6,272.57	163.61	12,937.02	541.73	13.00
6	Onion (mature bulb)	202,773.55	1.22	0.00	17,864.71	1.18	0.00
7	Onion, Bermuda	164,662.41	0.54	0.00	13,873.90	1.18	0.00
8	Cabbage	125,176.94	781.51	0.00	8,036.06	73.82	0.00
9	Potato	112,961.45	0.60	0.00	7,449.89	0.15	0.00
10	Stringbeans	112,908.54	2653.19	70.06	13,854.96	499.71	10.00
TOTAL		6,680,953.59	202,494.50	519,837.00	600,052.45	15,647.45	32,101.45
ALL VEGETABLES		8,097,667.46	240,528.70	521,861.00	800,472.93	20293.46	32353.55

*Identified vegetables are based from the top ten (10) vegetables produced in the Philippines (PSA, 2024).

Despite the significance of vegetable production in Basilan, very little has been done to encourage vegetable production in the area to minimize dependence on neighboring cities like Zamboanga City for the supply of vegetables. Of the thirty farmer respondents in the survey having a total farm area of 61.22 ha, only 18.26 ha (29.82%) is cultivated for vegetable production (Table 32). This indicates that the area cultivated for vegetables is too small compared to farm areas cultivated for other crops.

Table 32. Production areas utilized for vegetable production in Basilan

Vegetable Area (m ²)			% of total farm area (612250m ²)
CLUSTERED (in sqm)	f	%	
100-750	12	42.86	0.91
1000-6300	10	35.71	4.08
10000-15000	4	14.29	9.80
30000-32000	2	7.14	15.03
Total: 182,550	28		
%		100	29.82

Hence, there is a need to analyze the vegetable value chain to serve as basis in crafting integrated and innovative strategy for appropriate interventions, plans and programs and policy recommendations that can be applied to increase productivity and income while empowering the women, youth, and indigenous people in Basilan.

The actors typically found in a vegetable value chain include input suppliers, farmers, traders, retailers and the final consumers. These operators in the chain are linked by a series of relationships that take the product from producers to final consumers. The actors participate in the value chain from the field preparation to planting, harvesting until it reaches to the consumer. Understanding the vegetable value chain paves the way towards the determination of the potential and critical bottlenecks of specific nodes in the chains to identify strategies that will maximize the net benefits of all actors.

10.2 Characteristics of Vegetable Farmers in Basilan

In Basilan, there are more females (60%) involved in vegetable production than males (40%). This indicates that the women in the area are versatile and can perform work in the field traditionally carried out by men. Most of them are between 29-58 years old comprising 73.33% of the vegetable farmers in the area.

Majority (28 out of 30) are married comprising 93.33% of the vegetable farmer population with 2-4 members in the family having 2-3 schoolchildren. This implies that a married person finds that vegetable production is a viable livelihood to support his family than the unmarried or separated one. Farmers engaged in vegetable production are mostly Bisaya (50%) and Yakan (43.33%) affiliated to Roman Catholic and Islam religions. Majority have just reached elementary education (40%). Usually, it is the husband, wife, sons and sons-in-law are the ones working in the farm.

It is presented in Table 33 that there is a higher percentage of women (46.51%) involved in the vegetable crop production activities from land preparation to marketing. This data shows that women are supportive with higher enthusiasm for vegetable production. This initial interest and willingness can be levelled up by empowering the women. This is followed by the involvement of men (32.56%) and the youth (20.93) is least involved. In a marginal family, men engage also in other sources of income to sustain the family, leaving the rest of farm jobs to women to complement in providing the daily needs of the family.

The youth show less interest to pursue this labor-intensive livelihood, perhaps they cannot appreciate enough due to low motivation on the increasing demand for vegetables as a potential source of year-round income and livelihood.

Table 33. Involvement of males, females, and youth in the vegetable production activities in one cropping season for an average area of 0.54 ha in Basilan

ACTIVITIES	Male		Females		Youth		TOTAL	
	f	%	f	%	f	%	f	%
Land preparation	3	21.43	2	10	2	22.22	7	16.28
Sowing	2	14.29	3	15	1	11.11	6	13.95
Seedling	2	14.29	3	15	0	0.00	5	11.63
Transplanting	2	14.29	1	5	1	11.11	4	9.30
Maintenance	2	14.29	5	25	2	22.22	9	20.93
Harvesting	2	14.29	3	15	1	11.11	6	13.95
Marketing	1	7.14	3	15	1	22.22	6	13.95
TOTAL	14	100.00	20	100	9	100.00	43	100.00
%		32.56		46.51		20.93		100

10.3 Characteristics of Traders

There are five vegetable trader respondents in Basilan coming from barangay Sta. Clara (4) and Binuangan (1). Three of them (60%) are barangay traders and 1 (20%) each is a contract buyer and striker, respectively. Contract buyers make arrangements and agreements with the farmer to buy his produce. The striker has no pre arrangements with the farmer and just come to the farm to buy the vegetables. Both the contract buyer and striker handle the marketing of vegetables to the retailer. Most of the vegetable traders in Lamitan City are 48 years old married males and has either elementary or high school education. They belong to Bisaya, Zamboangueno, and Yakan ethnic groups affiliated to either Roman Catholic and Islam religion. Two of the five traders are members of either Sta. Clara Women's Association and Bohe Nange organization. They had been into vegetable trading for an average of 7.6 years.

Most of the traders (60%) grant cash advances to vegetable farmers for the production of the vegetables from land preparation to harvesting with the assurance that the farmers are to sell their vegetable produce to them at their buying price. This arrangement ensures the trader the supply of vegetables and maximized profit. The traders therefore got most of the income from vegetable production in Basilan, that is why no matter how productive is the vegetable farming in the area, the farmer producers remain poor and marginalized.

Table 34 shows that the vegetable trading activities in Basilan is mostly carried out by women (62.07%) while there is less involvement of males (37.93%). This data indicates the willingness and interest of women in Basilan to engage in vegetable trading.

Table 34. Trading activities of vegetables in Basilan

ACTIVITIES	Male		Female	
	f	%	f	%
1. Packing/Repacking of Fresh Vegetables at the Trader'	0	0	8	100
2. Selling of Vegetables	0	0	7	100
3. Hauling	3	100	0	0
4. Transporting of Products	5	62.50	3	37.50
5. Marketing/Bantay Tindahan	3	100	0	0
TOTAL	11	37.93	18	62.07

10.4 Value Chain Map of Vegetable Products

This section discusses the various industry operators and their contributions to the vegetable value chain in Basilan. The key players include the input suppliers of inputs to the farmers for the production and maintenance for vegetable production, traders/contract buyers, consolidator and retailers of vegetables in the market.

Vegetable farmers are primarily smallholders cultivating an average of 0.63 hectares for vegetable production. Most of them are members of cooperative. Inputs such as seeds, fertilizers and pesticides are mostly procured by the vegetable farmers from the input suppliers from the neighboring local stores and markets (57.14%). Sometimes, the farmers are also provided with inputs coming from Local Government Units (8.57%), Ministry of Agriculture, Fisheries Agrarian Reform (5.71%). Wee Safe (KCCDMFI), Department of Agriculture, Office of the Provincial Agriculturist also provided inputs (1% each). There are 5 local traders/contract buyers/strikers, 1 consolidator and several retailers market and street vendors).

Local traders facilitate the sale of vegetables within each barangay. Farmers usually sell their vegetables once in a week to the local traders or

directly to the LGU identified “tabuan”, an area which is located at the center of the city for the buying and selling of products. Vegetables are also sold by the farmers to street vendors and consumers for household use. Figure shows the value chain map of vegetables produced in Basilan.

The vegetable industry enablers in Basilan are the Office of the Provincial Agriculturist (OPAg), Ministry of Agriculture, Fisheries and Agrarian Reform, (MAFAR), Local Government Units (LGU), WEE SAFE-KCCDMFI and Basilan State College supporting the different chains from input supply to production, harvesting and marketing.

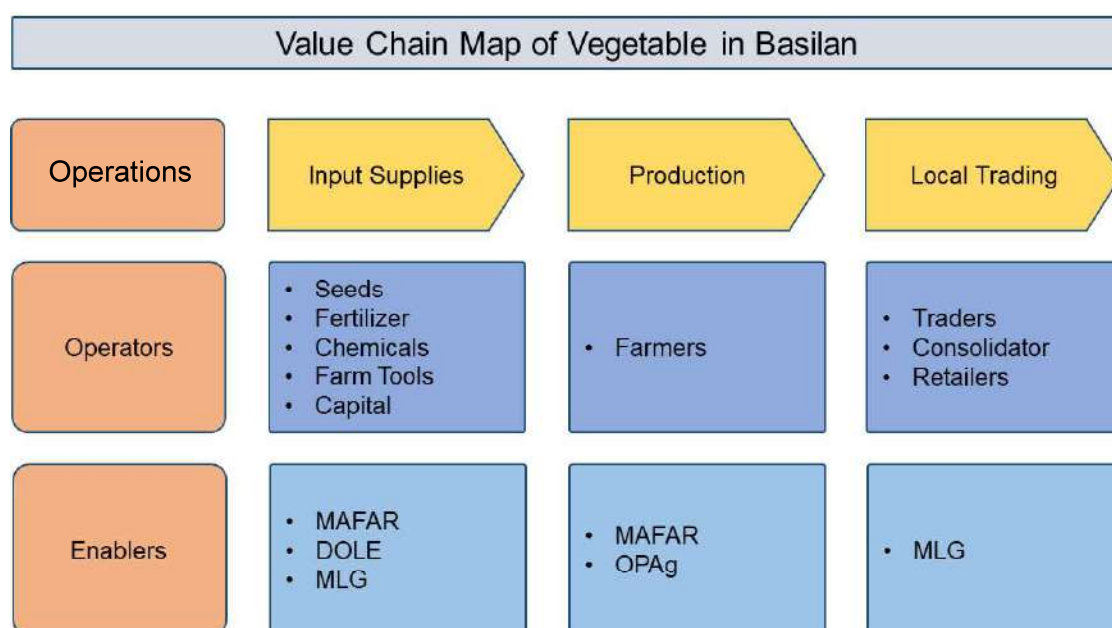


Figure 32. Value Chain Map of Vegetable in Basilan

In Lamitan City, the vegetable farms are located in 9 barangays. There are five local traders or contract buyers facilitating the selling of the vegetables to the retailers. The final consumers buy the vegetables from the retailers in the barangay.

Vegetable farmers usually sell their products once in a week in the “tabuan”. However, there are also some retailers and household consumers who come to the farm and buy some vegetables.



Figure 33. Supply Chain of Vegetables in Lamitan City

10.4.1 Value Chain Key Players and their Product Requirement

In Lamitan City, the vegetable farms located in the 7 barangays of Lamitan are maintained by individual small farm holders cultivating 0.1 ha – 0.25 ha (73.33%) for vegetable production while biggest area is 3.2 ha (10%).

The vegetable farmers sell their vegetables to local traders (contract traders, strikers) found in the barangay, or directly sell their products to the “tabuan”. They also sell to retailers and household consumers who come to the farm to buy vegetables.

The existing value chain operators with their roles and activities, and the product requirement in Lamitan City, Basilan Province (Tables 35-37) comprises the key players, ranging from vegetable farmers, local traders (contract traders, striker), retailers and consumers.

Table 35. Value Chain Operators and their product requirement in vegetable production in Basilan

Key Players	Customers	Volume Requirement	Grade/Quality Specification
	Vegetable Farmers	Not specified	Quality seedlings Appropriate fertilizers. pesticides
Vegetable farmers	Local and contract traders, consolidators, retailers, household consumers	Not specified	<ul style="list-style-type: none"> • Fresh • No damage
Local Traders	Contract traders, strikers, retailers	Not specified	<ul style="list-style-type: none"> • Fresh • No damage
Contract buyers	Strikers, retailers	Not specified	<ul style="list-style-type: none"> • Fresh • No damage

Retailers	Household consumers	Not specified	<ul style="list-style-type: none"> • Fresh • No damage
Consumers	Household members	As needed	<ul style="list-style-type: none"> • Fresh • No damage

10.4.2 Key Players and their Roles

The corresponding roles of key players in vegetable production is presented in Table 36. The input suppliers also act as traders who provides cash advances to the farmers with a verbal agreement that the farmer's vegetable harvest will be sold to him at his buying price which is usually ₱3-5 lower per kilo or per bundle than the market buying price. The ₱3-5 set by the input supplier serve as his margin for the advance payments made by the farmer. The farmer uses the cash advances from input suppliers to purchase some farm tools and for the family daily needs. Cultivation of the vegetables is usually carried out by the farmer and his family members including his wife. Harvesting, sorting, packing and marketing is done by the farmer's wife and family members.

The local traders especially the contract buyers monitor the harvest period to track down the vegetables harvested by the farmers and ensure that the farmer sell his produce to him to ensure the payment of the cash advances made by the farmer. When vegetable production fails due to unfavorable weather conditions and sometimes destroyed by stray animals, the farmer end up buried to debt to the input supplier. The traders forward the vegetables to the consolidator in Lamitan at the consolidator's buying price which is ₱5-10 higher than the buying price of the trader at the farmer's level. The traders also sell the vegetables to retailers. The consolidator sells the vegetables to the retailers. The retailers stationed at the wet market and alongside the streets buy vegetables from the retailers which are supplied to them mostly by their "suki". The retailed vegetables are repacked into smaller volumes and sold to the consumers.

The consumers are the households which buy the repacked vegetables sold by the retailers at the wet market and along the streets. Some consumers who are near the farm buy the vegetables directly from the farmer.

Table 36. Key Players and their Roles

Major Players	Roles
Input Suppliers	<ul style="list-style-type: none"> • Provide cash advances, farm input such as seeds, fertilizers, pesticides, farm tools
Vegetable Farmers <ul style="list-style-type: none"> • Cassava • Cucumber • Eggplant • String beans • Sweet potato 	<ul style="list-style-type: none"> • Source out input suppliers • Cultivate the area for vegetable production • Harvest and sort and pack • Sell the vegetables
Local Traders/ Contract Traders/ Strikers	<ul style="list-style-type: none"> • Buy the vegetables directly from the farmers • Supply vegetables to the consolidator
Retailers (market and street vendors)	<ul style="list-style-type: none"> • Buy the vegetables from the trader or direct from farmers • Repack and sell to the consumers
Consumers	<ul style="list-style-type: none"> • Buy packed/repacked vegetables from retailers or direct from the farmer

10.4.3 Activities/Processes and Costs

Vegetable production begins from land preparation which is done by the farmers themselves and some family members since the production area is small (0.01 ha - 0.40 ha) which is manageable by them to save labor cost and maximize income. Likewise, the maintenance, harvesting and marketing are performed by the family members and the wife. Vegetable production in Basilan mostly involve the family (Table 37).

Table 37. Activities involved in the production and marketing of vegetables and the cost per operation in Lamitan City

Activities	Performed by	Resources Needed	Average Costs per ha/ planting season	
			Labor	Inputs
1. Land preparation	Farmers including wives, children	Farm tools, carabao (if available)	9,144.00 30%	3,048.00 15%
2. Maintenance	Men, wives and children	Farm tools, fertilizer, pesticides, pail, sprinkler, sprayer, hose	12,192.00 40%	16,256.00 80%
3. Harvesting	Husbands, wives, children	Sythe, bolo, knives, baskets, scissors, plastic straw, baskets, bilao, sacks		
4. Cleaning, sorting of harvested vegetables	Wife and family members	Basket, basin, knives, scissors, sacks	1,524.00 5%	1,016.00 5%
5. Packing/tying	Farmer, wife and family members	Knives, scissors, basin, plastic straw, rubber bands, baskets, bilao, cellophane, sacks		
6. Hauling of vegetables from farm to barangay road	Farmer and family members	Habal habal, carabao/cow with sled	1,524.00 5%	-
7. Transportation from barangay road to "tabuan" area once a week, and to contract buyer, trader, retailers	Farmer, wife and family members	Habal habal, tricycle	3,048.00 10%	-
8. Marketing/selling	Farmers and Wives	Space in "tabuan"	3,048.00 10%	-
Sub total			30,480.00 (60%)	20,320 (40%)
TOTAL			50,800	

Source: Survey Report 2024

10.4.4 The flow of product, information and payment along the chain

The chain of vegetable production involves the flow of products, information, and payments among various stakeholders, from farmers to end-users. Vegetable production begins with land preparation followed by sowing of the seeds or planting of the seedlings, maintenance, and harvesting activities. The harvested vegetables are then sorted, tied and bundled. Some traders, contract buyers and strikers come to the farm while others wait at the roadside where the vegetables are hauled for transport to the buyer's destination or to the "tabuan" for marketing.

Figure 34 shows that the vegetable information flows from farmers to local traders to retailers then to consumers. The farmers inform the potential buyers such as the traders and retailers on the kind of vegetables that he will produce within the cropping season. Retailers promote the availability of vegetables in the market.

The vegetable products are bought by the local traders in bulk from the individual farms during the harvest season of every crop. The vegetables are then sold to retailers who sell the vegetables to the consumers. Farmers also directly sell his vegetables to the consumers in the "tabuan" and also to nearby household consumers.

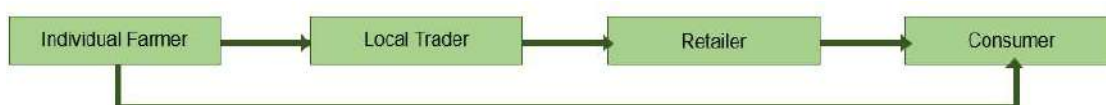


Figure 34. Information and product flow of vegetables in Basilan

Figure 35 shows that the price of vegetables in Basilan is dictated by the contract traders after cash advances are made by the farmer to finance the production. It is also the trader who will dictate the selling price per vegetable per unit to the retailers. The consumers buy the vegetables at the retailer's price.

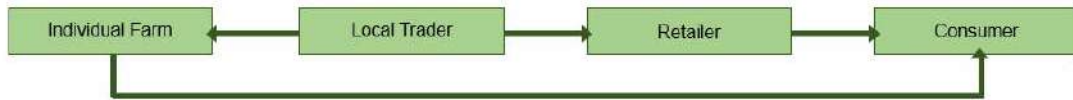


Figure 35. Price flow of the vegetables in Basilan

Figure 36 shows that local traders purchase the vegetables in bulk quantities from the farmers and distribute them to retailers. Retailers then sell the vegetables directly to consumers. The same figure also presents that consumers buy the vegetables from the retailers. The retailers buy their goods from the barangay traders. Barangay traders buy the vegetables in bulk from the farmers. However, the consumers and retailers also directly buy vegetables directly from the farmer. Cash sales flow along the chain from the consumers to the retailers. Cash payments then flow to the local traders. Then the local traders pay the farmers the unpaid balance from the cash advance made prior to vegetable production.

Throughout the chain, various stakeholders may also engage in contracts, negotiations, and financial transactions to facilitate the smooth flow of products and payments.

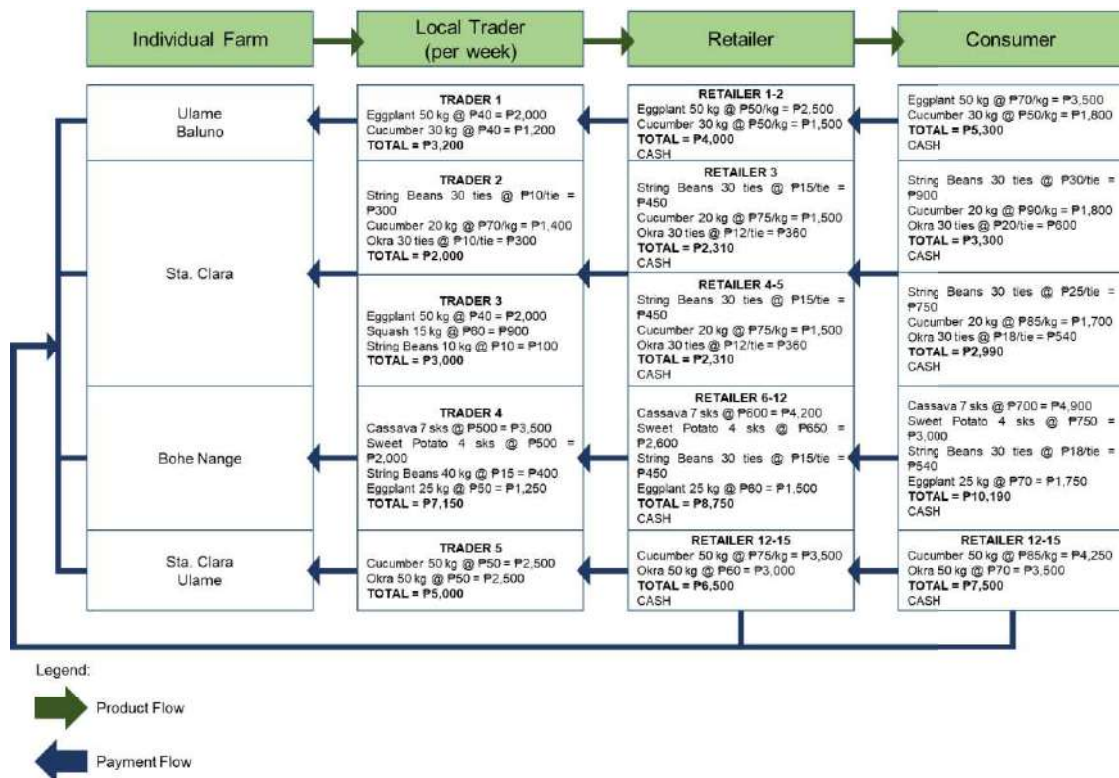


Figure 36. Product and payment flow of vegetables in Basilan

10.5 Cost and Return Analysis

10.5.1 Production Cost and Income of vegetable farmer

Vegetable farmers in Basilan are smallholders. Most of them are cultivating an area less than 1 hectare with mostly three cropping in a year. The vegetable cost and return is based on one cropping cycle per farm in an area between 5,000 square meters to 20,000 square meters.

Vegetable farmers are selling vegetables to traders once in a week. Harvesting is also done intermittently for some strikers and household consumers within the barangay. Farmers apply fertilizers and pesticides to the vegetables for good harvest. In spite of this the farmers experienced poor crop growth due to poor seed quality they bought from uncertified seeds sold in local stores. However, vegetables are the saver of their daily needs on the table. For marginalized farmers, cassava and camote is their source of carbohydrates for energy. Other vegetables are prepared as viand. Some vegetables like eggplant, string beans, ampalaya, okra, etc. continuously bear fruits continuously all year round. Farmers earn income from household consumers and some strikers who come intermittently to buy vegetables.

Costs of production encompass various expenses such as materials and supplies, transportation, labor costs for harvesting, sorting, hauling, transportation, space rentals, marketing and land revenue tax (considered as fixed cash cost). Activities involved in the production process include land preparation, sowing/planting, maintenance, harvesting, sorting, hauling, transportation, and marketing. To maximize income, vegetable farmers in Lamitan City utilize family labor for vegetable farming.

Cost and return analyses conducted per cropping is presented in Table 38. In Lamitan City, the estimated vegetable sales per cropping in a 5,000 square meters farm is ₱27,150.00. The vegetables planted include eggplant, string beans, patola and okra with an estimated net income of ₱5,650.00 and a return of investment (ROI) of 25.50%.

Table 38. Average Cost and Return of Vegetables per cropping /area cultivated (5,000m²)

Item	Value (P)
Income	
Eggplant 225 kg @ P50.00/kg)	11,250.00
String beans (180 kg @ P50.00/kg)	9,000.00
Patola (150 kg @ P30.00/kg)	4,500.00
Okra (96 kg @ P25.00/kg)	2,400.00
Cash Income	27,150.00
(a) Total Cash Income	27,150.00
Noncash Income	
Eggplant (5 kg @ P50.00/kg)	250.00
String beans (6 kg @ P50.00/kg)	300.00
Okra (4kg @ P25.00/kg)	100.00
Patola (3kg @ P30.00/kg)	90.00
(b) Total non-cash income	740.00
(c) Total Income (a) + (b)	P27,890.00
Cash Cost	
Seeds	1,200.00
Fertilizer	2,100.00
Chemicals	1,500.00
Variable Cash Costs	4,300.00
Transportation cost	1,000.00
(d) Total variable cost	10,100.00
Fixed Cash cost	
Land Tax	250.00
(e) Total Fixed Cash cost	250
(f) Total Cash Costs (d) + (e)	10,350.00
Non-Cash Cost	
Labor	10,800.00
Gifts	500.00
Token	500.00
(g) Total Variable Noncash Costs	11,800.00
Fixed Non-cash Costs	-
(h) Total Fixed Noncash Costs	-
(i) Total Noncash Costs (g) +(h)	11,800.00
(j) Total cost [(f) +(i)]	22,150.00
(k) Net Income [(c) - (j)]	5,650.00
(l) Net income/m² (k/area cultivated)	1.13
ROI (k/j*100)	25.50%

The cost and return analysis (CRA) for a vegetable farm with an area of 10,000 square meters planted with cassava, camote, eggplant, pechay and string beans is shown Table 39. The sales in one cropping is ₱45,100.00 generating a net income of ₱15,900.00 with a return on investment (ROI) of 48.18%.

Table 39. Average Cost and Return of Vegetables per cropping /area cultivated (10,000(m²))

Item	Value (₱)
Income	
Camote (5 sacks x 600/sack)	3,000.00
Cassava (50 ipit x 400/ipit)	20,000.00
Eggplant (320 ties X 30.00/tie)	9,600.00
Pechay (175 ties x 20.00/tie)	3,500.00
String beans (450 ties x 20.00/tie)	9,000.00
(a) Total Cash Income	45,100.00
Noncash Income	
Cassava (6 ipit x 400/ipit)	2,400.00
Eggplant (20 ties x 30.00/tie)	600.00
Pechay (20 tie x 20.00/tie)	400.00
String beans (20 ties x 20.00/tie)	400.00
(b) Total non-cash	3,800.00
(c) Total Income (a) + (b)	48,900.00
Cash Cost	
Chemicals	2,000.00
Fertilizer	5,000.00
Seeds	2,000.00
Variable Cash Costs	9,000.00
Transportation cost	2,500.00
(d) Total variable cost	11,500.00
Fixed Cash cost	
Land Tax	-
(e) Total Fixed Cash cost	-
(f) Total Cash Costs (d) + (e)	11,500.00
Non- Cash Cost	
Labor	20,000.00
Gifts	1,000.00
Token	500.00
(g) Total Variable Noncash Costs	21,500.00
Fixed Non-cash Costs	-
(h) Total Fixed Noncash Costs	-

(i) Total Noncash Costs (g) +(h)	21,500.00
(j) Total cost [(f) +(i)]	33,000.00
(k) Net Income [(c) - (j)]	15,900.00
(l) Net income per m ² (k/area (m ²))	1.59
ROI (k/j*100)	48.18%

The cost and return analysis (CRA) for a vegetable farm with an area of 20,000 m² planted with ampalaya, eggplant, patola, and string beans is presented in Table 40. A total sale of ₱71,200 was realized in one cropping season with a net income of ₱25,325 and return on investment of 53.32%.

Table 40. Average Cost and Return of Vegetables per cropping /area cultivated (20,000m²)

Item	Value (₱)
Income	
Cash Income	
Ampalaya (140kg@P80/kg)	11,200.00
Eggplant (800kg @ P45/kg)	36,000.00
Pechay (600 ties @ P10/tie)	6,000.00
String beans (480kg @ P25/kg)	18,000.00
(a) Total Cash Income	71,200.00
Noncash Income	
Ampalaya (10kg@P80/kg)	800.00
Eggplant (10kg @ P45/kg)	450.00
Pechay (30 ties @ P10/tie)	300.00
String beans (3kg @ P25/kg)	75.00
(b) Total Noncash Income	1,625.00
(c) Total Income (a) + (b)	72,825.00
Cost	
Cash Cost	
Chemicals	3,000.00
Fertilizer	10,000.00
Seeds	2,000.00
Materials/supplies	2,500.00
Variable Cash Costs	17,500.00
Labor Cost	20,000.00
Transportation Cost	5,000.00
Rentals	1,000.00
(d) Total Variable Cost	43,500.00
Fixed Cost	-

Land Tax	-
(e) Total Fixed Cash cost	-
	43,500 + 0 = 43,500.00
Noncash Costs	
Variable Noncash Costs	
Food expenses	2,000.00
Gifts, tokens	2,000.00
(g) Total Variable Noncash Costs	4,000.00
Fixed Noncash Costs	-
(h) Total Fixed Noncash Costs	-
Item	Value (₱)
(j) Total cost [(f) +(i)]	47,500.00
(k) Net Income [(c) - (j)]	25,325.00
(l) Net income/m² (k/area cultivated)	1.26
ROI (k/j*100)	53.32%

Vegetables are potential income earners for marginalized families in Basilan. Its ability to be raised as an intercrop will not only increase the income and profit of the farmers but also optimize land utilization, soil fertility, resource allocation and allows crop diversification. Vegetables are cash crops which can serve as viable source of livelihood among farmers.

Each farmer usually cultivates three to five different vegetables in his area. Land preparation is done before the rainy days. However, due to climate change, the farmers find it difficult to anticipate the dry and wet season due to unpredictable weather conditions. Water supply becomes a necessity to ensure higher harvest. Fertilization and pesticide application is also practiced by the farmers; however, the appropriate fertilizer application rate is not optimized because they do not practice soil analysis before the purchase and application. Farmers also practice calendared pesticide application to protect the vegetables from insect pests and diseases without proper basis as to what symptoms are observed, what pesticide to use and how much is needed in the area planted and the appropriate time to spray. This result to ineffective plant protection which do not optimize the pesticide input. Vegetables are still experiencing pest damage despite pesticide applications.

10.6 Participatory Systems Analysis (PSA)

The PSA exercises were carried out during the FGDs where participants were inquired exhaustively about the factors that contribute to the success of the rubber industry in Basilan. The participants that include rubber farmers, cooperative board of directors, managers, and traders identified as many factors that were eventually combine into eight factors. The factors were then arranged in a matrix (Table 41) and the degree by which a factor influences another factor was analyzed. Below are the factors of success in rubber industry identified by the participants:

Code	Factors
K&S	Knowledge & skills in vegetable farming
IS	Input subsidy in vegetable
CF	Credit Facility
TA	Technical Assistance in farming and marketing
MI	Market Information including pricing
IF	Infrastructure facility support
PHF	Post-harvest Facility
P	Policy in support to the vegetable industry

Following the procedures of Herweg and Steiner (2002) the ratings used were as follows:

a.	Strong influence	=	2.0
b.	Moderate influence	=	1.0
c.	Weak influence	=	0.5
d.	Very weak influence	=	0.1

The analysis presented in Figure 37 shows that Input Support (Inp S), technical assistance (TA), and market information (MI) are the necessary factors to improve and develop the vegetable industry in Basilan. Input support such as quality seedlings and fertilizers are necessary resources for a good foundation of the vegetable production activities. Of course, it has to be coupled with technical assistance to ensure a pretty harvest. Market information is essential so that the vegetable products will not experience underpricing by the traders. This will aid the farmers to optimize profit from optimized production, increasing farmer's income.

Post harvest facility (PHF), infrastructure support (IS), and policy (Pol) are essential support system to the vegetable industry. Since vegetables are perishable, these elements are necessary to minimize losses due to damage. If vegetable production in Basilan will be boosted, post-harvest facility is essential to optimize the life span of the produce and reduce the fear of farmers to waste their time and efforts. Likewise, infrastructure support will minimize damage due to movement of the vegetable products from one point to another. Vegetable production will be safe and secure if it is covered with policies in place.

Vegetables are annual crops where production activities are repeated in 2-3 croppings or cycles per year. A greenhorn vegetable farmer will be able to appreciate vegetable farming and realize its profitability for a better livelihood. Younger vegetable farmers such as the youth group of Basilan have expressed interest in vegetable raising and willingness to learn from actual experience and develop skills which can also be shared to other vegetable farmers to further the vegetable horizon. Women such as the wives and other family members also shows the same outlook for vegetable production since the production in Basilan is insufficient to supply the vegetable demand in the area. Vegetables available in the markets of Basilan are sourced out from Zamboanga City which entails additional cost for transport and handling which is then passed on to the consumers resulting to higher prices of vegetables available for consumers.

Vegetables are cash crops where the farmers can earn income continuously within the growing season for the daily needs of the family, hence, credit facility will be very useful for a vegetable farmer especially the marginalized groups so that they will not be tied to private lending institutions and contract traders who leave them without any choice for the price of their product.

Table 41. Relationships between different factors affecting the Vegetable Industry in Basilan

	ELEMENTS	1	2	3	4	5	6	7	8	Active Sum (AS)	Degree of Interaction (ASxPS)
		K&S	IS	CF	TA	MI	IF	PHF	Policy		
1	K&S		0.5	0.1	2.0	0.5	0.5	0.5	0.5	4.60	39.10
2	Inp S	2.0		1.0	0.5	0.5	1.0	1.0	1.0	7.00	39.20
3	CF	1.0	0.5		0.5	0.1	0.5	0.5	1.0	4.10	31.16
4	TA	1.0	1.0	1.0		0.1	1.0	1.0	1.0	6.10	37.21
5	MI	2.0	0.1	0.5	0.1		0.1	0.1	0.5	3.40	8.16
6	IS	1.0	1.0	2.0	1.0	0.1		2.0	1.0	8.10	49.41
7	PH F	1.0	0.5	1.0	1.0	0.1	2.0		1.0	6.60	40.26
8	Policy	0.5	2.0	2.0	1.0	1.0	1.0	1.0		8.50	51.00
	Passive Sum (PS)	8.5	5.6	7.6	6.1	2.4	6.1	6.1	6.0		
	Activity Ratio AS/PS	0.54	1.25	0.54	1.00	1.42	1.33	1.00	1.42		
	Rating System: Strong influence= 2.0, Moderate influence=1.0, Weak influence=0.5, Very weak influence= 0.1										

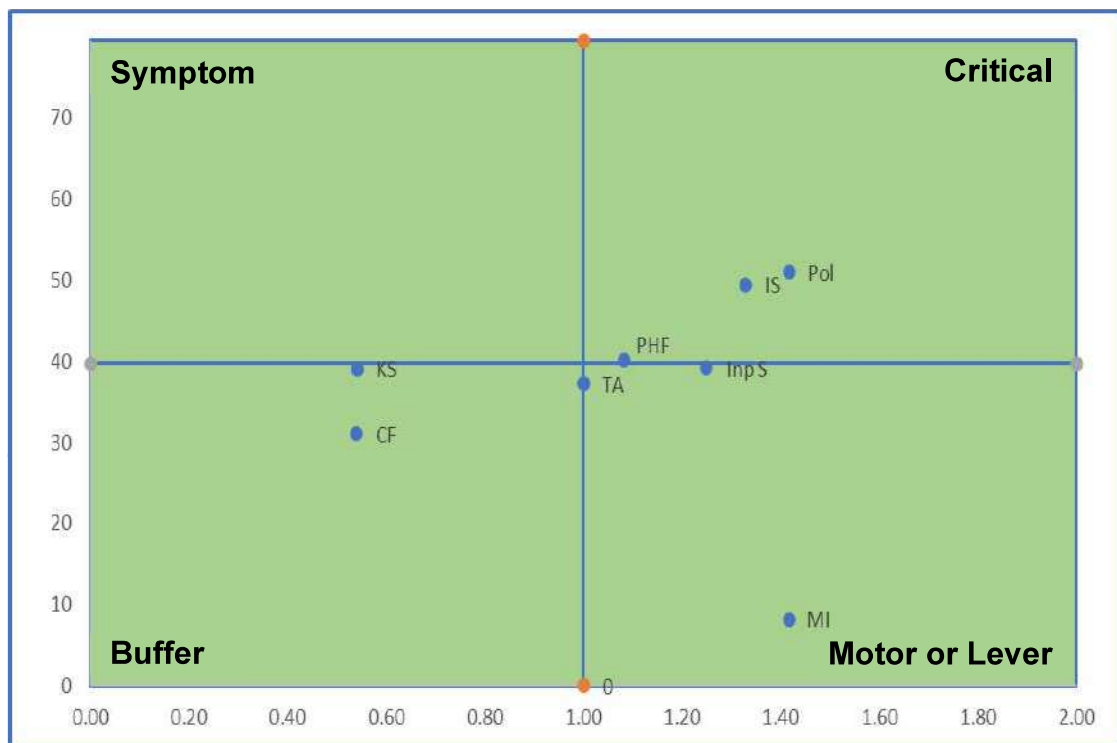


Figure 37. PSA Motor Quadrant for Vegetable

10.7 Opportunities and Constraints

Constraints are elements that hinder the progress and competitiveness of the vegetable industry. Conversely, opportunities serve as enablers that can enhance its growth. Despite the challenges encountered by the upstream sector in recent times, there exists the potential for expanding business operations. In fact, some constraints can even be transformed into business opportunities for MSMEs (Micro, Small, and Medium Enterprises) in vegetable producing areas.

The evaluation of constraints and opportunities commences with a thorough analysis carried out through survey interviews with stakeholders at different levels, such as farmers, traders of vegetables. These results were subsequently validated and enhanced via Focus Group Discussions and Key Informant Interviews, involving primary stakeholders involved in the vegetable production in Basilan.

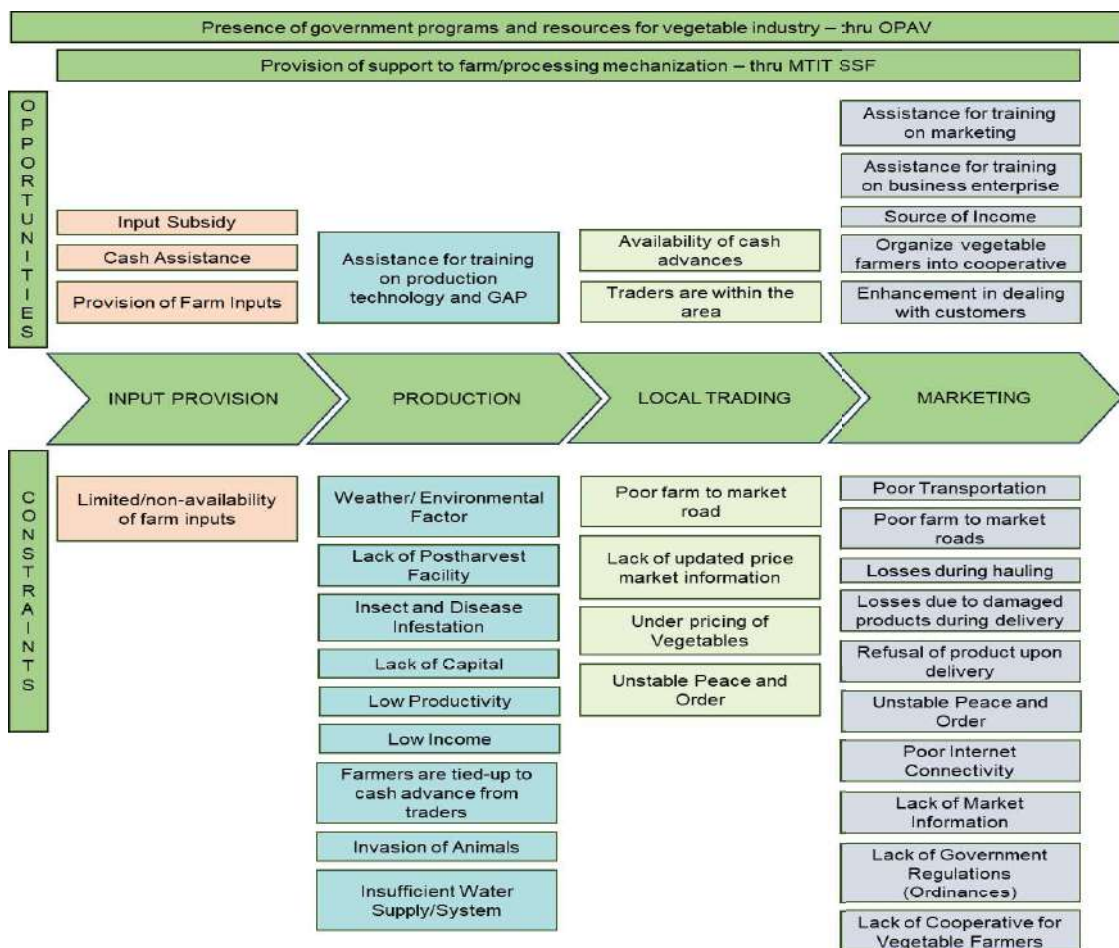


Figure 38. Opportunities and constraints in vegetable industry

Input Provision

Opportunities:

- **Input subsidy:** The LGU, MAFAR and OPAG of Basilan provide some support for inputs. This reduces farmer's financial burden for the purchase of seeds, fertilizers and pesticides.
- **Cash assistance:** LGU and MAFAR provide cash assistance to farmers. Land bank is offering agricultural loans for farmers. This will aid farmers financial needs for vegetable production
- **Provision of farm inputs:** The LGU, MAFAR and OPAG of Basilan also provide free farm tools and equipment which farmers can avail.

Constraints:

- **Limited access to farm inputs:** This includes high costs of fertilizers, pesticides, and quality seed source which added financial burden to farmers.

Production

Opportunities:

- **Assistance for training on production technology and GAP:** The LGU, MAFAR and OPAG of Basilan provide free training on GAP. However, after the training, there was no follow ups and/or impact assessment. Apparently, the percentage success in terms of the level of capacity and skill for vegetable production on the ground is not known.
- **The unmet supply of vegetables:** This is an opportunity for income and livelihood among women, youth and indigenous people of Basilan. There has been a greater demand of vegetables in Basilan since the volume of production is insufficient for satisfy the needs of the island province, thus resorting to outsourcing of vegetables outside Basilan like Zamboanga City.

- **Empower women, youth and indigenous people (Yakans) for vegetable production:** Women in Basilan has been the men's counterpart for livelihood. Empowering them for vegetable production will improve their production practices resulting to increased profitability and income.

Constraints:

- **Weather/environmental factor:** This factor is beyond control. Climate change has significantly impacted vegetable production when extreme dry and rainy days unpredictably occur. During prolonged dry periods, the vegetables need to be irrigated. This adds to cost of labor for vegetable production. When water supply is not enough, the growth and development of vegetables suffer resulting to decrease in yields. On the other hand, during the rainy days, the vegetables are vulnerable to attack of diseases like root rot causing high mortality of the plants. Vegetable production is always associated with insect and disease infestation with higher infestation without pesticide application resulting to decreased volume of marketable produce and low market price for slightly damaged vegetables. Since blemish-free vegetables command higher market price, most of the farmers cannot optimize their income from vegetable production.
- **Lack of post-harvest facilities:** The FGD reveals that there is no Storage Facility for their vegetable harvest especially the perishables. There is no way for them to extend the shelf life of the vegetables after they are brought to the market. Farmers has no choice but sell their harvest within a day or two even at low price because there is no storage facility that can minimize spoilage.
- **Lack of capital:** This causes the farmer to resort to contract traders which allow them to avail capital for vegetable production with the condition that the payment will be in the form of harvested vegetables at the trader's price which is lower than the prevailing market price in the area.

- **Low productivity:** Inadequate crop management practices due to lack of training in vegetable production and access to new technologies. Vegetable production is associated with pest (insects and diseases) infestations resulting to reduced (unspecified quantity) marketable harvest. Insecticide application is not often due to financial constraints. Farmers cannot always afford to buy pesticides to prevent pest attack. On the other hand, fertilizer application for vegetables is necessary to maximize productivity, however, most of the farmers depend on the availability of fertilizer assistance from the LGU. Majority of the vegetable farmers cannot afford to buy fertilizers.
- **Low income:** This is the result of poor yields due to poor vegetable production technologies, underpriced harvest, low price due to poor quality of the vegetables, postharvest losses (no data on quantity) due to damage during hauling, transportation, and due to perishability. Losses are also incurred due to damage during delivery is caused by harvest packaging and transportation. The harvested vegetables are just placed in sacks and large baskets and loaded to “habal-habal” (an improvised single motorcycle with extensions) for transport to the market. Farm to market roads is very poor, making the transport difficult. Since loading of the vegetables is maximized per transport, some fruit vegetables like eggplant, cucumber, string beans are cracked or broken while leafy vegetables got pressed and torn upon reaching the market and are thrown away as garbage and the slightly damaged ones are sold at very low price.
- **Farmers are tied up to cash advances from traders:** Farmers cannot demand the prevailing market price of his harvested vegetables. It is the trader who will dictate the price per unit as payment of the amount the farmer has advanced from the trader.
- **Invasion of animals:** Vegetable production areas are also attacked by astray animals usually causing significant damage.
- **Insufficient water supply/system:** This is essential for vegetable production. However, there is no ample water supply and lack of water system to support the production of vegetables in the area.

Local Trading

Opportunities:

- **Availability of cash advances:** Vegetable farmers can avail cash advances from local traders to be paid in the form of vegetable harvest which ensures the market of his produce.
- **Traders are within the area:** This provides easy access to local traders which saves time and minimizes transportation cost.
- **Empowering the women, youth and indigenous people:** This will enable members of the community to become productive in the area of vegetable production.

Constraints:

- **Poor farm to market road:** This contributes significantly to losses. Vegetables are likely to get damaged during movement from the farm to the highway since the road is narrow and rugged.
- **Lack of updated price market information:** Farmers has no reference for the current market price of the vegetables and hence, prices are variable and subject to bargaining negotiations between the farmer and the buyer.
- **The vegetables produced in Basilan are sold by the farmers at low price** due to lack of updated market information and yet buyers still bargain for a much lower price.
- **Underpricing of vegetables:** The price per unit of the vegetables sold by the farmers to contract traders is dictated by the trader, therefore, the price is lower than the prevailing market price in Basilan.
- **Unstable peace and order:** Peace and order especially in remote areas of Basilan is unpredictable especially when security measures in the area is no longer strict and tight. It is not advisable to be complacent.

Marketing

Opportunities:

- **Assistance for training on marketing and business enterprise:** DTI provides free training to develop farmer's skills on marketing skills and entrepreneurial abilities which can help in the strategic marketing engagements of vegetables.
- **Source of income:** The demand for vegetable is higher than the vegetables produced in Basilan which indicates that vegetable production is a viable source of income. Vegetables are cash crops and can be grown the whole year round. This provides livelihood among marginalized women, youth and the indigenous people of Basilan to support the daily needs of the family.
- **Organize vegetable farmers into cooperative:** Cooperative for vegetable farmers will enhance empowerment among them making them motivated to pursue vegetable farming as an enterprise.
- **Enhancement in dealing with customer:** As a seller of vegetable products, it is inherent to improve an understanding of the customer to be able to effectively sell his products.

Constraints:

- **Poor transportation:** The transport of vegetables from the farm to the market is by "habalhabal" or tricycle which the products are not properly loaded causing damages on the vegetables. This will reduce the market price and sometimes unsalable vegetables.
- **Poor farm to market roads:** This contributes significantly to losses. Vegetables are likely to get damaged during movement from the farm to the highway since the road is narrow and rugged.
- **Losses during hauling:** Vegetables are inevitably damaged during manual hauling.
- **Losses due to damaged products during delivery:** Damage on vegetables are also incurred during delivery to traders and retailers due to improper packing and handling.

- **Refusal of products upon delivery:** Customers refuse to accept the vegetables upon delivery. This incurs additional expenses on hauling and transportation cost and damages on the products during transportation and handling.
- **Unstable peace and order:** Occurrence of chaos is unpredictable which causes reluctance among investors, businessmen and entrepreneurs to engage into business in Basilan.
- **Poor internet connectivity:** Communication is vital any enterprise. Poor internet connectivity hinders timely flow of information among the key players in vegetable production.
- **Lack of market information:** This will result to variable market price of the vegetables which are often below the prevailing market price.
- **Lack or government regulations (ordinances):** Market price is very variable and underpriced with the middlemen getting most of the profits leaving the producers with marginal share of the profit.
- **Lack of cooperative for vegetable farmers:** Vegetable farmers are not organized into a cooperative, hence, have no collective bargaining power.

11.0 STRATEGIC INTERVENTIONS

Vegetable production in Basilan Province needs specific strategic intervention to improve the quantity and quality of the produce. Vegetables produced in Basilan is not sufficient to supply the needs of the island province. Most of the vegetables supplied in the markets of Basilan are procured from Zamboanga City. Of the thirty respondents in the survey having a total farm area of 61.22 ha, only 18.26 ha (29.82%) is cultivated for vegetable production.

Based on the result of the performance system analysis (PSA) and the identified opportunities and constraints, specific interventions can be addressed as follows:

Input Supply Scheme

- Creation of vegetable cooperative which will cater for input supply and marketing of the vegetable produce.
- Partnership among vegetable farmers, public and non-government institutions to promote collective bargaining power for input support from land preparation to marketing among vegetable stakeholders in favor of vegetable production system.
- Continue with the LGU initiatives of providing quality seeds, fertilizers, and pesticides.

Production Scheme

Most of the vegetable production areas in Basilan are patches of small pieces of land of less than 1,000 square meters each cultivated by marginalized individual small farmers. Improvement of the vegetable production system includes the following interventions:

- Encourage expansion of areas for vegetable production for sufficient and sustainable vegetable supply in Basilan
- It is highly recommended that the commonly outsourced vegetables be cultivated in Basilan such as carrots, cabbage, lettuce, tomatoes, bulb onion, garlic.
- Provision of training for optimum harvest, to wit:
 - a) appropriate fertilizer application using soil test result as basis
 - b) pest management to optimize pesticide applications and the preparation and use of organic pesticides
- Establish model vegetable farms for the top 5 vegetables produced in the Philippines
- Adoption of new and innovative technologies and Good Agricultural Practices (GAP) intended to improve productivity and quality of vegetables
- Encourage diversified farming and the cultivation of vegetables as intercrop to increase family income and livelihood among smallholders

- Adoption of new farming system to increase farm productivity and income of farmers
- Synchronize planting to ensure continuous vegetable harvest throughout the year
- Provision of water systems to sustain the production cycles
- Access to financial support and institutions

Harvest and Post Harvest Scheme

- Provide training for harvest and post-harvest guide
- Provide storage facility

Marketing Scheme

The local government unit (LGU) of Basilan provided an area called “TABUAN” for the selling and marketing of farm produce situated at the center of the city. It serves as the venue for the selling and buying by traders, retailers and household consumers. Freshly harvested vegetables are brought by the farmers at the “tabuan” scheduled once in a week which caters to the harvest time of the vegetable farmers. Vegetables are sold in the “tabuan” by kilograms and others by ties or bundles while cassava and camote are also sold by cans or sacks.

However, most of the farmers enter into contract selling to traders who grants them capital to shoulder the production expenses. The farmer is then tied to the contract trader who oftentimes dictate the selling price per unit of the produce which is lower than the selling price when sold at the “tabuan”, leaving the no choice. This practice reduces the income of the farmers. The small hold vegetable farmers claim that the income they got from contract traders are just more or less enough to cover their labor. At least, it serves them a livelihood to sustain the family needs. Therefore, most of the profit goes to the middlemen like the traders and retailers. Hence, marketing interventions are necessary to improve the income of the vegetable farmers, such as:

- Regulation of the selling price of each vegetable sold to traders and retailers and in “tabuan”

- Monitoring system for the price of each vegetable/unit through intensive support of the MTIT
- Promote local market price information to stakeholders especially the vegetable farmers with the assistance of the local Philippine Information Agency (PIA)
- Creation and consistent implementation of local ordinance for legal sanctions against violators
- Provide training on marketing
- Promotion of market products

Processing Scheme

- Market excess and damaged vegetables can be processed into a product as:
 - a) Preserved vegetables (dried, powdered, canned)
 - b) Liquid organic fertilizer
 - c) Compost
- Provide training for vegetable processing
- Establish processing center and packing for processed vegetables

12.0 SUMMARY OF FINDINGS

- China is the leading vegetable producer in the world contributing 52.18% of the world's vegetable production while Philippines occupies 22th in the rank in 2021. However, in terms of area planted with vegetables, the Philippines got the 6th rank.
- Northern Mindanao leads the vegetable production of 195.25 thousand metric tons of cassava followed by Central Luzon contributing 121.12 thousand metric tons of onion and ampalaya fruit.
- In Zamboanga Peninsula and Basilan, cassava is also the top vegetable produced followed by sweet potato/camote with a

production volume of 156,117.30 metric tons (64.91%) and 518,575 metric tons (93.37%) of the vegetables produced, respectively.

- Other vegetables are planted in small patches of land in Basilan which is insufficient to supply the needs of the island province, hence, the vegetables are sourced out from Zamboanga City.
- The vegetables such as cassava, cucumber, eggplant, string beans, sweet potato produced in Basilan is insufficient to meet the demand in the island province. Hence, the vegetables supplied in the markets of Basilan are procured from Zamboanga City.
- The value chain map of vegetables in Basilan includes input supplies from local stores and markets suppliers with uncertain quality.
- Production is carried out by the farmers and trading is facilitated by traders and retailers.
- The vegetable farmers in Basilan are smallholder land owners and tenants cultivating an average of 0.54 hectares where most of them are cultivating less than 0.1 ha for vegetable production. Vegetables such as are cultivated in three cropping cycles in a year with a weekly harvest in every cropping. A vegetable farmer cultivating 5000 square meters, 10,000 square meters and 20,000 square meters earns ₱5,650.00 with ROI of 25.5%, ₱15,900.00 with ROI of 48.18%, and ₱23,325.00 with ROI of 53.32%, respectively, in one cropping cycle.
- Input Support (Inp S), technical assistance (TA), and market information (MI) are primary elements to be taken into consideration in vegetable farming.

- The perishability of vegetables requires substantial postharvest facility, infrastructure support to minimize losses and policy to secure the investments in vegetable production.
- The unmet demands for vegetables in Basilan present a vast opportunity for livelihood among members of the family such as the women, youth and among indigenous members of the community like the Yakans. The support from government, non-government, and private institutions can be maximized with proper training to increase the quantity and improve the quality of vegetables in Basilan. Most of the constraints are related to production, trading and marketing where the variability of price per unit of the produce benefited the middleman (traders and retailers) most. Aside from this, addressing the constraints will allow Basilan to overcome the dependence of vegetable supply outside of the Basilan like Zamboanga City. Hence, profitability and income of the marginalized farmers will be increased towards sufficiency and sustainability while empowering the women, youth and the indigenous people in the island province.
- Organizing farmers into cooperative, creation of local ordinances, peace and order, weather/environmental conditions, and market information's are the external factors that are also necessary for the success vegetable production.

13.0 RECOMMENDATIONS

To improve vegetable production in Basilan especially among marginal farmers, it is highly recommended that the family members such as wives of farmers and extended women family members, children and youth be encouraged to engage in vegetable farming. It is further recommended that they will be given training on vegetable production to empower them for immediate productive livelihood for additional income and eventually increase vegetable supply in Basilan. A local vegetable production program may be launched to motivate members of the community like the indigenous peoples such as Yakans of Basilan to engage in vegetable production.

Input Supply Scheme

- Provision of farm tools, equipment, seeds, fertilizer and pesticides
- Consistent monitoring scheme to ensure that the inputs provided are given to the actual qualified and trained vegetable farmers and are utilized for vegetable production

Production Scheme

- Increase vegetable production areas
- Establishment of model farms for vegetable production especially for outsourced vegetables such as carrots, cabbage, lettuce, tomatoes, bulb onion, garlic.
- Subject vegetable production areas to soil testing to optimize fertilizer application
- Provide pest management training to optimize pesticide applications and the preparation and use of organic pesticides
- Advocate new and innovative technologies and Good Agricultural Practices (GAP) to improve productivity and quality of vegetables
- Encourage diversified farming and the cultivation of vegetables as intercrop
- Provision of water systems to sustain the production cycles
- Incentivize vegetable production (quota based on inputs availed)

Harvest and Post Harvest Scheme

- Provide storage facility
- Minimize losses by providing training for proper harvesting, handling, transport and packaging of vegetables

Marketing Scheme

- The local government unit (LGU) of Basilan and MTIT should regulate the farmgate and market price of vegetables sold by the farmers.
- Provision of training on marketing and promotion of market products

Processing Scheme

- Provision of training to qualified women, youth and indigenous people for vegetable processing
- Establishment of processing center and packing/packaging of processed vegetables

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RESULTS AND DISCUSSION

Fish/Cephalopods

15.1 Global Context: Philippine Fisheries

In 2022, the Philippines ranked 11th among the top fish-producing nations globally, with a total production of 4.11 million metric tons (MT) of fish, crustaceans, mollusks, and aquatic plants, including seaweeds. This accounted for 1.88% of the global production of 218.36 million MT. Specifically, in aquaculture production (excluding aquatic plants), the Philippines also ranked 11th, contributing 928,820.99 MT or 1.02% of the worldwide aquaculture output of 90.86 million MT, valued at 2.05 billion. Moreover, the Philippines was the 4th largest producer of aquatic plants, including seaweeds, with a total production of 1.34 million MT, representing 3.82% of the global production of 36.31 million MT (FAO, 2022).

Table 42. Production Volume of Fish, Crustaceans, Molluscs, and Aquatic Plants in Major Producing Countries by Sub-sector, 2021

Major Countries	Total		Fish, Crustaceans, Molluscs, etc.			Aquatic Plants (includes seaweeds)		
	MT	% Share	Capture	Aquaculture	Total	Capture	Aquaculture	Total
China	85,947,656.91	39.36	12,938,457.00	51,220,644.91	64,159,101.91	204,380.00	21,584,175.00	21,788,555.00
Indonesia	21,812,384.15	9.99	7,149,512.34	5,515,207.92	12,664,720.26	56,356.85	9,091,307.04	9,147,663.89
India	14,433,205.00	6.61	4,991,560.00	9,403,000.00	14,394,560.00	33,345.00	5,300.00	38,645.00
Vietnam	8,289,523.98	3.80	3,540,250.15	4,736,119.66	8,276,369.81		13,154.17	13,154.17
Peru	6,726,988.67	3.08	6,526,680.49	150,817.60	6,677,498.09	49,490.59		49,490.59
Russia	5,487,045.00	2.51	5,160,239.00	295,479.00	5,455,718.00	7,464.00	23,863.00	31,327.00
USA	4,730,895.61	2.17	4,275,417.00	448,234.61	4,723,651.61	6,864.00	380.00	7,244.00
Bangladesh	4,621,228.00	2.12	1,982,483.00	2,638,745.00	4,621,228.00			
Norway	4,220,624.46	1.93	2,395,709.24	1,664,865.58	4,060,574.82	159,803.17	246.46	160,049.63
Japan	4,114,556.93	1.88	3,088,989.93	621,567.00	3,710,556.93	61,900.00	342,100.00	404,000.00
Philippines	4,112,128.81	1.88	1,839,224.34	928,820.99	2,768,045.33	376.93	1,343,706.55	1,344,083.48
Chile	3,833,592.38	1.76	1,995,212.38	1,426,516.00	3,421,728.38	394,860.00	17,004.00	411,864.00
South Korea	3,742,566.29	1.71	1,307,454.36	581,995.00	1,889,449.36	7,435.00	1,845,681.93	1,853,116.93
Myanmar	2,594,956.87	1.19	1,665,740.00	929,216.87	2,594,956.87			
Others	43,697,076.79	20.01	32,333,760.18	10,300,585.70	42,634,345.96	158,058.51	904,672.31	1,062,730.82
WORD TOTAL	218,364,430	100.00	91,190,689	90,861,816	182,052,505	1,140,334	35,171,590	36,311,925

Data Source: FAO retrieved July 10, 2023

15.2 The Philippine Fisheries Sector

The fisheries sector of the Philippines is categorized into commercial fisheries, municipal fisheries, and aquaculture. Commercial fisheries refer to capture fishing operations using fishery vessels of over 3 GT outside the municipal waters (beyond 15 km from the shoreline) and are classified into: a) small scale using passive or active gear and utilizing fishing vessels of 3.1–20 GT; b) medium scale utilizing active gears and vessels of 20.1–150 GT; and c) large scale utilizing active gears and vessels of more than 150 GT. Municipal fisheries refer to capture fishing operations using fishery vessels of 3 GT or less

including other forms of fishing not involving the use of watercraft. Aquaculture involves fish culture activities in inland and marine waters.

15.2.1 Fisheries Export and Import Performance in 2022

According to the 2022 Philippine Fisheries Profile, the fishery industry's foreign trade resulted in a net surplus of USD 292.25 million, with total exports valued at USD 1.21 billion and total imports at USD 920.46 million. This surplus was USD 98.59 million lower than in 2021.

Table 43. Balance of Trade in Fisheries, 2021-2022

Trade	2021			2022		
	Volume (MT)	Value		Volume (MT)	Value	
		('000 PhP)	('000 USD)		('000 PhP)	('000 USD)
Fishery Exports	258,374	56,204,801	1,137,289	282,674	66,065,802	1,212,711
Fishery Imports	533,235	36,889,533	746,449	561,158	50,144,743	920,462
Balance of Trade		19,315,268	390,840		15,921,059	292,249

Data Source: PSA retrieved July 21, 2023
2021 Exchange rate: USD 1 = PhP 49.92
2022 Exchange rate: USD 1 = PhP 54.48

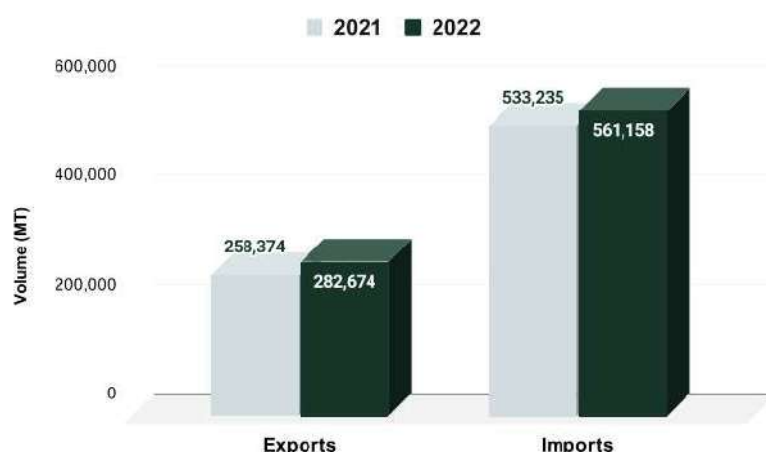


Figure 39. Fisheries Import and Export Volume, 2021-2022

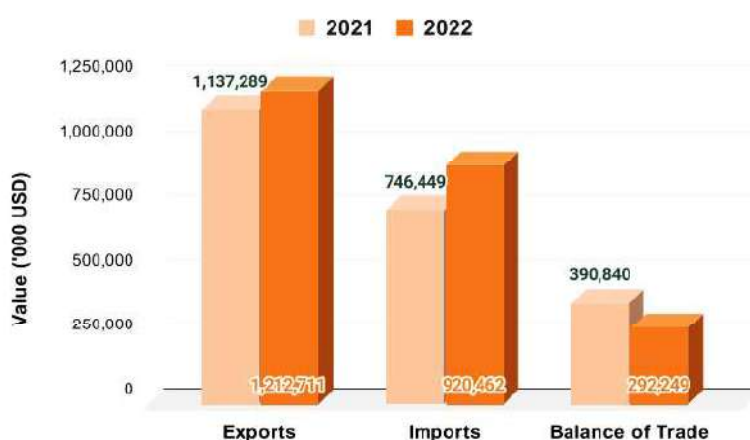


Figure 40. Fisheries Import and Export Value, 2021-2022

The fisheries sector saw a 9.41% increase in export volume in 2022, reaching 282,674 MT worth ₱66.07 billion. The top three export commodities—tuna, seaweed, and crab—accounted for 58.36% of the total export volume and 69.61% of the total export value. Tuna, the leading export, included 106,923 MT of various tuna products valued at USD 403.51 million, up 16.53% from the previous year, making up 86.46% of the total tuna exports. Seaweed was the second most exported product, with 48,491 MT contributing 28.80% of the total export earnings, with major markets in the USA, Netherlands, Spain, Germany, and China. Crab ranked third, with 9,156 MT valued at USD 91,440; fresh and frozen crab products had the highest volume share at 65.22%, while prepared/preserved crab products brought in USD 65.37 million or 71.50% of the total export earnings, with major markets in Hong Kong, China, the USA, and Taiwan. Other significant exports, including eel, octopus, grouper, milkfish, shrimps/prawns, cuttlefish, and sardines, together made up 19.18% or USD 232.61 million of the total export revenue.

On the import side, Philippine fishery imports totaled 561,158 MT in 2022, valued at ₱50.14 billion. The bulk of imports consisted of fish, crustaceans, mollusks, and other processed or preserved fish products, amounting to ₱43.78 billion or 87.32% of the total import value. Miscellaneous fishery products and by-products were the second largest category, with 62,690 MT worth ₱6.31 billion, while shell imports were minimal, with 381 MT valued at PHP 45.21 million. The top source countries were China, providing 219,477 MT valued at ₱18.73 billion (39.11% of the total import volume), Vietnam, with 77,354 MT worth ₱7.28 billion, and Papua New Guinea, exporting 68,893 MT valued at ₱6.38 billion.

15.2.2 Contribution to National Economy, 2022

In 2022, the Agriculture, Forestry, and Fishing (AFF) sector generated a Gross Value Added (GVA) of ₱2.10 trillion. Within this, the fishing and aquaculture industry contributed ₱269.64 billion, representing 12.82% of the total, trailing behind agricultural crops at 46.41% and livestock at 14.25%. Moreover, the Philippines achieved a trade surplus in fisheries, with a positive trade balance of USD 292.25 million, or ₱15.92 billion.

15.2.3 Sub-sectoral Fisheries Production Volume and Value

Table 44. Fisheries Production by Sub-sector, 2022

Sub-sector	Volume (MT)	% Share to Total	Value at Current Prices ('000 PhP)	% Share to Total
Aquaculture	2,349,252.01	54.15	124,002,547.45	37.97
Capture	1,988,946.58	45.85	202,564,986.40	62.03
Commercial Fisheries	862,686.33	19.89	74,931,961.99	22.95
Municipal Fisheries	1,126,260.25	25.96	127,633,024.41	39.08
TOTAL FISHERIES	4,338,198.59	100.00	326,567,533.85	100.00

Data Source: PSA retrieved July 21, 2023

In 2022, the fisheries sector achieved a total production volume of 4.34 million metric tons (MT) valued at ₱326.57 billion. Aquaculture accounted for the majority of the production volume at 54.15%, while capture fisheries (including municipal and commercial sectors) contributed 45.85%. However, capture fisheries dominated the total production value with a share of 62.03%, amounting to ₱202.56 billion. Municipal fisheries alone constituted 39.08% of the total production value. In contrast, despite its significant volume, aquaculture contributed ₱124.00 billion or 37.97% to the total production value, primarily due to lower commodity prices. For instance, seaweed, the top commodity in aquaculture, averaged ₱137.50 per kilogram in 2022, whereas tuna, the leading commodity in capture fisheries, averaged ₱262.88 per kilogram.

Table 45. Fisheries Production Volume by Sub-sector and Region, 2022

Region	Volume (MT)			Total	Growth rate (%)
	Commercial	Municipal	Aquaculture		
NCR	55,875.24	15,209.43	2,044.23	73,128.90	-11.94
CAR	.	539.15	3,382.31	3,921.46	-3.26
I	4,758.91	26,577.70	162,777.58	194,114.19	2.56
II	3,920.66	26,454.77	15,470.79	45,846.22	2.39
III	7,961.33	56,178.63	300,345.65	364,485.61	-1.20
IV-A	26,108.23	66,918.39	102,423.85	195,450.47	-15.43
MIMAROPA	22,571.35	104,670.91	253,738.52	380,980.78	0.76
V	38,484.93	115,054.29	24,636.74	178,175.96	-15.51
VI	74,960.78	112,148.33	148,219.29	335,328.40	-11.00
VII	13,219.50	44,268.47	21,889.53	79,377.50	-45.89
VIII	21,244.71	78,538.53	4,650.64	104,433.88	-15.97
IX	225,113.96	124,479.99	178,773.85	528,367.80	-7.66
X	25,239.80	41,706.94	29,077.94	96,024.68	-18.70
XI	5,673.52	43,327.69	32,321.10	81,322.31	67.23
XII	234,026.98	47,816.11	17,941.81	299,784.90	7.40
XIII	11,173.57	36,206.40	9,493.94	56,873.91	-7.61
BARMM	92,352.88	186,164.53	1,042,064.26	1,320,581.67	30.65
TOTAL	862,686.33	1,126,260.25	2,349,252.01	4,338,198.59	2.12

The total fisheries production of 4.34 million metric tons was predominantly from aquaculture, comprising a 54.15% share equivalent to 2.35 million metric tons. BARMM contributed significantly to aquaculture production, accounting for 44.40% of the total aquaculture output with 1.32 million metric tons, translating to 30.44% of the overall fisheries production. Region XI showed the most substantial increase in production volume, growing by 67.23%. In contrast, Region VII experienced a significant decline of 45.89% in its total production volume.

In terms of value, capture fisheries accounted for over half, specifically 62.03%, of the total fisheries production in 2022. Region III emerged as the top contributor to the production value from both capture fisheries and aquaculture, holding 14.82% of the total at ₱48.41 billion. Following closely was Region VI with ₱35.88 billion, constituting a 10.99% share. Despite BARMM's significant production volume of 1.32 million MT, it generated a total value of ₱31.92 billion, just slightly higher than Region XII, which ranked sixth in production volume contribution.

Table 46. Fisheries Production Value by Sub-sector and Region, 2022

Value ('000 PhP)					
Capture		Aquaculture	Total	Growth rate (%)	
Commercial	Municipal				
5,210,074.35	952,710.28	112,230.28	6,275,014.91	0.36	
.	75,211.45	357,210.29	432,421.74	2.86	
611,262.38	3,691,846.19	20,403,683.97	24,706,792.54	2.04	
460,913.58	3,144,091.43	2,529,912.24	6,134,917.25	20.17	
1,221,542.99	6,737,965.90	40,450,073.39	48,409,582.28	-3.79	
4,348,212.69	6,377,454.34	11,077,165.34	21,802,832.37	-6.17	
2,091,607.50	10,828,692.15	4,899,491.39	17,819,791.04	20.97	
2,874,706.91	12,098,273.69	1,512,118.89	16,485,099.49	15.43	
9,085,841.74	15,312,967.53	11,482,305.07	35,881,114.34	6.70	
1,374,655.35	5,942,188.22	1,971,393.16	9,288,236.73	-37.12	
2,249,539.59	11,575,876.51	381,091.97	14,206,508.07	-3.23	
12,693,993.01	12,346,139.05	3,559,643.39	28,599,775.45	32.14	
2,978,225.64	5,396,597.76	5,079,958.54	13,454,781.94	-12.19	
1,089,847.04	6,429,499.12	4,328,943.11	11,848,289.27	89.63	
23,008,560.05	5,201,760.74	3,117,010.49	31,327,331.28	23.03	
1,671,183.61	5,128,049.16	1,172,005.99	7,971,238.76	10.76	
3,961,795.56	16,393,700.89	11,568,309.94	31,923,806.39	28.05	
74,931,962.99	127,633,024.41	124,002,547.45	326,567,534.85	7.98	

Table 47. Municipal Fisheries Production Volume and Value by Region, 2022

Region	Volume (MT)			Value ('000 PhP)		
	Marine	Inland	Municipal (Marine & Inland)	Marine	Inland	Municipal (Marine & Inland)
NCR	12,493.18	2,716.25	15,209.43	806,483.02	146,227.26	952,710.28
CAR	.	539.15	539.15	.	75,211.45	75,211.45
I	23,770.63	2,807.07	26,577.70	3,387,896.84	303,949.35	3,691,846.19
II	17,932.40	8,522.37	26,454.77	2,272,175.05	871,916.38	3,144,091.43
III	34,695.21	21,483.42	56,178.63	4,670,860.74	2,067,105.16	6,737,965.90
IV-A	31,871.12	35,047.27	66,918.39	5,592,740.41	784,713.93	6,377,454.34
MIMAROPA	102,459.13	2,211.78	104,670.91	10,614,397.79	214,294.36	10,828,692.15
V	112,243.18	2,811.11	115,054.29	11,876,222.51	222,051.18	12,098,273.69
VI	108,436.01	3,712.32	112,148.33	14,907,295.26	405,672.27	15,312,967.53
VII	44,187.28	81.19	44,268.47	5,933,652.51	8,535.71	5,942,188.22
VIII	77,235.38	1,303.15	78,538.53	11,407,903.86	167,972.65	11,575,876.51
IX	123,284.58	1,195.41	124,479.99	12,178,811.04	167,328.01	12,346,139.05
X	39,758.77	1,948.17	41,706.94	5,151,007.09	245,590.67	5,396,597.76
XI	43,256.12	71.57	43,327.69	6,420,888.39	8,610.73	6,429,499.12
XII	26,987.59	20,828.52	47,816.11	3,639,284.52	1,562,476.22	5,201,760.74
XIII	31,574.19	4,632.21	36,206.40	4,749,218.39	378,830.77	5,128,049.16
BARMM	120,723.92	65,440.61	186,164.53	9,084,364.52	7,309,336.37	16,393,700.89
TOTAL	950,908.69	175,351.57	1,126,260.26	112,693,201.94	14,939,822.47	127,633,024.41

Municipal capture fisheries achieved a total production volume of 1.13 million metric tons, combining outputs from marine and inland fisheries. This production was valued at ₱127.63 billion. BARMM stood out as a leading producer in both marine and inland fisheries, contributing 186,164.53 MT or 16.53% of the sub-sector's total production volume, translating to a production value of ₱16.39 billion—the highest among all regions. Region IX followed BARMM in production contribution with 124,479.98 MT, predominantly from marine municipal fisheries, which accounted for 99.04% of its total volume. Region VI, despite lower production volume, recorded the second highest production value at ₱15.31 billion.



Figure 41. Volume and Value of Municipal Fisheries Production, 2013-2022

Table 48. Municipal Fisheries Production Volume by Region, 2013-2022

Region	Volume (MT)					Volume (MT)				
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NCR	8,239.83	8,539.23	8,730.22	7,573.61	9,051.90	8,200.63	9,545.06	4,034.20	5,510.01	15,230.43
CAR	1,114.46	1,157.11	1,173.82	1,238.48	1,151.12	1,111.20	1,092.87	941.64	615.00	550.15
I	32,821.31	34,346.31	31,014.29	24,334.15	25,137.68	25,990.00	26,387.91	26,000.18	26,770.87	26,577.70
II	34,062.28	34,005.32	31,925.28	30,285.38	29,597.31	26,072.69	27,308.25	26,157.35	26,732.25	26,454.77
III	40,685.52	40,406.33	40,041.81	41,029.55	44,117.17	54,477.24	60,890.27	53,649.67	66,640.73	56,178.63
IV-A	128,798.44	145,475.38	138,033.70	135,215.74	111,250.72	100,688.92	99,072.57	87,135.13	70,973.74	66,918.39
MIMAROPA	160,158.46	150,732.95	145,766.71	131,183.42	125,265.66	126,954.47	127,687.22	126,607.22	121,001.02	104,670.91
V	149,894.87	145,623.05	131,821.25	124,052.63	125,132.98	126,771.24	126,092.62	126,391.82	126,116.68	115,054.29
VI	155,723.52	145,436.89	143,380.00	137,404.80	120,898.91	111,537.83	111,287.76	99,985.69	108,013.33	112,148.53
VII	82,113.00	40,802.23	48,587.49	55,507.62	59,307.93	63,583.49	67,985.77	76,536.78	77,132.93	44,206.47
VIII	85,152.52	76,496.25	77,597.67	83,442.90	79,107.01	70,111.64	79,383.58	84,080.98	89,280.39	76,538.53
IX	129,028.53	122,408.03	125,282.11	125,251.76	120,803.91	117,065.38	122,737.11	135,802.43	132,640.81	124,470.99
X	42,565.18	43,613.83	43,889.15	45,729.41	44,975.43	44,732.88	45,222.92	41,852.37	37,374.07	41,706.94
XI	19,490.00	16,157.27	18,660.48	23,178.33	27,834.75	23,120.86	21,704.67	17,977.65	17,607.25	43,327.69
XII	46,206.54	46,999.32	40,285.71	36,778.50	34,423.49	31,224.50	25,264.10	22,220.83	28,012.17	47,816.11
XIII	59,477.54	59,600.57	59,414.96	56,189.59	52,704.00	51,863.56	45,887.22	42,806.20	39,281.09	36,206.40
BARMM	121,764.36	136,328.95	130,390.27	128,942.05	112,197.07	120,271.81	127,630.53	126,934.22	177,196.89	186,164.53
TOTAL	1,264,416.48	1,244,258.95	1,216,526.72	1,127,931.00	1,126,817.30	1,196,071.84	1,126,217.47	1,102,282.36	1,131,907.31	1,126,280.28

Over the past decade, the municipal sub-sector has seen a decline in total production, with a 0.50% decrease from the previous year's output. This decline is largely due to reduced production in ten regions, notably Region VII, which experienced the largest drop of 42.61%, equating to a decrease of 32,867.51 metric tons. Despite this, BARMM remained the largest contributor with 186,164.53 metric tons and consistently showed positive growth in production. Additionally, NCR and Region XI recorded significant increases in production volume, with growth rates of 175.63% and 146.08%, respectively.

Table 49. Municipal Fisheries Production Value by Region, 2013-2022

Region	Value (1000 PHP)					Value (1000 PHP)				
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NCR	428,863.23	588,008.13	707,046.63	780,261.59	1,012,747.09	1,015,247.30	1,146,389.04	372,131.25	412,870.85	992,112.28
CAR	109,222.10	115,338.44	124,062.59	130,304.33	121,910.52	114,569.80	145,540.12	112,763.50	76,535.34	75,211.45
I	2,799,490.21	2,531,429.30	2,701,407.14	2,112,905.49	2,207,890.54	2,660,353.53	3,033,541.11	3,652,305.07	4,025,113.79	3,691,846.19
II	2,645,622.90	2,600,483.35	2,667,526.70	2,585,130.79	2,581,169.45	2,660,154.85	2,694,768.48	2,616,389.57	2,747,228.21	3,144,091.43
III	3,191,370.34	3,312,074.05	3,336,020.38	3,636,584.61	4,168,156.16	5,896,565.83	7,514,522.49	6,489,054.41	8,012,336.52	6,737,065.90
IV-A	5,099,073.07	5,553,968.52	5,407,770.00	4,555,221.90	5,208,043.33	5,128,910.12	5,866,527.06	4,853,989.00	4,903,475.40	6,277,494.34
MIMAROPA	8,668,857.57	8,317,551.67	8,173,009.53	7,756,153.82	8,033,689.38	12,060,852.88	11,152,577.45	11,361,313.14	10,632,000.93	10,826,692.15
V	9,218,577.49	9,320,025.56	9,171,371.19	8,684,988.22	9,418,811.34	10,656,146.76	10,645,371.37	10,402,869.11	9,086,442.83	12,098,273.69
VI	12,009,614.90	11,563,354.80	11,407,422.33	11,775,129.20	11,718,547.33	11,644,106.31	11,037,854.56	9,846,309.69	13,197,117.49	15,312,967.53
VII	3,811,832.63	3,513,069.17	3,030,408.98	4,530,002.89	5,325,321.19	6,975,300.43	8,092,164.72	3,852,433.96	10,746,850.11	5,942,185.22
VIII	4,568,487.94	4,244,208.12	4,341,550.37	4,869,468.18	4,987,760.91	7,651,121.25	9,379,527.80	9,620,243.00	11,728,075.88	11,575,875.51
IX	6,815,701.94	6,006,291.43	6,017,294.96	6,485,075.05	6,372,981.59	6,959,468.02	7,605,909.76	8,138,083.08	8,746,939.00	12,345,130.05
X	3,124,371.50	3,363,088.46	3,281,011.75	3,472,301.89	3,303,546.00	3,762,383.21	3,960,570.44	3,624,282.88	3,520,770.74	5,390,597.76
XI	1,758,364.22	1,400,030.82	1,761,708.51	2,093,672.46	3,025,155.00	2,578,305.38	2,719,030.40	2,218,604.25	2,400,660.70	6,425,493.12
XII	3,122,020.31	3,300,911.03	2,948,511.86	2,413,577.66	3,125,016.64	2,195,031.48	2,028,546.27	1,740,989.23	2,521,002.02	5,201,760.74
XIII	4,432,986.62	4,626,137.46	5,049,066.52	4,773,927.44	4,604,509.03	4,781,818.29	4,364,975.52	4,733,045.20	4,805,539.22	5,120,049.10
BARMM	7,096,536.04	7,412,016.82	7,886,135.08	6,865,265.43	6,868,967.75	7,507,123.52	8,333,149.40	8,756,766.58	14,331,630.55	15,393,700.89
TOTAL	80,897,993.14	81,805,031.27	81,486,171.48	76,825,020.10	83,478,711.83	93,874,457.31	103,341,987.46	95,011,573.94	112,059,949.41	127,833,024.41

The municipal capture fisheries recorded a total value of ₱127.63 billion. BARMM, as the leading producing region in this sub-sector, posted a significant value of ₱16.39 billion, representing an average annual share of 9.48%. This was followed by Region VI with ₱15.31 billion (12.90%), Region IX with ₱12.35 billion (8.12%), Region V with ₱12.10 billion (10.65%), and Region VIII with ₱11.58 billion (8.72%).

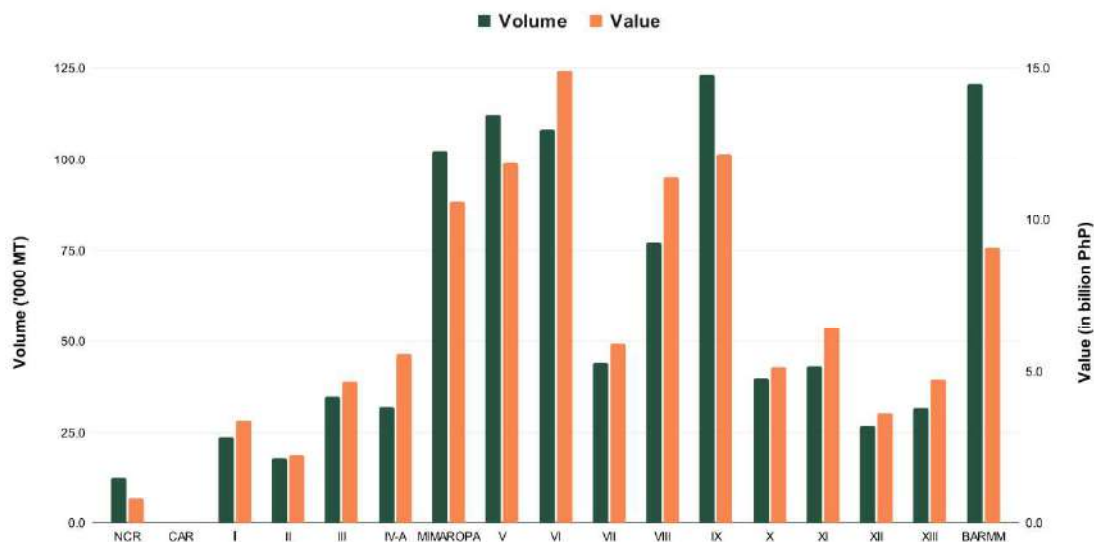


Figure 42. Volume and Value of Marine Municipal Fisheries Production by Region, 2022

In the marine municipal fisheries sub-sector, Region IX surpassed BARMM's 2022 production by 2,560.66 metric tons, registering a volume of 123,284.58 metric tons. BARMM still made a significant contribution with a total volume of 120,723.92 metric tons. In terms of production value, Region VI led the way, contributing ₱14.91 billion, which accounted for 13.23% of the sub-sector's total production value.

Table 50. Marine Municipal Fisheries Production Volume by Region, 2013-2022

Region	Volume (MT)					Volume (MT)				
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NCR	3,299.83	-	6,439.22	7,573.61	9,091.38	-	-	-	-	-
CAR	-	-	-	-	-	-	-	-	-	-
I	31,052.98	32,270.74	30,253.04	22,520.03	23,495.79	24,296.02	24,397.97	25,376.74	25,690.26	23,770.63
II	19,827.45	21,573.95	21,237.96	20,804.72	20,461.58	19,693.70	18,568.97	17,684.69	17,009.29	17,932.40
III	27,565.01	27,291.05	26,790.02	27,689.48	30,021.94	38,112.39	45,937.70	59,256.72	33,296.53	34,635.21
IV-A	35,817.41	39,521.03	38,755.19	36,212.02	33,290.96	33,336.80	34,126.68	26,844.75	24,531.58	31,871.12
MIMAROPA	159,167.89	149,748.25	144,781.41	129,659.29	123,991.11	124,933.02	126,169.20	124,625.09	116,363.79	102,450.13
V	143,295.17	139,069.39	125,607.27	119,454.74	120,123.15	122,076.66	120,824.02	122,634.26	97,667.04	112,243.18
VI	146,050.11	132,894.01	132,946.62	130,829.04	117,331.79	103,635.37	102,887.73	91,819.44	101,465.99	108,438.01
VII	51,938.36	48,800.22	48,317.62	55,336.05	59,151.07	63,658.73	67,835.58	76,454.98	77,064.17	44,167.26
VIII	64,265.01	75,695.32	76,553.62	82,753.17	78,426.96	69,550.93	73,006.32	63,506.00	67,675.11	77,235.38
IX	128,095.67	121,507.05	124,279.63	124,275.21	119,771.68	116,123.36	122,412.27	132,132.84	132,073.47	123,284.58
X	38,546.04	39,496.80	40,051.79	41,667.59	41,154.12	40,242.85	40,528.67	37,569.65	34,769.43	39,750.77
XI	19,171.16	15,879.61	15,403.74	23,006.75	27,626.75	22,876.92	21,455.32	17,622.17	17,506.12	40,256.12
XII	21,312.42	21,766.71	17,254.67	15,221.16	14,384.18	11,587.66	10,550.89	9,351.54	10,740.76	26,987.59
XIII	55,092.93	50,157.50	55,634.41	51,748.10	48,566.90	47,178.25	41,631.41	38,940.30	34,333.07	31,574.19
BARMM	93,736.49	66,379.94	101,552.09	88,971.69	90,029.70	96,478.97	102,907.29	103,615.15	106,301.18	120,723.92
TOTAL	1,882,147.63	1,620,394.45	1,611,792.73	976,941.19	962,146.84	941,870.85	968,758.60	952,188.62	926,568.90	950,908.89

Over the past decade, Region IX has significantly contributed to the sub-sector's overall production, averaging a 12.74% share annually. A considerable portion of its output was tuna, making up 13.72% of the region's total ten-year production. In contrast, BARMM displayed a fluctuating production trend from 2013 to 2016 but has shown an increasing trend since 2017, peaking at

120,723.92 metric tons in 2022. Other notable contributors were Region V with 112,243.18 metric tons (11.80%), Region VI with 108,436.01 metric tons (11.40%), and MIMAROPA with 102,459.13 metric tons (10.77%).

Table 51. Marine Municipal Fisheries Production Value by Region, 2013-2022

Region	Value (000 PHP)					Value (000 PHP)				
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NGR	426,863.23	508,932.15	707,046.63	786,363.59	1,012,747.05	1,015,947.09	1,146,289.94	372,131.25	331,885.23	806,483.02
CAR	-	-	-	-	-	-	-	-	-	-
I	2,604,076.73	2,092,448.09	2,519,085.81	1,824,153.50	2,017,452.16	2,434,098.76	2,755,211.85	3,265,839.42	3,626,227.23	3,307,866.84
II	1,460,919.03	1,636,144.67	1,793,187.31	1,801,783.93	1,858,839.42	1,872,079.77	1,837,489.64	1,779,103.17	1,890,469.00	2,272,175.95
III	2,236,213.10	2,303,909.16	2,286,011.69	2,259,342.79	3,012,021.02	4,298,707.05	3,910,637.22	4,770,617.00	4,307,442.33	4,603,869.74
IV-A	3,454,896.14	3,696,969.90	3,326,114.38	3,505,969.97	3,970,457.70	3,910,063.49	4,686,616.05	3,726,454.93	3,918,302.02	5,552,740.41
MIMAROPA	8,593,333.68	8,990,529.60	9,106,965.69	7,671,470.00	7,941,064.06	11,964,814.94	11,050,176.00	11,261,894.90	10,563,600.33	10,614,307.79
V	8,834,342.21	8,936,537.84	8,805,713.86	8,421,007.10	9,116,374.57	10,348,838.42	10,344,467.88	10,124,985.97	8,507,541.43	11,876,222.51
VI	11,533,158.65	11,035,638.41	10,901,665.06	11,169,318.74	11,029,060.70	10,740,035.71	10,163,344.23	8,803,591.52	12,508,355.79	14,907,295.26
VII	3,799,944.43	3,799,122.07	3,927,204.88	4,519,454.58	5,324,965.79	6,659,061.41	6,080,480.35	9,654,196.99	10,740,374.96	5,903,632.51
VIII	6,495,513.09	6,176,765.45	6,277,212.71	6,602,620.34	6,925,008.76	7,591,058.56	9,343,086.04	9,626,088.70	11,527,026.76	11,407,903.85
IX	6,747,070.37	6,537,032.94	6,540,640.89	6,417,665.70	6,304,123.96	6,697,446.96	7,511,832.79	8,011,163.40	8,700,196.70	12,178,811.04
X	2,874,186.11	3,113,655.74	3,026,307.11	3,161,130.12	3,236,711.37	3,443,357.78	3,623,261.54	3,826,171.94	3,924,370.99	5,151,907.99
XI	1,736,135.01	1,412,521.88	1,743,667.23	2,081,441.45	3,008,157.78	2,554,322.06	2,692,220.54	2,171,361.46	2,366,763.72	6,439,888.39
XII	1,689,955.66	1,977,902.14	1,555,559.95	1,174,819.77	1,059,969.04	936,065.77	1,008,716.07	902,544.26	1,332,123.03	3,639,284.52
XIII	4,174,594.43	4,655,199.62	4,803,987.68	4,527,849.25	4,462,530.30	4,519,261.05	4,606,115.55	4,392,901.00	4,552,316.43	4,749,218.30
BARMM	5,095,163.82	5,222,253.35	5,387,101.46	4,836,495.56	5,096,639.83	5,475,826.25	6,182,870.60	6,404,638.60	6,755,750.67	9,094,364.62
TOTAL	71,806,277.87	71,925,995.59	71,717,675.27	71,131,580.39	75,346,716.15	84,871,810.66	90,990,987.69	88,533,295.66	94,746,605.62	112,693,201.94

In 2022, the value of production for marine municipal fisheries totaled ₱112.69 billion. Region VI led with the highest production value of ₱14.91 billion, holding an average annual share of 13.71%. Following Region VI was Region IX with ₱12.18 billion and an average annual share of 9.04%. Other regions with significant contributions included Region V with ₱11.88 billion (11.54%), Region VIII with ₱11.41 billion (9.72%), and MIMAROPA with ₱10.62 billion (11.54%).

15.3 Basilan Fisheries Performance

Table 52. Trends in Fisheries Production by Category (2013-2023)

Category	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Fisheries	3717 4.19	3817 2.50	3826 2.81	1765 3.52	1983 7.87	2274 1.76	2244 8.92	2268 4.17	2339 6.75	2976 0.76	3449 2.90
Municipal Fisheries	1317 2.18	1348 5.62	1378 6.77	4903 .47	5814 .52	6619 .52	6795 .74	5759 .00	6066 .61	1866 4.71	2513 9.84
Marine Municipal Fisheries	1316 4.53	1347 7.73	1377 8.80	4837 .58	5805 .11	6614 .56	6790 .88	5735 .55	6041 .80	1863 6.55	2513 4.71

15.3.1 Overall Fisheries Performance

Basilan, a province within BARMM, showed variability in its overall fisheries production trends. The production increased slightly from 37,174.19 metric tons in 2013 to 38,262.81 metric tons in 2015, followed by a significant drop to 17,653.52 metric tons in 2016. From 2017 to 2019, Basilan experienced a recovery, with production rising to 22,448.92 metric tons. This growth continued through 2023, reaching 34,492.90 metric tons.

Within BARMM, Basilan's contribution fluctuated. In 2013, Basilan accounted for around 4.44% of BARMM's total production. This contribution dropped significantly to 2.14% in 2016 due to a decline in Basilan's production. By 2019, Basilan's share slightly decreased to 2.40%, and despite its own production growth, its contribution to the BARMM total was 2.45% in 2023 due to the rapid overall growth in BARMM's production.

15.3.2 Municipal Fisheries Production

In terms of municipal fisheries production, the province exhibited variability. From 2013 to 2015, Basilan's production steadily increased from 13,172.18 metric tons to 13,786.77 metric tons. In 2016, production sharply declined to 4,903.47 metric tons. Recovery began from 2017 to 2019, with production increasing to 6,795.74 metric tons. Significant growth occurred from 2020 to 2023, peaking at 25,139.84 metric tons in 2023.

Regarding Basilan's contribution to BARMM's total municipal fisheries production, it initially contributed around 10-11% from 2013 to 2015. In 2016, Basilan's contribution significantly dropped to about 4.50% due to the sharp decline in its production. From 2017 to 2019, Basilan's contribution fluctuated around 5%. Notable increases occurred from 2020 to 2023, with the contribution peaking at approximately 12.47% in 2023. This reflects both the recovery and growth in Basilan's production and the broader growth trends within BARMM's municipal fisheries sector.

15.3.3 Marine Municipal Fisheries Production

Basilan's production exhibited variability, with an initial rise to 13,778.80 metric tons in 2015, followed by a sharp decline to 4,837.58 metric tons in 2016, and subsequent recovery and growth to 25,134.71 metric tons in 2023.

Basilan's contribution to BARMM's marine municipal fisheries production fluctuated over the years. Initially stable at around 14% from 2013 to 2015, its share dropped sharply to 5.48% in 2016 due to decreased production. From 2017 onward, Basilan's contribution gradually increased as production recovered, ranging from 6% to approximately 18.36% in 2023. This increase reflects both Basilan's recovery and substantial growth in production, contributing significantly to the overall marine municipal fisheries sector within BARMM.

15.4 Additional Fisheries Information

15.4.1 Food Consumption

Fish and fishery products are the second most consumed food items in the Philippines, following rice and rice products. Fish and fishery products constitute 11.68% of an average Filipino's diet, with an intake of approximately 93.90 grams per day. This consumption rate is 63.30% higher than that of meat products and 205.86% higher than poultry.

Table 53. Mean One-day Per Capita Food Consumption and Percent Share of Food to Total Intake, 2018-2019

Food Group/ Sub-group	Consumption		% of Total Intake
	g/day	kg/yr	
ENERGY-GIVING FOOD			
Cereals and Cereal Products	315.0	115	39.2
Rice and Rice Products	275.9	100.7	34.3
Corn and Corn Products	17.1	6.2	2.1
Cereal Products	22.0	8.0	2.7
Starchy Roots and Tubers	10.2	3.7	1.3
Sugar and Syrups	8.3	3.0	1.0
Fats and Oil	14.1	5.1	1.8
BODY BUILDING FOOD			
Fish, Meat and Poultry	182.1	66.5	22.7
Fish and Fishery Products	93.9	34.3	11.7
Meat and Meat Products	57.5	21.0	7.2
Poultry	30.7	11.2	3.8

15.4.2 Prices and Inflation

From January to December 2022, fish prices fluctuated, with notable increases in the retail prices of certain species. The price per kilogram rose by ₱12.20 for shrimp (sugpo), ₱6.37 for seaweed (lato), and ₱4.04 for squid. At constant 2018 prices, the fish inflation rate reached a four-year high of 6.70% in 2022, with the highest monthly inflation rates recorded in October (9.40%), July (9.20%), and September (9.10%).

15.5 Characteristics of Lamitan Fisherfolks

The average age of fisherfolks is 41.5 years, indicating a middle-aged population. The age range is quite broad (19-84 years), showing a mix of younger and older individuals. The average household size is relatively large (6.17 members), reflecting typical extended family structures in rural communities. On average, each household has about 2 children attending

school, with some households having no school-going children and others having up to 7. Monthly expenses vary widely (₱1,600 to ₱21,100), with an average of ₱10,043. This indicates a significant disparity in economic conditions among fisherfolk families.

The vast majority of fisherfolk are male (93.3%), which is common in many fishing communities where fishing is traditionally a male-dominated occupation. Most respondents are married (75.9%), with smaller percentages being single, widowed, or in live-in relationships. This suggests a stable family structure among most fisherfolk.

The population is diverse, with the largest groups being Tausug (41.4%) and Sama Bangingi (24.1%). This diversity may influence cultural practices and social dynamics within the community. The majority of the fisherfolk are Muslim (89.7%), with a minority being Roman Catholic (10.3%). Religious affiliation might play a role in community activities and lifestyle choices.

Educational levels vary significantly, with a notable portion (23.3%) having completed high school. However, there is a significant number of individuals with very low educational attainment, including those with only elementary education or none at all. This highlights a potential area for development, as higher educational levels can lead to better economic opportunities.

15.6 Characteristics of Traders and their Practices

The fish traders in Lamitan City are predominantly middle-aged, averaging 45.4 years, with a range from 38 to 58 years, indicating substantial experience in the industry. The gender distribution is slightly male-dominated, with three males and two females, reflecting some level of gender diversity. All respondents are married, suggesting that family-run businesses are common. They belong to the Sama Bangingi and Yakan ethnic groups, highlighting the cultural diversity within the trade. All specified respondents practice Islam, which likely influences their business practices and community interactions.

Educational attainment among the traders is varied: one is a college graduate, two are high school graduates, one completed elementary education, and one did not finish elementary school. This range suggests differing levels of capacity for adopting new business practices and technologies. Only one respondent is a member of the Tumakid Agri-Fishery Association, indicating low participation in formal organizations, which could limit access to collective resources and support.

Fish trading roles in Lamitan City are diverse, including consolidator and barangay trader, with no cooperative traders identified. Specifically, there are three consolidators based in different barangays: Brgy. Luksumbang, Brgy. Ulami, and Brgy. Tumakid. Additionally, a local trader also operates in Brgy. Tumakid. The traders deal with various products like cephalopods, big fish, shrimps, and other seafood, showcasing the region's rich marine resources. Price determination is mainly controlled by the traders, with some input from storage facilities (bodegas), indicating an autonomous pricing mechanism. The primary challenges faced include weather conditions, buying prices, logistics, capital investment, and quality of fish and cephalopods. The lack of post-harvest facilities is a significant issue, pointing to a need for improved infrastructure to reduce losses and enhance product quality.

Labor distribution shows a predominantly male workforce across sorting, weighing, and hauling tasks, with hauling being the most labor-intensive and least compensated. Most traders rely on Zamboanga City as their main market, maintaining generally positive customer relations.

The majority of traders do not pay for market information, which may limit their access to market trends and intelligence. Environmental factors and electricity reliability are primary concerns, emphasizing the need for infrastructural improvements and stable energy supply. Addressing these challenges can significantly enhance the efficiency and profitability of fish trading in Lamitan City.

15.7 Mapping the Value Chain

This section discusses various industry operators and their corresponding contributions in the entire value chain of fishing industry in Lamitan City. The industry is composed of key players ranging from suppliers of inputs for of fisherfolks, traders, retailers, and ultimately to the consumers.

The value chain map of fish industry in Lamitan City is composed of local suppliers of fishing paraphernalia, the fisherfolks who are members of associations in their respective barangays, traders, retailers, and consumers.



Figure 43. Supply Chain Map

Fisherfolks are situated in four barangays of Lamitan City namely the Luksumbang, Ulami, Maloong Canal, and Tumakid. The value chain for fish products begins with input suppliers, who provide essential materials such as fishing gear, fuel, and bait. Lamitan City and adjacent municipalities host numerous suppliers, ensuring ample availability of essential materials for day-to-day fishing activities. This robust local supply chain facilitates the fishing operations with ready access to necessary resources.

After processing the catch (sorting, weighing, etc), they are typically sold to traders who play the role in aggregating fish from multiple fisherfolks, ensuring a steady and substantial supply. In Lamitan, there are two identified trader types which are local traders and consolidators. These traders purchase fish in bulk from fisherfolks, often providing financial support contingent on the fisherfolks selling their catch at agreed-upon prices. Consolidators may store and sometimes process the fish to maintain its quality before selling it to local traders or retailers. These local traders or retailers bring the fish to markets or retail outlets, making it accessible to the end consumers. In some instances,

fisherfolks may bypass the consolidators and sell their catch directly to local traders or retailers. Occasionally, some fisherfolks even sell their catch directly to consumers, eliminating all intermediary stages.

The fishing industry enablers in Basilan are the Ministry of Agriculture, Fisheries and Agrarian Reform, (MAFAR), Ministry of Basic, Higher, and Technical Education - Technical and Skills Development (MBHTE – TESD), Ministry of Trade, Investment, and Tourism (MTIT), and Ministry of Science and Technology (MOST), supporting the different chains from input supply to production, and trading.

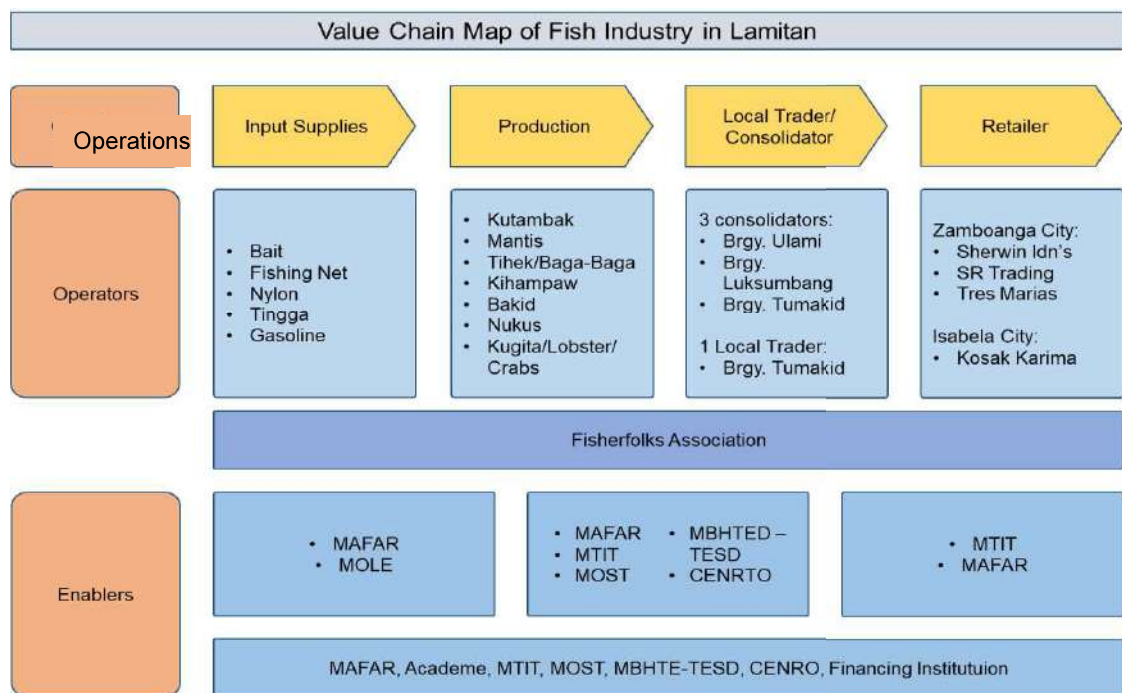


Figure 44. Value Chain of Fishing Industry in Lamitan

15.8 Value Chain Key players and their product requirement

The value chain in Lamitan City, Basilan Province, comprises key players including input suppliers, fisherfolks, traders (consolidators, local trader), and consumers. Although traders do not set specific volume requirements, fisherfolks prefer to consolidate their catch to attract buyers. This consolidation increased their bargaining power and ensure better pricing.

In cases where fisherfolks sell directly to consumers, they process their catch immediately and distribute it to nearby barangays. This direct sales approach can lead to higher margins for fisherfolks, as it eliminates the need for middlemen, but it also requires efficient processing and distribution logistics to maintain freshness, as well as market information.

Regarding grade and quality specifications, nearly all traders and consumers demand that the catch be fresh, properly handled, and of marketable size. This emphasis on quality implies that fisherfolks must adopt best practices in handling and storing their catch to meet market expectations. Failure to do so could result in lower prices or unsold inventory, impacting their livelihood.

Table 54. Value Chain Operators and their product requirement

Key Players	Customers	Volume Requirement	Grade/Quality Specification
Input Supplier	Fisherfolks	Gasoline – 4L (capacity for most local engine) Nets, Nylon, Pukot, Tingga etc – Depending on need, as some can be reused multiple times	Quality Inputs
Fisherfolks	Consolidators / Local traders (Brgy. level)	Nokus – min. 3 boxes* <i>Other species (mantis, kutambak, kihampaw etc) Not specified individually, but these are consolidated to meet larger volume requirement</i>	Fresh, properly handled Cephalopods – medium size Fish – medium size
	Consumers	Not specified	Fresh, undersize/oversize
Consumers		Not specified	Fresh, undersize/oversize

*Agreed volume by the fisherfolks

Source: Survey Report 2024

15.9 Key Players and their Roles

The table outlines the major players in the fishing industry value chain: input suppliers, fisherfolks, traders, and consumers. Input suppliers provide essential fishing equipment and materials to fisherfolks, who manage the fishing process from acquiring inputs to conducting fishing activities and handling post-harvest operations. Traders purchase fish from fisherfolks, store it, and supply it to other traders or retail outlets, ensuring it reaches the market in good condition. Consumers, the end-users, buy fish products from fisherfolks or retail stores, driving the demand that influences the entire value chain. The efficiency and sustainability of the value chain depend on reliable input supplies, effective fishing practices, proper storage and transportation by traders, and meeting consumer demand for quality fish products. Ensuring market access and maintaining fish quality throughout the chain are crucial for its stability and profitability.

Table 55. Key Players and their Roles

<i>Major Players</i>	<i>Roles</i>
Input Supplier	<ul style="list-style-type: none"> • Provide fishing equipment and supplies to fisherfolks
Fisherfolks	<ul style="list-style-type: none"> • Acquire fishing materials and other necessary inputs • Oversee the entire fishing and production process • Conduct fishing activities and handle post-harvest operations
Traders	<ul style="list-style-type: none"> • Purchase fish directly from fisherfolks • Store the collected fish • Supply fish to other traders in the chain
Consumers	<ul style="list-style-type: none"> • Buy fish products from fisherfolks or retail stores

Source: Survey Report 2024

15.10 Activities/Processes and Costs

Almost all activities are being performed by the men which includes the youths with participation of women in preservation and marketing. The involvement of youth alongside men in fishing activities highlights the generational passage of skills and labor within the community. While men and youths engage in the physically demanding tasks of fishing, women's roles are crucial in ensuring the sustainability and profitability of the industry. Their involvement in post-harvest activities such as cleaning, processing, and selling the fish adds significant value to the overall fishing operations. Almost all of the activities are own labor of the fisherfolks except for preparation of bait where

some of them buy it at around 1,000 per fishing trip. The reliance on personal labor in the fishing industry emphasizes the need for support programs that focus on the physical health and well-being of fishermen, as their capacity directly affects productivity and income. Additionally, the importance of skill development and training to enhance efficiency and safety in fishing practices becomes evident. The cost associated with purchasing bait suggests opportunities for cost-saving measures, such as training fishermen to prepare their own bait or finding more affordable sources. Recognizing the extensive use of personal labor also highlights the need for policy interventions to ensure that the true value of fishermen's work is acknowledged and adequately supported.

Table 56. Activities involved in the production and marketing of fish and the cost per operation in Lamitan City

Activities	Performed by	Resources Needed	Average Costs per year
1. Buying of fishing for bait/ Catching of fish for bait	Men	Vehicle Bangka, Engine, Bingit, etc	1,000/Fishing Activity/ Others catch their own bait
2. Preparation of fishing gears	Men		Labor
3. Fishing	Men	Bangka, Engine, Bingit, Nylon, Pukot, etc	Labor
4. Fish catch segregation/sorting/ sizing	Men	Chest/Containers	Labor
5. Weighing of fish caught	Men	Weighing scale	Labor
6. Preserving the fish	Men and Women	Ice Chest/Ice	Labor
7. Unloading and hauling of fish	Men		Labor
8. Transporting	Men	Vehicle/Motorcylce	Labor
9. Selling/Marketing	Men and Women	Ice Chest (Container)	Labor

Source: Survey Report 2024

15.11 The flow of product, information and payment along the chain

The fish production chain involves the flow of products, information, and payments among various stakeholders, from fisherfolks to end consumers. Fisherfolks, equipped with essentials from input suppliers, catch the fish and often sell it to consolidators, as seen in Brgy. Luksumbang, Tumakid, and Ulame (Fig. 45-47). These consolidators gather fish from multiple sources, ensuring a steady supply and may process it to maintain quality before passing it on to other traders or retailers. All identified consolidators in these areas pass their products to retailers in Zamboanga City. In Brgy. Tumakid (Fig. 48), one local trader consolidates fish products in the area and passes them to a retailer in Isabela City. At the consumer end, local traders or retailers sell the fish in markets or shops. Sometimes, fisherfolks bypass consolidators and sell directly to local traders or consumers, streamlining the process (Fig. 45). Consumers then purchase the fish for their consumption, often informed by retailers or fisherfolks about the fish's origin and quality. Notably, no products reach the local Lamitan City fish market. This complex network ensures a consistent fish supply across regions, but the absence of local market penetration in Lamitan City suggests potential gaps in local distribution or demand dynamics.

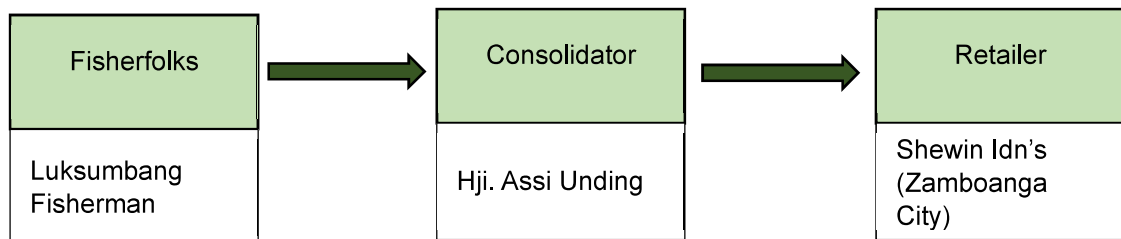


Figure 45. From Luksumbang Fisherfolks to Local Consolidator to Zamboanga Buyer/Retailer

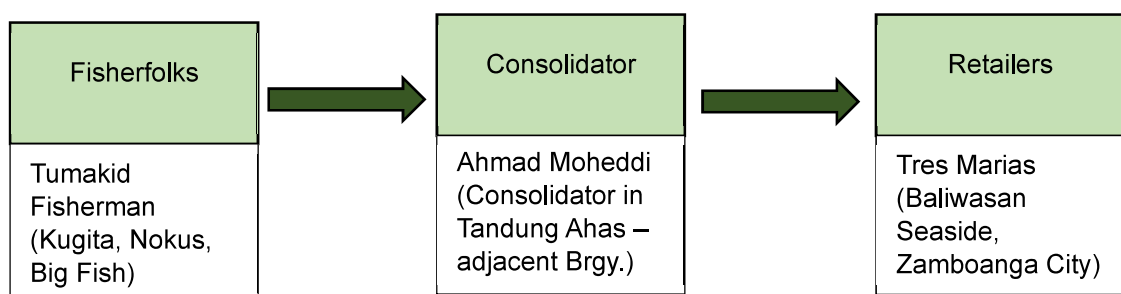


Figure 46. From Tumakid Fisherfolks to Consolidator to Zamboanga Buyer/Retailer

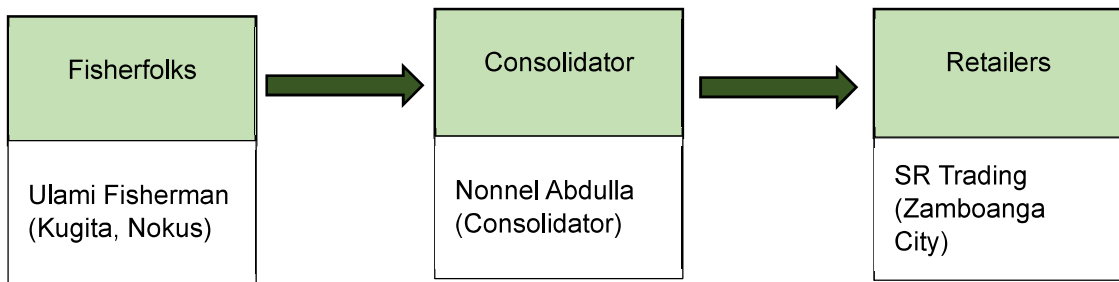


Figure 47. From Tumakid Fisherfolks to Consolidator to Zamboanga Buyer/Retailer

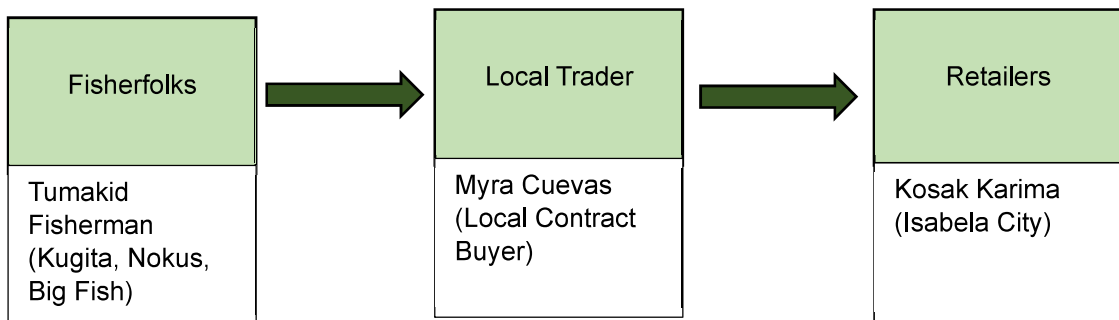


Figure 48. From Tumakid Fisherfolks to Local Trader/Buyer to Isabela City Retailer

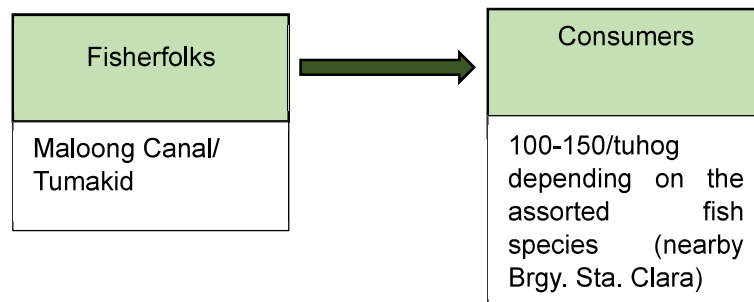


Figure 49. From Tumakid and Maloong Canal Fisherfolks directly sells to consumers

Payments flow smoothly along the chain, starting from consumers pay local traders, who then compensate fisherfolks. When fisherfolks sell directly to consumers or local traders, they receive immediate payments, reducing the number of intermediaries. Throughout this chain, contracts, negotiations, and financial transactions are managed to ensure compensation and smooth operations.

Information flows continuously among all parties. Fisherfolks receive updates on fishing practices, prices, and weather forecasts from relevant

nearby source and traders. Traders assess market trends, customer preferences, and order from the consumers ensuring the right products reach the market.



Figure 50. Price Information Flow among various stakeholders

In cases where fisherfolks sell their catch directly to consumers, the initial prices are typically set by the fisherfolks. However, consumers often engage in bargaining to negotiate lower prices. This negotiation process can lead to a compromise, where the final price is settled somewhere between the fishermen's initial asking price and the consumers' desired price. In some instances, the consumers' proposed prices may prevail.



Figure 51. Price Information Flow from consumer directly to fisherfolks

15.12 Cost and Return Analysis

The average annual cost and return analyses were conducted with results detailed in Table 57. In the context of fish and cephalopods, the primary income sources for fishermen are direct sales to locals and traders. The estimated annual income for fish and cephalopods amounts to ₱913,061.33. However, this figure includes non-cash income. According to the findings, ₱101,813.33 of the total estimated income is non-cash, this is the income consumed by the fishermen themselves or given as tokens to neighbors. Therefore, the actual cash income is ₱811,248.00. The inclusion of non-cash income in the total estimated income can lead to an overestimation of available funds for reinvestment or savings. Fisherfolks need to be aware of this distinction for accurate financial planning. When designing support programs or

policies for fishermen, authorities should consider both cash and non-cash incomes. Programs that focus solely on cash income might overlook significant aspects of the fishermen's livelihoods. In addition, for economic assessments and comparisons with other industries, distinguishing between cash and non-cash income provides a clearer picture of the financial viability and economic impact of the fishing industry. On the other hand, the practice of giving part of the catch as tokens to neighbors strengthens community bonds and social support networks. This social capital can be invaluable, especially in times of need.

There is also a need to look into the production costs which encompass a variety of expenses, including materials and supplies, transportation, rentals, labor costs, and other operating costs. Activities involved in the production process include catching, processing, and transporting the fish and cephalopods to market. There is no cost at the landing site or handling charges. Annually, the total production cost an estimated amount of ₱551,485.31. Of the total production cost, ₱108,000.00 is the labor cost which constitute a significant portion of the costs, underscoring the labor-intensive nature of this industry. In this context, the costs were quantified based on the number of hours spent on each fishing activity and then converted to an equivalent value based on the minimum daily wage in the BARMM. The fishermen do not hire laborers; instead, they personally carry out all the operations. The need for efficient labor management and the potential benefits of introducing labor-saving technologies or methods to reduce costs and increase productivity. The reliance on personal labor highlights the importance of ensuring the health and well-being of fishermen, as their physical capacity directly impacts their livelihoods. Fisherfolks awareness in accurate cost quantification can help them to better understand their profit margins and make informed decisions about pricing, investment, and growth.

Significant portion also is the transportation cost amounting to ₱183,827.59. These are the cost for transporting their catch to directly selling it to the consumer and the gasoline they spent in fishing operations. However, significant costs, particularly labor (if they will hire laborers) and transportation,

must be managed efficiently. Fishermen need to consider strategies to optimize these expenses, potentially through cooperative efforts or improved logistical arrangements. Enhancing the efficiency of operations and negotiating better terms for supplies and labor can further improve profitability and sustainability in this sector.

Table 57. Average Annual Cost and Return Analysis for Fisherfolks in Lamitan City, Basilan Province, 2024

Item	Value per unit
Income	
Cash Income	₱ 811,248.00
(a) Total Cash Income	₱ 811,248.00
Noncash Income	₱ 101,813.33
(b) Total Noncash Income	₱ 101,813.33
(c) Total Income (a) + (b)	₱ 913,061.33
Cost	
Cash Cost	
Variable Cash Costs	
Labor Cost	₱ 108,000.00
Materials/Supplies	₱ 88,100.00
Transportation cost	₱ 183,827.59
Rentals	
Other operating cost	
(d) Total variable cost	₱ 379,927.59
Fixed Cash cost	₱ 5,373.67
Land Tax	
(e) Total Fixed Cash cost	₱ 5,373.67
(f) Total Cash Costs (d) + (e)	₱ 385,301.26
Noncash Costs	
Variable Noncash Costs	₱ 166,184.05
Food expenses	
Gifts, tokens	
(g) Total Variable Noncash Costs	₱ 166,184.05
Fixed Noncash Costs	
(h) Total Fixed Noncash Costs	₱ -
(i) Total Noncash Costs (g) +(h)	₱ 166,184.05
(j) Total cost [(f) +(i)]	₱ 551,485.31
Net Income [(c) - (j)]	₱ 361,576.02
Return on Investment (ROI)	
(Net Income / Total Cost) *100	65.56%

The analysis also highlights the financial viability of the fish and cephalopod industry, showcasing substantial cash and noncash incomes. With an impressive net income of ₱361,576.02 or 65.56% return on investment (ROI), the industry presents a profitable opportunity for fisherfolks. The estimated annual income assumes that fisherfolks go fishing daily throughout

the year under normal conditions. However, considering the regional climate, it is assumed that bad weather prevents fishing for at least 60 days annually. Given this, the estimated net income is around ₱302,108.00. This adjustment highlights the significant impact of weather conditions on fishermen's income, emphasizing the need for contingency planning and financial resilience. Policymakers and support programs should account for these disruptions and provide resources or alternative income opportunities during non-fishing days. Accurate income estimation also helps fishermen manage their finances better and plan for periods of inactivity.

15.13 Participatory Systems Analysis (PSA)

To understand how marginalized individuals can effectively participate in the diverse value chains of the fishery industry, a Participatory Systems Analysis (PSA) was conducted. This methodology evaluates the interconnections among various factors impacting a specific concern. By analyzing these relationships, the PSA identifies the most effective initial focal points for project interventions and highlights areas requiring further investigation and deeper understanding.

The PSA exercises were conducted during focus group discussions (FGDs). Participants were thoroughly questioned about the factors influencing their involvement in the fishery industry. The collected data was then structured into a matrix (Table 58) to assess the extent to which each factor influences the others. Following this assessment, participants identified the following factors as pivotal for achieving success in the fishery industry:

Code	Factors
K&S	Knowledge & skills
IS	Input subsidy
CF	Credit Facility
TA	Technical Assistance
MI	Market Information including pricing
IF	Infrastructure and other facility (mechanical support)
PHF	Post-harvest Facility
P	Policy in support to the fishing industry

Following the procedures of Herweg and Steiner (2002) the ratings used were as follows:

- | | | | |
|----|---------------------|---|-----|
| a. | Strong influence | = | 2.0 |
| b. | Moderate influence | = | 1.0 |
| c. | Weak influence | = | 0.5 |
| d. | Very weak influence | = | 0.1 |

The analysis identified three key drivers of success in the motor or lever quadrant: Market information (MI), input support (Inp S) (which includes necessary resources like fishing materials), and credit facilities (CF) (Figure 52). These factors address the challenges faced by fisherfolk directly and provide clear, predictable benefits.

Credit facilities are crucial for financing the operations of fisherfolk, enabling them to cover costs for gasoline, bait, and other fishing paraphernalia. Recognizing these financial challenges, many fisherfolk have expressed the need for input support. They have requested new engines, boats, and additional supplies to enhance their fishing operations and efficiency. Furthermore, access to market information is vital for fisherfolk, providing them with up-to-date and relevant information that can help maximize their profits.

Conversely, factors such as technical assistance and policy development fall into the critical element quadrant. While these factors aim to address various problems, they require careful management to ensure positive outcomes. Interventions in these areas can be complex and may lead to unintended consequences if not managed effectively.

This analysis underscores the importance of crafting well-designed policies, developing appropriate infrastructure, and improving post-harvest practices. Furthermore, investing in the education and skill development of fisherfolk is crucial. Providing them with the knowledge and skills necessary to effectively utilize these resources and overcome potential challenges will enhance their capacity for sustainable fishing operations.

Overall, the strategic combination of providing essential resources, financial support, and targeted educational programs can significantly improve

the productivity and sustainability of fisherfolk communities. By addressing both immediate needs and long-term development, these interventions can create a robust support system for the fishing industry.

Table 58. Relationships between different factors affecting the fishing Industry

ELEMENTS	1 K&S	2 IS	3 CF	4 TA	5 MI	6 IF	7 PH F	8 Pol	Active Sum (AS)	Degree of Interaction (ASxPS)
1 K&S		0.5	0.1	1	0.5	1	1	1	5.1	38.25
2 IS	1		2	1	0.1	2	2	2	10.1	90.9
3 CF	1	2		0.5	0.1	2	2	2	9.6	83.52
4 TA	1	2	0.5		0.5	2	2	0.5	8.5	59.5
5 MI	2	0.5	0.1	0.5		0.1	0.1	1	4.3	14.62
6 IF	1	1	2	1	0.1		1	2	8.1	81.81
7 PH F	1	1	2	1	0.1	1		2	8.1	81.81
8 Policy	0.5	2	2	2	2		2		12.5	131.25
Passive Sum (PS)	7.5	9.0	8.7	7.0	3.4	10.1	10.1	10.5		
Ration	0.68	1.12	1.10	1.21	1.26	0.80	0.80	1.19		

Rating System: Strong influence= 2.0, Moderate influence=1.0, Weak influence=0.5, Very weak influence= 0.1

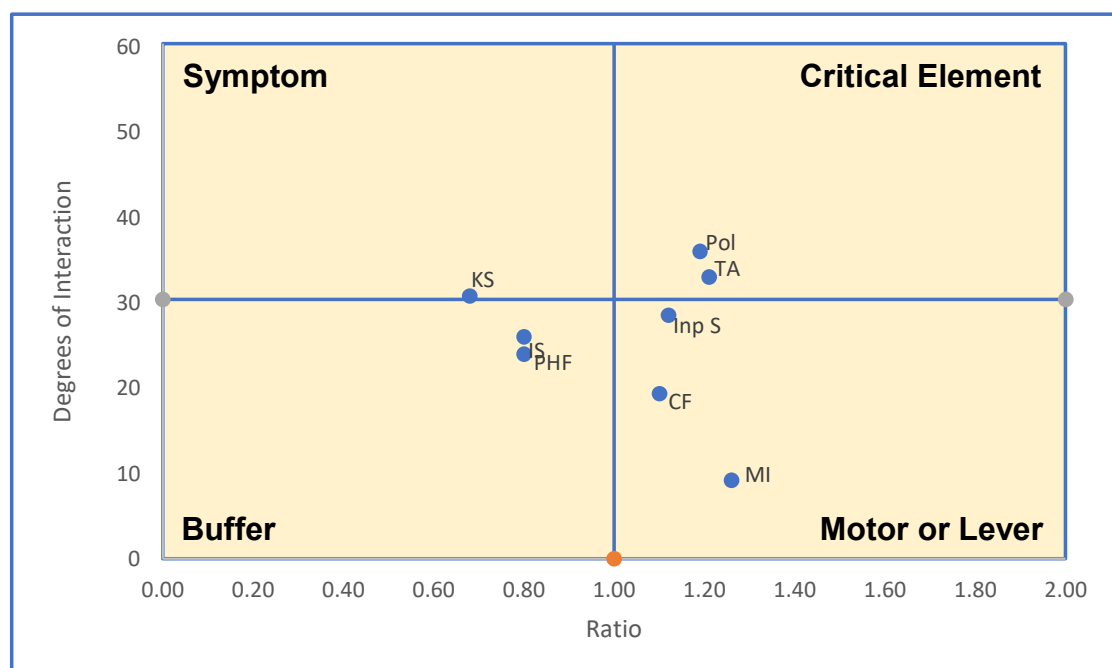


Figure 52. PSA Motor Quadrant for Fish

15.14 Opportunities and Constraints

Input Provision

Opportunities:

The fishing industry offers substantial opportunities in the provision of essential inputs. Fisherfolks have expressed a strong need for new fishing materials, including nets, nylon, hooks, and other materials. Meeting this demand can significantly enhance the efficiency and output of fishing operations. These supplies are readily available in Lamitan and nearby municipalities, with many local suppliers catering to these needs. Additionally, there is a steady and reliable supply of gasoline in the area, ensuring uninterrupted fishing activities. This can further boost productivity and profitability in the sector.

Constraints:

However, several constraints hinder the effective provision of these inputs. The lack of affordable gasoline is a significant issue, hampering the continuity of fishing activities. Moreover, the widespread use of old and damaged fishing equipment limits operational efficiency and safety, posing significant risks to fisherfolks. It has been identified that although fisherfolks received fiberglass boats, these boats were not utilized because they easily sank in the sea.

Production

Opportunities:

Production within the fishing industry offers numerous opportunities for economic benefits. Fishing is a vital source of income, savings, and financial support for daily expenses, education, and bills. This economic potential underscores the importance of improving production efficiency. Practical suggestions from fisherfolks, such as acquiring new materials and ensuring a steady supply of gasoline, directly address key production challenges.

Implementing these suggestions can lead to significant improvements in productivity and economic outcomes for fisherfolks.

Constraints:

Despite the opportunities, the fishing industry faces several significant challenges that have severe implications for its sustainability and productivity. Adverse weather conditions pose a considerable threat to fishing activities, often leading to disruptions and reduced catch volumes. These disruptions not only impact daily operations but also reduce the overall profitability of fishing activities, making it difficult for fisherfolks to sustain their livelihoods.

Overfishing is another critical issue that threatens the sustainability of fish stocks and the long-term viability of the fishing industry. The statement of overfishing comes from the observations and reports of the fisherfolks themselves. They have noted a decline in their catches, which they attribute to overfishing. Their assumption is since many of them fish in the same areas due to the limited capacity of their boats, leading to intensified fishing pressure in these regions. This anecdotal evidence, combined with the common practice of fishing in the same locations by multiple fisherfolk, suggests that overfishing could be a contributing factor to the reduced catches they are experiencing. If left unaddressed, overfishing can lead to the depletion of fish populations, jeopardizing the future of the industry and the communities that rely on it for income and food security.

Engine malfunctions further disrupt operations and lead to conflicts, reducing productivity. Frequent engine failures can halt fishing activities, leading to lost time and increased maintenance costs.

Ice availability is also a significant issue. Ice plays a crucial role in preserving fish while it is stored before being sold to traders, especially as they wait to accumulate the desired volume. However, frequent blackouts in these communities, coupled with the fact that few households' own refrigerators, force them to source ice from neighboring barangays. This added effort increases their production costs, further impacting profitability.

Landing sites also present significant hygiene concerns. In the surveyed area, these sites are often simple, unstructured spaces where boats dock, and fish are temporarily placed, as shown in the photos below. It is important to emphasize that the handling of fish at these landing sites directly affects food loss and waste (FLW) in later stages of the value chain. This, in turn, impacts the nutritional value and safety of the fish, which is particularly concerning for vulnerable groups such as pregnant women, children, the elderly, and those who are ill.



Figure 53. Landing sites of the survey areas

Financing day-to-day operations is also a significant challenge for many fisherfolks. They often rely on borrowing from local traders or consolidators, which obligates them to sell their catch to these financiers at less favorable terms. This exploitative financial arrangement limits their profit margins and keeps them in a cycle of debt and dependency, further marginalizing them economically.

Health issues among fisherfolks are another serious concern. Almost all fisherfolks suffer from lack of sleep, have thin physiques, and complain about various health conditions. This not only affects their efficiency and productivity but also increases the risk of accidents and long-term health problems. The demanding nature of fishing, combined with inadequate rest and poor health, can lead to chronic health issues, reducing their ability to work and support their families.

Local Trading

Opportunities:

Local trading of fish presents opportunities to improve market access and profitability for fisherfolks. Establishing or enhancing wet markets (Bagsakan) can facilitate better trading conditions, allowing fisherfolks to sell their products more efficiently. Moreover, understanding customer preferences regarding fish species, market schedules, and prices can help fisherfolks tailor their offerings to meet demand more effectively. This customer-centric approach can enhance sales and customer satisfaction, contributing to the overall success of the fishing industry.

Constraints:

However, local trading is constrained by several factors. Fisherfolks often face challenges with customers offering low prices for their products, which impacts profitability. Additionally, some customers perceive the fish as too expensive or of insufficient quality, hindering sales. Transportation issues further complicate local trading, as difficulties in transporting fish to the market can lead to delays and spoilage, reducing the value of the catch. Machine

malfunctions in transportation and storage equipment also pose significant risks. Furthermore, logistical challenges, such as the need for reliable vehicles and backup electricity for ice preservation, highlight the operational constraints faced by fisherfolks. Addressing these issues requires improving market facilities, transportation infrastructure, and equipment reliability to ensure the smooth and profitable trading of fish products.

The fishing industry offers numerous opportunities for growth and improvement across all stages of production, from input provision to local trading. However, these opportunities are accompanied by significant constraints that must be addressed to ensure the sustainable development of the industry. By providing new materials and ensuring a steady supply of gasoline, enhancing market facilities, understanding customer preferences, and addressing logistical challenges, stakeholders can support the productivity and profitability of fisherfolks. Additionally, managing environmental risks, improving equipment reliability, and supporting the health and well-being of fisherfolks are essential for the long-term success and sustainability of the fishing industry.

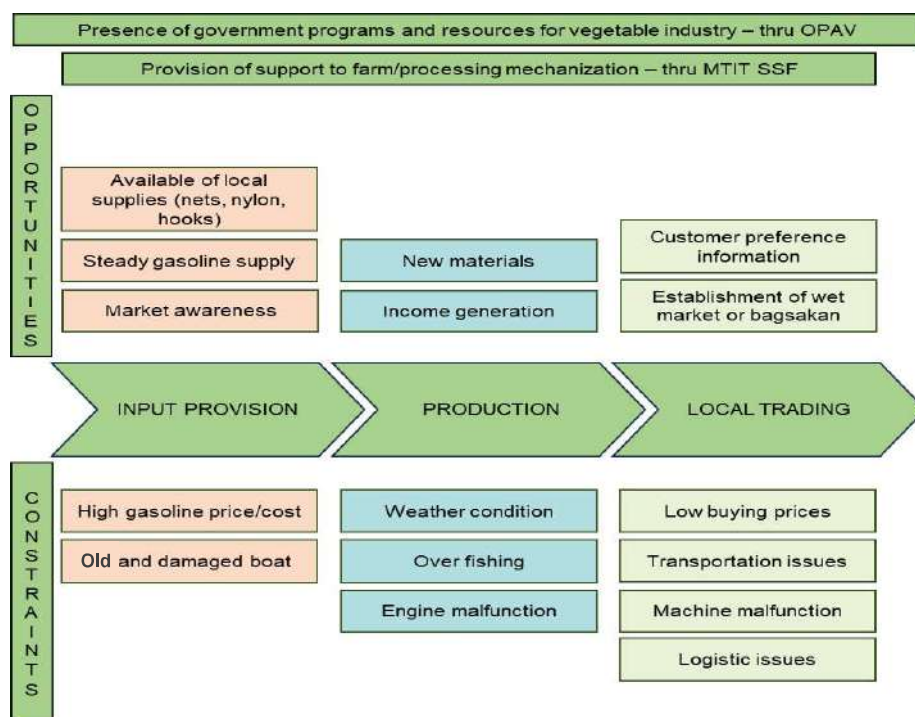


Figure 54. Opportunities and Constraints on Fish Production in Lamitan City, Basilan Province

15.15 Strategic Interventions

Input Supply Scheme

- **Provision of New Fishing Materials and Equipment:** Implementing a subsidy or grant program, in collaboration with the Ministry of Agriculture, Fisheries, and Agrarian Reform (MAFAR) and the Local Government of Lamitan through City Agriculture, can provide new boats, nets, engines, propellers, and other essential fishing gear. These are the equipment identified directly by the fisherfolk as their immediate needs. Agencies must ensure that the equipment provided aligns with the specific needs of the concerned fisherfolk to avoid unused or inappropriate equipment. Up-to-date equipment will reduce downtime due to malfunctions and increase catch efficiency, directly enhancing income for fisherfolk.
- **Access to Gasoline:** Establishing a cooperative gasoline station exclusively for fisherfolk, facilitated by MAFAR and the Local Government of Lamitan, ensures a steady and potentially cheaper supply of fuel. This is identified as a top need, as purchasing gasoline within their community is expensive and adds to their production costs. Reliable access to fuel is crucial for regular fishing operations and can mitigate one of the primary challenges identified by the community.
- **Maintenance Workshops:** Setting up local workshops for the maintenance and repair of fishing equipment, with support from MAFAR, is essential. Regular maintenance can prolong the lifespan of fishing gear, ensuring that operations run smoothly and efficiently, minimizing disruptions and costs associated with equipment failure.

Marketing Scheme

- **Establishment of Wet Market (Bagsakan):** Developing a centralized wet market where fisherfolk can directly sell their catch, with the assistance of the Ministry of Trade, Investment, and Tourism (MTIT) and the Local Government of Lamitan, can streamline sales, reduce transportation costs, and potentially offer better prices through direct

transactions. This initiative will facilitate a more organized and profitable marketing process. In addition, fisherfolk can use appropriate measuring units to quantify their catch, ensuring proper pricing and avoiding the "tuhog" method, which bundles assorted fish together.

- **Internet Access for Market Information:** Providing internet access points within the community, in collaboration with MTIT and MAFAR, will enable fisherfolk to monitor market prices and consumer preferences in real-time. This access to market information allows for informed decision-making about when and where to sell their catch, optimizing revenue.

Production Scheme

- **Improved Transportation Solutions:** Investing in a fleet of refrigerated vehicles for transporting fish to market, supported by MTIT and MAFAR, will help maintain freshness and quality. Ensuring that fish reaches the market in optimal condition can fetch higher prices and reduce spoilage, enhancing profitability for fisherfolk. For example, one association indicated that having a larger boat for transporting their products would allow them to avoid dealing traders from Zamboanga, thereby increasing their income by selling directly to destination market they prefer.
- **Backup Electricity Solutions:** Installing backup generators for ice-making facilities, with support from the Local Government of Lamitan, ensures a reliable ice supply for preserving fish, especially during power outages. This measure is crucial for maintaining product quality and preventing losses due to spoilage. This is essential while storing fish to meet the volume required by traders or for transporting their catch.
- **Microfinance and Credit Programs:** Developing microfinance schemes and credit facilities tailored to fisherfolk, facilitated by MAFAR and in partnership with local banks or credit cooperatives, can provide the financial support needed to invest in necessary equipment and cover operational costs. These programs will promote the expansion and improvement of fishing activities. With access to credit, fisherfolk will no longer be forced to sell their catch to those who finance their operations,

giving them the freedom to choose their market and potentially achieve better prices.

- **Training Programs:** Organizing training sessions on sustainable fishing practices, equipment maintenance, and business management, with the collaboration of the Ministry of Basic, Higher, and Technical Education - Technical and Skills Development (MBHTE - TESD) and MAFAR, will enhance the knowledge and skills of fisherfolk. Improved competencies can lead to better resource management, higher efficiency, and increased profitability.
- **Educational Support for Families:** Providing scholarships or financial aid for the children of fisherfolk, supported by MBHTE - TESD and local education authorities, ensures they receive a good education. Higher educational attainment among the younger generation can open up better economic opportunities and reduce the community's reliance on fishing alone.
- **Formation of Cooperatives:** Encouraging the formation of fisherfolk cooperatives, with the guidance and support of MAFAR and the Local Government of Lamitan, can facilitate collective bargaining, resource sharing, and mutual support. Cooperatives can help fisherfolk negotiate better prices for supplies, access larger markets, and share resources efficiently, strengthening their economic position.
- **Advocacy for Policy Support:** Engaging with local and national governments, including MAFAR and the Local Government of Lamitan, to advocate for supportive policies such as infrastructure development and subsidies for fishing communities can create a more conducive environment for sustainable fishing practices and community development. Policy support is essential for long-term growth and stability.
- **Healthcare Access:** Improving access to healthcare services, including regular health check-ups and emergency medical support, facilitated by the Local Government of Lamitan, is crucial for maintaining the well-being of fisherfolk. Healthier individuals can work more efficiently and

consistently, reducing the impact of health-related downtime on their livelihoods.

- **Safety Training:** Conducting safety training programs focused on safe fishing practices and first aid, with support from MAFAR and the Local Government of Lamitan, can reduce the risk of accidents and health issues related to fishing activities. Enhanced safety knowledge will contribute to a safer working environment and overall better health outcomes for the community.
- **Promotion of Sustainable Fishing:** Educating fisherfolk on sustainable fishing techniques, with the collaboration of MAFAR and the Lamitan City Environment and Natural Resources Office (CENRO), is vital to prevent overfishing and ensure the long-term viability of fish stocks as some fisherfolk have reported a decline in fish catch over the years. Sustainable practices will help maintain fish populations, securing a stable income source for future generations.
- **Environmental Conservation Initiatives:** Implementing conservation projects such as mangrove reforestation and establishing marine protected areas, with the support of CENRO and MAFAR, will support biodiversity and the health of fish populations. Protecting the marine environment is essential for the sustainability of fishing activities and the overall well-being of the community. Engaging the community in these initiatives can foster a sense of stewardship and collective responsibility.

16.0 SUMMARY OF FINDINGS

- In 2022, the Philippines ranked 11th globally in fish production (4.11 million MT) and aquaculture production (928,820.99 MT), significantly impacting global markets.
- Philippine fisheries achieved a trade surplus of USD 292.25 million in 2022, with major exports including tuna, seaweed, and crab, highlighting economic strength.

- The fishing and aquaculture industry contributed PhP 269.64 billion to the economy in 2022, underscoring its critical role in national economic development.
- Over the past decade, municipal fisheries production in the Philippines has seen a slight decline, with notable increases in production in NCR and Region XI, while BARMM remained a consistent top producer.
- Basilan's fisheries production fluctuated significantly from 37,174.19 MT in 2013 to 34,492.90 MT in 2023, showcasing variability over the years. Despite fluctuations, Basilan's contribution to BARMM's total production increased from 2.14% in 2016 to 2.45% in 2023.
- Basilan's municipal fisheries production ranged widely from 13,172.18 MT in 2013 to 25,139.84 MT in 2023, with significant variability. Its contribution to BARMM's municipal fisheries output dropped to 4.50% in 2016 but recovered to approximately 12.47% by 2023, reflecting growth and recovery in the sector.
- Lamitan fisherfolks have an average age of 41.5 years, with a wide age range of 19-84 years, indicating a mix of younger and older individuals. They typically belong to large households (average 6.17 members) with varying monthly expenses (₱1,600 to ₱21,100). The majority are male (93.3%) and married (75.9%). Tausug (41.4%) and Sama Bangingi (24.1%) are the largest ethnic groups, with most being Muslim (89.7%). Educational levels vary, with 23.3% having completed high school, highlighting room for educational improvement.
- Traders in Lamitan City are middle-aged (average 45.4 years) and predominantly male, operating within family-run businesses. They belong to the Sama Bangingi and Yakan ethnic groups, all practicing Islam. Educational attainment varies, affecting business adaptation and technology adoption. Most traders operate independently, facing

challenges in market information access, infrastructure, and weather conditions.

- The fishing industry in Lamitan City involves input suppliers, fisherfolks across barangays (Luksumbang, Ulami, Maloong Canal, Tumakid), traders (consolidators, local traders), and consumers. Suppliers provide fishing materials, fisherfolks catch fish, traders aggregate and distribute to retailers or consumers, forming a comprehensive value chain.
- Lamitan's fishing value chain includes input suppliers, fisherfolks, traders, and consumers. Fisherfolks consolidate catches to enhance bargaining power and price outcomes. Market demand emphasizes fresh, well-handled fish of marketable size, driving quality standards and logistical efficiency.
- Input suppliers provide equipment, fisherfolks fish and handle catch, traders aggregate and distribute, and consumers drive demand in Lamitan's fishing value chain. Efficient operations rely on quality inputs, effective practices, and meeting consumer expectations for stable and profitable outcomes.
- Lamitan's fishing activities are predominantly performed by men including the youth, with women involved in preservation and marketing. The industry relies heavily on personal labor, emphasizing the need for health-focused support and skill development to enhance efficiency and safety. Cost considerations, such as the purchase of bait at ₱1,000 per trip, highlight opportunities for cost-saving measures and underscore the importance of policies recognizing the value of fishermen's work.
- In Lamitan's fish production chain, products flow from fishermen to traders, ensuring a steady supply through processing and distribution to retailers or consumers. Payments follow from consumers to local traders, who compensate fishermen directly in streamlined transactions.

Continuous information exchange on fishing practices and market trends enhances operational efficiency, while negotiation dynamics influence final prices between fishermen and consumers.

- The average annual income from fish and cephalopods in Lamitan City totals ₱913,061.33, with a return on investment of 65%. After adjusting for non-cash items, the actual cash income is ₱811,248.00, crucial for accurate financial planning and policy design. Production costs amount to ₱551,485.31 annually, with labor costs (₱108,000.00) and transportation costs (₱183,827.59) as significant components. Understanding these costs aids in optimizing operations and enhancing profitability.
- Participatory Systems Analysis identified key drivers for success in Lamitan's fishing industry: market information (MI), input support (Inp S), and credit facilities (CF). These factors play pivotal roles in enhancing productivity and profitability, while technical assistance and policy development require careful management due to their critical impacts and complex nature. Strategic interventions focusing on resources, financial support, and education can bolster the industry's sustainability and resilience.
- Input provision opportunities in Lamitan include meeting the demand for fishing materials and gasoline to enhance productivity. However, challenges such as costly gasoline and old equipment limit efficiency and safety, necessitating improvements. Production faces fisherfolks health, financial constraints, weather disruptions and overfishing threats, impacting sustainability. Local trading offers opportunities with better market access but faces challenges like price negotiations and transportation issues, requiring infrastructure and operational enhancements for sustainable growth.

The fishing industry in Lamitan City exhibits significant economic potential, underscored by substantial annual incomes primarily derived from fish and cephalopod sales. However, challenges such as weather disruptions, high production costs, and health issues among fishermen threaten sustainability and profitability. Detailed cost and return analyses emphasize the importance of distinguishing between cash and non-cash incomes for accurate financial planning and effective policy formulation. The Participatory Systems Analysis (PSA) identifies critical intervention areas like market information, input subsidies, and credit facilities to enhance industry productivity and sustainability. Opportunities in input provision, production efficiency, and local trading require leveraging to address constraints such as overfishing, infrastructure deficiencies, and financial challenges. Activities are predominantly labor-intensive, highlighting the need for skill development and cost-saving measures. Efficient product, information, and payment flows through the production chain are crucial for market responsiveness and profitability. By implementing sustainable practices, improving infrastructure, and enacting targeted policies, Lamitan City can cultivate a resilient and prosperous fishing sector that benefits fishermen and the broader community alike.

17.0 RECOMMENDATIONS

Input Supply Scheme

- The immediate provision of essential fishing materials and equipment, in collaboration with the Ministry of Agriculture, Fisheries, and Agrarian Reform (MAFAR) and the Local Government of Lamitan, is crucial to enhance productivity and efficiency.
- Establishing a cooperative gasoline station, facilitated by MAFAR and the local government, will address the high cost of fuel, reducing production costs and ensuring regular fishing operations.

- Setting up local maintenance workshops with support from MAFAR will prolong the lifespan of fishing gear, minimize downtime, and reduce repair costs, supporting operational efficiency.

Marketing Scheme

- Developing a centralized wet market (Bagsakan) with assistance from the Ministry of Trade, Investment, and Tourism (MTIT) and the Local Government of Lamitan will streamline sales, reduce transportation costs, and improve profit margins by facilitating direct transactions between fisherfolk and consumers.
- Providing internet access points within the community, in collaboration with MTIT and MAFAR, will enable fisherfolk to stay informed about market prices and consumer preferences, allowing them to make informed decisions about when and where to sell their catch, thus optimizing revenue.

Production Scheme

- Investing in refrigerated vehicles, supported by MTIT and MAFAR, will maintain fish freshness during transport, ensuring higher market prices and reduced spoilage.
- Installing backup generators for ice-making facilities, with assistance from the Local Government of Lamitan, is essential to provide a reliable ice supply, preserving fish quality.
- Tailored microfinance schemes, developed in partnership with local banks or credit cooperatives and facilitated by MAFAR, will support investments in necessary equipment and operational costs, granting fisherfolk greater market freedom and financial stability.
- Training programs on sustainable fishing practices, equipment maintenance, and business management, organized with the Ministry of

Basic, Higher, and Technical Education - Technical and Skills Development (MBHTE - TESD) and MAFAR, will enhance their knowledge and efficiency, while educational support for their families, with support from MBHTE - TESD and local education authorities, will improve long-term economic opportunities.

- Promoting sustainable fishing practices among fisherfolk, with guidance from MAFAR and the Lamitan City Environment and Natural Resources Office (CENRO), is vital to prevent overfishing and ensure the long-term viability of fish stocks. Implementing conservation projects such as mangrove reforestation and establishing marine protected areas, supported by CENRO and MAFAR, will support biodiversity and the health of fish populations.

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Other source:

Quarterly Commercial Fisheries Survey (QCFS), Quarterly Municipal Fisheries Survey (QMFS), Quarterly Inland Fisheries Survey (QIFS) and Quarterly Aquaculture Survey (QAqS)

**APPENDIX A
RUBBER FARMER**

Table 59: Summary of Rubber Farmers' Responses (30 Farmers)

Items	Average	Frequency	Percentage
1. Age <i>* Only 29 respondents answered this question</i>	51 years old		
2. Household Size	5		
3. Gender			
Male		24	80%
Female		6	20%
4. No. of Children in School <i>* Only 25 respondents answered this question</i>	2		
5. Civil Status			
Married		26	87%
Single		2	7%
Live-in		1	3%
Separated		1	3%
6. Ethnicity			
Tausug		3	10%
Jimama		1	3%
Sama Bangingi		1	3%
Bisaya		14	47%
Zamboangueno		7	23%
Yakan		4	1%
7. Religious Affiliation			
Islam		9	30%
Roman Catholic		21	70%
8. Highest Educational Attainment			
College Graduate		5	17%
High School Graduate		7	23%
Elementary Graduate		3	10%
College Undergraduate		2	7%
High School Undergraduate		6	20%
Elementary Undergraduate		7	23%
9. Occupation			
Farmer		27	90%
Government Employee		1	3%
Bookkeeper		1	3%
Security Guard		1	3%
10. Nature of Operation – Rubber Based Crops <i>* Only 24 respondents answered this question</i>			
Monthly		4	13%
Every other day		11	37%
Every day		9	30%
Every 15 days		3	10%
Once a week		1	3%
Twice a week		2	7%

11. Output per cycle	17.24		
<i>* Only 26 respondents answered this question</i>	kg/day		
12. Value per kg	Php 30.09		
<i>* Only 28 respondents answered this question</i>			
13. Secondary Source of Income			
<i>* Only 24 respondents answered this question</i>			
Employment	14	58%	
Retail/Merchandizing	2	8%	
Income from Miscellaneous Sources	7	29%	
Remittance	1	4%	
14. Family Expenses on Monthly Basis			
Food	Php 5,508.62		
Education of Children	Php 2,484.00		
<i>* Only 26 respondents answered this question</i>			
Household Needs	Php 1,160.00		
<i>* Only 29 respondents answered this question</i>			
Medicine	Php 723.33		
<i>* Only 21 respondents answered this question</i>			
Bills	Php 674.48		
<i>* Only 29 respondents answered this question</i>			
Payment of Credits	Php 3,301.10		
<i>* Only 10 respondents answered this question</i>			
Total Monthly Expenses	Php 10,658.61		
15. Member of any farming organization or association			
Yes	28	93%	
No	2	7%	
16. Name of organization or association			
<i>* Only 29 respondents answered this question</i>			
Lamitan Agrarian Reform Beneficiaries Cooperative	5	17%	
Lumuton Small Grower Association	6	20%	
Malo-ong Canal Farmers Agrarian Reform Multi-Purposes Cooperative	6	20%	
Sta. Clara Agrarian Reform Beneficiaries Integrated Development Cooperative	1	4%	
Tumakid Diversified Ahon Farmer Association	6	20%	
United Workers Agrarian Reform Beneficiaries Multi-Purpose Cooperative	1	4%	

	Ulame Farmer Organization	4	15%
17.	Number of years as members	7.25 years	
	<i>* Only 27 respondents answered this question</i>		
18.	Benefits or services availed		
	<i>* Only 13 respondents answered this question</i>		
	Farm Inputs (e.g. Seeds, Vegetables, Fertilizer)	3	22%
	Cash Incentives	5	36%
	Loan	2	14%
	Trainings	2	14%
	Salary	1	7%
	Live Stocks	1	7%
19.	Number of years in Rubber Farming	13.05 years	
20.	Farm Location		
	Tumakid	6	20%
	Malo-ong Canal	6	20%
	Sta. Clara	1	3%
	Ulame	5	17%
	Lumuton	7	23%
	Limo-ok	5	17%
21.	Total farm area	4.24 ha.	
	<i>* Only 28 respondents answered this question</i>		
22.	Farm area planted with rubber	0.50 ha.	
	<i>* Only 28 respondents answered this question</i>		
23.	Number of rubber trees planter per ha.	24.00 ha.	
24.	Tenurial Status		
	<i>* Respondent 19 answered both Owned and Tenant</i>		
	Owned	26	84%
	Tenant	5	16%
25.	Frequency of harvest per year		
	Daily	11	37%
	Every other day	17	57%
	Every after 2 days	1	3%
	Every after 3 days	1	3%
26.	Form of Assistance provided under the program		
	<i>* Only 14 respondents answered this question</i>		
	Trainings for Production Technology	6	35%
	Input Subsidy	1	6%
	Cash Assistance	2	11%
	Loan	3	18%
	Others:		
	Farms Inputs	3	18%
	Pest and Disease Assessment	1	6%
	Honorarium	1	6%

27. Type of farming practices		
<i>* Respondent 17 answered both Mono-cropping and Multi-cropping</i>		
Mono-cropping	26	84%
Intercropping	4	13%
Multi-cropping	1	3%
28. Crop Management Adopted		
<i>* Only 24 respondents answered this question</i>		
Replanting	5	17%
Pest and Disease Control	9	31%
Fertilization	13	45%
Tabas	2	7%
29. Farm affected by diseases or pests		
No	11	37%
Yes	19	63%
If yes, what are these?		
Rubber Leaf Fall Disease	13	68%
Root Disease	2	11%
Bukbok	4	21%
30. Disease mitigating measures and practices		
<i>* Only 24 respondents answered this question</i>		
Monthly cleaning	15	48%
Use of herbicides/pesticides	7	22%
Burning/cutting of infected rubber trees	4	13%
Others:		
Tabas	2	7%
Yearly cleaning	2	7%
Brushing	1	3%
31. Degree of disease/infestation	49%	
<i>* Only 18 respondents answered this question</i>		
32. Main challenges in rubber farming		
<i>* Only 27 respondents answered this question</i>		
Quality/Source of Seedlings	4	6%
Capital Investment	2	3%
Weather Condition	24	31%
Pest and Diseases	22	28%
Buying Price	16	21%
Access to Market		
Information	1	1%
Marketing	1	1%
Logistics	1	1%
Others:		
Farm inputs	4	5%
Low latex	1	1%
Dry trees	1	1%
Money	1	1%

33. Where do you sell your products?		
Local Traders	14	47%
City Traders	4	13%
Consolidators	1	3%
Cooperative	3	10%
Manufacturer	1	3%
Within the Barangay	7	23%
34. Are you satisfied with the price of your products?		
<i>* Only 24 respondents answered this question</i>		
Yes	20	83%
No	4	17%
35. What are the possible causes of not getting the desired sales of your products?		
<i>* Only 11 respondents answered this question</i>		
Poor Market	3	14%
Poor Farm to Market Road	3	14%
Losses in Handling	3	14%
No Post-harvest Facilities	7	32%
Low Demand or Bidding	1	5%
Price	1	5%
Quality	3	14%
Cooperative	2	9%
36. Main source of funding for farm operations		
<i>* Only 26 respondents answered this question</i>		
Sale of farm produce	19	70%
Financing from traders	2	7%
Loan/Borrowings	1	4%
Personal Money	4	14%
Subsidy from the Cooperative	1	4%
37. Access to post-harvest facilities		
<i>* Only 24 respondents answered this question</i>		
No	13	54%
Yes	11	46%
Post-harvest storage	9	60%
Drying facilities	1	7%
<i>Banyera</i>	2	13%
<i>Bangag sa yuta</i>	2	13%
Concrete cement	1	7%
38. Member of a cooperative or association		
<i>* Only 18 respondents answered this question</i>		
No	6	26%
Yes	17	74%
Association	2	13%

Lamitan Agrarian Reform Beneficiaries Cooperative	5	33%
Malo-ong Canal Farmers Agrarian Reform Multi-Purpose Cooperative	6	40%
Philippine Coconut Authority	1	7%
Sta. Clara Agrarian Reform Beneficiaries Integrated Development Cooperative	1	7%
39. Services extended or offered by the cooperative		
<i>* Only 13 respondents answered this question</i>		
Farm Inputs	6	33%
Livestock	1	6%
Cash Incentives	4	22%
Loan	5	28%
Bidding for Market	2	11%
40. Access to rubber production information		
<i>* Only 26 respondents answered this question</i>		
No, information would like to access:	6	23%
High yielding varieties	4	44%
Disease management	5	56%
Yes, these are:	20	77%
High yielding varieties	17	60%
Disease management	8	28%
Price	1	4%
Personal practice	1	4%
All information	1	4%
41. Available agricultural extension agencies in the area		
<i>* Only 22 respondents answered this question</i>		
No	19	86%
Yes, these are:	3	14%
City Agriculture	1	33%
Kasanyangan Center for Community Development and Microfinance Foundation, Inc.	1	33%
Ministry of Agriculture, Fisheries, and Agrarian Reform	1	33%
42. Do you want to expand your rubber farming as an enterprise?		
<i>* Only 25 respondents answered this question</i>		
Yes	19	76%
No	6	24%

43. Problems dealing with your customers		
<i>* Only 28 respondents answered this question</i>		
No	26	26%
Yes, these are:	2	2%
Low bidding price	1	50%
Debt	1	50%
44. Concerns in dealing with those involved in production		
<i>* Only 3 respondents answered this question</i>		
Absences	1	33%
Stealing product	1	33%
Refusing to work	1	33%
45. Opportunities and benefits in rubber farming		
<i>* Only 24 respondents answered this question</i>		
No	4	17%
Yes, these are	20	83%
Source of income	29	74%
Savings	10	26%
46. Concerns in marketing your product/s		
<i>* Only 10 respondents answered this question</i>		
Price	8	80%
Storage facility	1	10%
Difficulty in delivering the products	1	10%
47. Final destination of the products		
<i>* Only 29 respondents answered this question</i>		
Within the barangay	18	56%
Within Lamitan City	10	31%
Isabela City	4	13%
48. Do you pay for the information you get about the market?		
<i>* Only 29 respondents answered this question</i>		
Yes	2	7%
No	27	93%
49. Do you experience problems in marketing?		
<i>* Only 29 respondents answered this question</i>		
Yes	4	14%
No	25	86%
50. Factors beyond our ability or control that actually affect operations and success in our enterprise		
<i>* Only 29 respondents answered this question</i>		
Cooperative Policies	1	2%
Peace and Order	3	6%
Weather/Environmental Factor	29	60%

Internet Connectivity	3	6%
Electricity	2	4%
Market Information	10	21%

Table 60: By-products of Rubber (30 Farmers)

Items	Total Produce per Harvest	Volume Sold	Selling Price	Total Sales
1. Cup Lumps <i>* Only 26 respondents answered this question</i>	1,827.38 kg	1,883.04 kg	Php 31.02	Php 55,281.90
2. Crumb Rubber <i>* Only 7 respondents answered this question</i>	456.43 kg	456.43 kg	Php 26.71	Php 11,392.86
3. Latex <i>* Only 2 respondents answered this question</i>	115 kg	115 kg	Php 30.00	Php 3,450.00

Table 61: Activities in Rubber Farming (30 Farmers)

	Tapping	Collecting	Hauling	Soaking with Water/Acid <i>* Only 9 respondents answered this question</i>	Area Clearing
1. Male	4	2	2	1	2
2. Female	1	8	2	1	1
3. Youth	2	1	-	-	2
4. No. of hours per worker	2.7 hours	1.54 hours	1.88 hours	1 hours	3.24 hours
5. Total hours of work	3.2 hours	1.97 hours	2.3 hours	1.13 hours	4.53 hours
6. Average wage rate	Php 130.40	Php 80.15	Php 94.06	Php 45.84	Php 194.73
7. No. of workdays	20 days	17.33 days	1.13 days	18.13 days	3.27 days

COCONUT FARMER

Table 62: Summary of Coconut Farmers' Responses (30 Farmers)

Items	Average	Frequency	Percentage
1. Age	54.87 years old		
2. Household Size <i>* Only 29 respondents answered this question</i>	5		
3. Gender			
Male		21	80%
Female		9	20%
4. No. of Children in School <i>* Only 20 respondents answered this question</i>	2		
5. Civil Status			
Married		25	83%
Widow/Widower		3	10%
Single		1	3%
Separated		1	3%
6. Ethnicity <i>* Only 28 respondents answered this question</i>			
Bisaya		10	36%
Ilonggo		1	4%
Sama Bangingi		4	14%
Tausug		5	18%
Zamboangueno		8	29%
7. Religious Affiliation <i>* Only 29 respondents answered this question</i>			
Islam		12	41%
Roman Catholic		17	59%
8. Highest Educational Attainment			
College Graduate		11	37%
College Undergraduate		4	13%
High School Graduate		5	17%
High School Undergraduate		2	7%
Elementary Graduate		1	3%
Elementary Undergraduate		7	23%
9. Occupation <i>* Only 26 respondents answered this question</i>			
Farmer		19	73%
Government Employee		2	8%
Private Employee		2	8%
Self-employed		1	4%
Businessman		1	4%
Pensioner		1	4%

10. Nature of Operation –			
Coconut Based Crops			
Quarterly		27	90%
Every 2 months		1	3%
Semiannual		1	3%
Daily		1	3%
11. Output per cycle	861.17 kg		
12. Value per kg	Php 19.98		
13. Secondary Source of Income			
<i>* Only 22 respondents answered this question</i>			
Employment		11	38%
Retail/Merchandizing		6	21%
Income from		6	21%
Miscellaneous Sources		3	10%
Remittance		1	3%
4Ps		1	3%
Pension		1	3%
Allowance (for laborer)		1	3%
14. Family Expenses on Monthly Basis			
Food	Php		
	7,003.33		
Education of Children	Php		
<i>* Only 20 respondents answered this question</i>	3,031.00		
Household Needs	Php		
<i>* Only 28 respondents answered this question</i>	1,821.43		
Medicine	Php		
<i>* Only 25 respondents answered this question</i>	769.97		
Bills	Php		
	994.33		
Payment of Credits	Php		
<i>* Only 1 respondent answered this question</i>	560.00		
Total Monthly Expenses	Php		
	12,378.64		
15. Member of any farming organization or association			
<i>* Only 28 respondents answered this question</i>			
Yes		28	100%
16. Name of organization or association			
Lamitan Agrarian Reform Beneficiaries Cooperative		5	17%
Ulame Agrarian Reform Beneficiaries Multipurpose Cooperative		5	17%
Ulame Farmer Association		3	10%
Lamitan Agrarian Reform Beneficiaries Cooperative		5	17%

	Tumakid Diversified Farming Association	9	30%
	Sta. Clara Cooperative Agrarian Reform Beneficiaries Cooperative	1	3%
	Rose Women Organization	1	3%
	FADA	1	3%
17.	Number of years as members	8.97 years	
18.	Benefits or services availed		
	<i>* Only 13 respondents answered this question</i>		
	Farm Inputs (e.g. Seeds, Vegetables, Fertilizer)	2	15%
	Cash Incentives	7	54%
	Land Grant	1	8%
	Trainings	1	8%
	Salary	1	8%
	Sustainable Livelihood Program	1	8%
19.	What is your status in your organization?		
	Active	29	97%
	Inactive	1	3%
20.	Have you or any of your household members attended any trainings/seminars related to Horticulture or Agriculture?		
	<i>* Only 29 respondents answered this question</i>		
	Yes	13	45%
	No	16	55%
21.	Number of years in Rubber Farming	22.97 years	
22.	Farm Location		
	<i>* Only 29 respondents answered this question</i>		
	Limo-ok	9	31%
	Ulame	7	24%
	Atieza	1	3%
	Purok Bogambilla	1	3%
	Tumakid	10	34%
	Sta. Clara	1	3%
23.	Total farm area	40.06 ha.	
24.	Farm area planted with rubber	8.61 ha.	
25.	Number of rubber trees planter per ha.	883 trees	
26.	Tenurial Status		
	Owned	25	83%
	Tenant	4	13%
	Cooperative	1	3%

27. Frequency of harvest per year		
6 times per week	1	3%
Every 2 months	1	3%
Quarterly	28	93%
28. Form of Assistance provided under the program		
<i>* Only 21 respondents answered this question</i>		
Trainings for Production Technology	7	26%
Training for Marketing	3	11%
Training for Business Enterprise	1	4%
Input Subsidy	1	4%
Cash Assistance	4	15%
Others:		
Farm Inputs	5	19%
Trainings/Seminars	4	15%
Cocolisap Injection	1	4%
Cash Incentives	1	4%
29. Type of farming practices		
Mono-cropping	8	27%
Intercropping	14	47%
Multi-cropping	8	27%
30. Farming Practices Adopted		
Cultivation Weeding	24	36%
Fertilization	11	17%
Pest and Disease Control	12	18%
Replanting	18	27%
<i>Pagulong</i>	1	2%
31. Farm affected by diseases or pests		
No	5	17%
Yes	25	83%
If yes, what are these?		
Cocolisap	23	96%
Beetle	1	4%
32. Disease mitigating measures and practices		
<i>* Only 28 respondents answered this question</i>		
Monthly cleaning	23	53%
Use of herbicides/pesticides	10	23%
Burning/cutting of infected rubber trees	7	16%
Others:		
Injection	1	2%
Quarterly Cleaning	1	2%
Smoke	1	2%

33. Degree of disease/infestation	62.11%	
<i>* Only 20 respondents answered this question</i>		
34. Extent of damage to your productions	55.26%	
<i>* Only 19 respondents answered this question</i>		
35. Main challenges in rubber farming		
<i>* Only 29 respondents answered this question</i>		
Quality/Source of Seedlings	11	15%
Capital Investment	16	22%
Weather Condition	9	12%
Pest and Diseases	12	16%
Buying Price	13	18%
Access to Market Information	3	4%
Marketing	3	4%
Logistics	2	3%
Others:		
Farm inputs	1	1%
Dedication	1	1%
Fencing	1	1%
Maintenance	1	1%
36. Where do you sell your products?		
<i>* Only 29 respondents answered this question</i>		
Local Traders	20	57%
City Traders	10	29%
Consolidators	3	9%
Cooperative	1	3%
Within the Community	1	3%
37. What are the possible causes of not getting the desired sales of your products?		
<i>* Only 24 respondents answered this question</i>		
Poor market	13	41%
Poor farm to market road	1	3%
Losses on handling	1	3%
No post-harvest facility	4	13%
Lack of competition	5	16%
Low demand or bidding price	1	3%
Quality	2	6%
Infestation	1	3%
Weather	1	3%
Lack of Farm Inputs	1	3%
Replanting	1	3%

	Monopolized by the Cooperative	1	3%
38.	Main source of funding for farm operations		
	<i>* Only 29 respondents answered this question</i>		
	Sale of farm produce	27	84%
	Business or another farm investment	2	6%
	Off farm employment	1	3%
	Loan/Borrowings	1	3%
	Personal Money	1	3%
39.	Do you borrow money for capital?		
	<i>* Only 28 respondents answered this question</i>		
	Yes	2	7%
	No	26	93%
40.	Do you have access to post-harvest facilities?		
	<i>* Only 28 respondents answered this question</i>		
	No	2	7%
	Yes	28	93%
	Post-harvest storage	1	7%
	Drying facilities	28	93%
41.	Are you a member of a cooperative or association?		
	<i>* Only 29 respondents answered this question</i>		
	No	-	
	Yes	29	100%
	LARBECO	9	32%
	UARBMPC	6	21%
	Ulame Farm Association	2	7%
	Tumakid Diversified Farmers Association	10	36%
	SCARBDC	1	4%
42.	Services extended or offered by the cooperative		
	<i>* Only 17 respondents answered this question</i>		
	Equipment	3	14%
	Facility	1	5%
	Farm Inputs	4	19%
	Technical Advices	2	10%
	Cash Incentives	6	29%
	Linkages	1	5%
	Salary	1	5%
	Training/Seminar	3	14%

43.	Do you have access to coconut production information		
	No, information would like to access:	14	47%
	High yielding varieties	11	55%
	Disease management	7	35%
	Fertilizer	2	10%
	Yes, these are:	16	53%
	High yielding varieties	13	48%
	Disease management	10	37%
	PCA Program and Seminars	2	7%
	Practices	1	4%
	Farm Inputs	1	4%
44.	Do you have available agricultural extension agencies in the area?		
	<i>* Only 29 respondents answered this question</i>		
	No	19	66%
	Yes	10	34%
45.	Do you want to expand your rubber farming as an enterprise?		
	<i>* Only 25 respondents answered this question</i>		
	Yes	19	76%
	No	6	24%
46.	Are there problems dealing with your customers		
	<i>* Only 27 respondents answered this question</i>		
	No	23	79%
	Yes, these are:	7	24%
	Low or cannot demand bidding price	5	71%
	Cannot sell outside the cooperative	2	29%
47.	Concerns in dealing with those involved in production		
	<i>* Only 5 respondents answered this question</i>		
	Higher labor cost	5	100%
48.	Are there opportunities and benefits in coconut farming?		
	<i>* Only 29 respondents answered this question</i>		
	No	1	3%
	Yes, these are	28	97%
	Source of income	28	90%
	Longer life span	1	3%
	Employment/Salary	2	6%

49.	Concerns in marketing your product/s		
	<i>* Only 16 respondents answered this question</i>		
	Capital	2	11%
	Price	12	63%
	Quality of the product	1	5%
	Transportation	1	5%
	Monopolizing the market	1	5%
	Cannot sustain	1	5%
	Low income	1	5%
50.	Final destination of the products		
	<i>* Respondent 7 answered both Nearby Municipality and Isabela City. Respondent 13 answered both Within the Barangay and Isabela City.</i>		
	Within the barangay	14	44%
	Nearby Municipality	1	3%
	Isabela City	17	53%
51.	Do you pay for the information you get about the market?		
	<i>* Only 28 respondents answered this question</i>		
	Yes	2	7%
	No	26	93%
52.	Do you experience problems in marketing?		
	<i>* Only 26 respondents answered this question</i>		
	Yes	12	46%
	No	14	54%
53.	What are the factors beyond our ability or control that actually affect operations and success in our enterprise?		
	<i>* Only 27 respondents answered this question</i>		
	Government Regulations	2	4%
	Cooperative Policies	3	7%
	Peace and Order	3	7%
	Weather/Environmental Factor	22	49%
	Internet Connectivity	4	9%
	Market Information	11	24%

Table 63: By-products of Coconut (30 Farmers)

Items	Total Produce per Harvest	Volume Sold	Selling Price	Total Sales
1. Copra <i>* Only 28 respondents answered this question</i>	630.50 kg	2,594.86 kg	Php 20.16	Php 51,324.29
2. Charcoal Briquettes <i>* Only 22 respondents answered this question</i>	14. 46 sacks	58.55 sacks	Php 192.72	Php 11,279.09
3. Oil <i>* Only 2 respondents answered this question</i>	1 liter	4 liters	Php 175.00	Php 700.00
4. Coconut Milk <i>* Only 1 respondent answered this question</i>	2 kg	8 kg	Php 30.00	Php 240.00
5. Liquor <i>* Only 1 respondent answered this question</i>	70 liters	840 liters	Php 100.00	Php 84,000.00
6. Broom <i>* Only 1 respondent answered this question</i>	40 brooms	480 brooms	Php 35.00	Php 16,800.00
7. Nuts <i>* Only 2 respondents answered this question</i>	5,000 nuts	1,585,000 nuts	Php 5.00	Php 7,925,000.00

Table 64: Activities in Coconut Farming (30 Farmers)

Activity	Worker			No. of hours per worker	Total hours work	Ave. wage rate	No. of workdays
	Male	Female	Youth				
1. Land Clearing/ Cultivation	3	1	1	6.7 hours	37.57 hours	Php 352.18	5.53 days
2. Harvesting of Coconut	2	-	-	6.67 hours	35.07 hours	Output based	5.02 days
3. Picking Hauling of Harvested Coconut Fruit to Processing Area	3	1	1	6.47 hours	34.72 hours	Output based	5.02 days
4. Dehusking of Coconut <i>* Only 29 respondents answered this question</i>	3	1	-	6.86 hours	14.86 hours	Output based	3.12 days
5. Slicing of Coconut <i>* Only 28 respondents answered this question</i>	3	1	1	6.64 hours	11.12 hours	Output based	1.61 days
6. Cooking of Coconut Meat <i>* Only 29 respondents answered this question</i>	3	1	1	7.54 hours	8.18 hours	Output based	1.07 days
7. Scrapping of Coco Meat <i>* Only 28 respondents answered this question</i>	3	1	1	6.61 hours	12.82 hours	Output based	1.86 days
8. Re-cooking of Uncooked Coco Meat <i>* Only 28 respondents answered this question</i>	3	1	1	4.29 hours	4.32 hours	Output based	1 day
9. Sacking of Copra <i>* Only 26 respondents answered this question</i>	3	1	-	2.30 hours	2.54 hours	Output based	1 day
10. Hauling of Copra from Farm to Barangay Road <i>* Only 16 respondents answered this question</i>	4	-	-	2.07 hours	2.10 hours	Output based	2.44 days

11. Transportation							
from Farm to							
Trader/							
Consolidator/	2	-	-	1.85	1.94	Php	1 day
Processor				hours	hours	275.00	
<i>* Only 11 respondents answered this question</i>							
12. Marketing							
	1	-	-	1.52	1.52	Php	1 day
				hours	hours	242.86	
<i>* Only 10 respondents answered this question</i>							

VEGETABLE FARMERS

Table 65: Summary of Vegetable Farmers' Responses (30 Farmers)

Items	Average	Frequency	Percentage
1. Age	47.53 years old		
2. Household Size	5		
3. Gender			
<i>* Only 29 respondents answered this question</i>			
Male		11	38%
Female		18	62%
4. No. of Children in School	3		
<i>* Only 27 respondents answered this question</i>			
5. Civil Status			
<i>* Only 29 respondents answered this question</i>			
Married		27	93%
Widow/Widower		1	3%
Single		1	3%
6. Ethnicity			
<i>* Only 29 respondents answered this question</i>			
Bisaya		14	48%
Tausug		2	7%
Yakan		13	45%
7. Religious Affiliation			
Islam		16	53%
Roman Catholic		14	47%
8. Highest Educational Attainment			
<i>* Only 27 respondents answered this question</i>			
College Graduate		4	15%
College Undergraduate		1	4%
High School Graduate		4	15%
High School Undergraduate		7	26%
Elementary Graduate		2	7%
Elementary Undergraduate		7	26%
Did not go to school		2	7%
9. Occupation			
Farmer		25	83%
Government Employee		2	7%
House Helper		1	3%
Tricycle Driver		1	3%
Businessman		1	3%
10. Nature of Operation – Vegetable Based Crops			
<i>* Only 28 respondents answered this question</i>			
Once a week		8	29%
Twice a week		12	43%
Every 2 months		1	4%

Every 3 months		2	7%
Every 4 months		2	7%
Semiannual		2	7%
Yearly		1	4%
11. Output per cycle	47.2 kg		
<i>* Only 29 respondents answered this question</i>	3.4 sacks		
	30.89 ties		
	Php 48.57/kg		
12. Value	Php		
<i>* Only 28 respondents answered this question</i>	310.00/sack		
	Php 17.89/tie		
13. Secondary Source of Income			
<i>* Only 25 respondents answered this question</i>			
Employment		16	44%
Retail/Merchandizing		7	19%
Income from Miscellaneous Sources		3	8%
Remittance		6	17%
4Ps		3	8%
Salary		1	3%
14. Family Expenses on Monthly Basis			
Food	Php 4,573.330		
Education of Children	Php 2,601.79		
<i>* Only 28 respondents answered this question</i>			
Household Needs	Php 961.67		
Medicine	Php 435.69		
<i>* Only 29 respondents answered this question</i>			
Bills	Php 639.18		
<i>* Only 28 respondents answered this question</i>			
Payment of Credits	Php 2,166.67		
<i>* Only 12 respondents answered this question</i>			
Total Monthly Expenses	Php 9,595.67		
15. Member of any farming organization or association			
<i>* Only 28 respondents answered this question</i>			
Yes		28	100%
16. Name of organization or association			
<i>* Only 25 respondents answered this question</i>			
Malo-ong San Jose Farmers Association		3	12%
Women's Organization		3	12%
Al-hudda Agri-Producer and Marketing Association		4	16%

Calugusan Farmers Association	2	8%
Bangsamoro Inland Farmers Association	4	16%
Sta. Clara Organic Farmers Association	3	12%
ISCORRA Organization	1	4%
Baungus Women's Association	1	4%
UFO	4	16%
17. Number of years as members	1.79 years	
<i>* Only 29 respondents answered this question</i>		
18. Benefits or services availed		
<i>* Only 7 respondents answered this question</i>		
Farm Inputs	4	50%
Incentives (e.g. Cash, Rice)	3	38%
Land Cultivation	1	13%
19. What is your status in your organization?		
<i>* Only 28 respondents answered this question</i>		
Active	28	100%
20. Have you or any of your household members attended any trainings/seminars related to Horticulture or Agriculture?		
<i>* Only 28 respondents answered this question</i>		
Yes	9	32%
No	19	68%
21. Number of years in Vegetable Production	9.09 years	
22. Total farm area	2.04 ha.	
23. Farm area planted with vegetables	0.63 ha.	
<i>* Only 29 respondents answered this question</i>		
Vegetable 1	0.07 ha.	
<i>* Only 29 respondents answered this question</i>		
Vegetable 2	0.07 ha.	
<i>* Only 26 respondents answered this question</i>		
Vegetable 3	0.05 ha.	
<i>* Only 23 respondents answered this question</i>		
Vegetable 4	0.29 ha.	
<i>* Only 17 respondents answered this question</i>		
Vegetable 5	0.07 ha.	
<i>* Only 8 respondents answered this question</i>		

24. Tenurial Status		
<i>* Only 24 respondents answered this question</i>		
Owned	7	29%
Tenant	7	29%
Others	10	42%
25. Frequency of harvest per year		
<i>* Only 28 respondents answered this question</i>		
Weekly	21	66%
Every 2 weeks	1	3%
Monthly	8	25%
Quarterly	2	6%
26. Average number of members of the family that are engaged in vegetable production		
Men	1	
<i>* Only 28 respondents answered this question</i>		
Women	1	
<i>* Only 27 respondents answered this question</i>		
Youth	2	
<i>* Only 9 respondents answered this question</i>		
27. Where do you get your inputs for vegetable production?		
<i>* Only 28 respondents answered this question</i>		
Office of the Provincial Agriculturist	1	3%
Department of Agriculture	1	3%
Neighboring/Local Store/Market	20	57%
Ministry of Agriculture, Fisheries and Agrarian Reform	2	6%
Local Government Unit	3	9%
KCCDMFi	1	3%
Free Personal	1	3%
	6	17%
28. Amount of farm inputs used in vegetable production		
Seeds	1,236 seeds	
<i>* Only 20 respondents answered this question</i>		
Fertilizers	359.08 kg	
<i>* Only 13 respondents answered this question</i>		
Chemicals	8,751.33 kg	
<i>* Only 9 respondents answered this question</i>		

29. What are the problems or constraints in acquiring inputs?

** Only 23 respondents answered this question*

No available farm inputs	3	12%
No irrigation	1	4%
Capital	15	58%
High Cost	3	12%
Weather Condition	1	4%
Transportation	2	8%
Old Stocks	1	4%

30. Is your farm affected by vegetable insect pests and disease infestations for the last 2 years?

** Only 28 respondents answered this question*

No	3	11%
Yes	25	89%
Insect Pests		
Ants	11	12%
Armyworm	6	7%
Arphid	11	12%
Beetles	13	14%
Borers	6	7%
Cotton Strainer	1	1%
Fruitly	15	16%
Fruitworm	6	7%
Grasshoppers	4	4%
Leafhoppers	5	5%
Leaf Miners	5	5%
Leaf Rollers	5	5%
Mealybugs	1	1%
Whitefly	3	3%
Diseases		
Blight	6	10%
Damping Off	4	7%
Die Back	5	8%
Leaf Mosaic	3	5%
Leaf Spot	12	20%
Powdery Mildew	13	21%
Root Rot	4	7%
Stem Rot/Blossome	2	3%
End Rot	2	3%
Wilt	12	20%

31. What is your disease mitigating measures and practices?

** Only 28 respondents answered this question*

Monthly Cleaning	25	44%
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Use of		
Herbicides/Pesticides	14	25%
Burning/Cutting of Infected Crops	16	28%
Smoking	1	2%
Smuggling	1	2%
32. Extent of damage for your production		
<i>* Only 6 respondents answered this question</i>		
10%	2	33%
50%	1	17%
60%	2	33%
80%	1	17%
33. Form of assistance provided under the program		
<i>* Only 15 respondents answered this question</i>		
Trainings for Production Technology	4	21%
Training for Marketing	2	11%
Training for Business Enterprise	3	16%
Input Subsidy	5	26%
Cash Assistance	5	26%
34. What are the main challenges in vegetable production?		
<i>* Only 27 respondents answered this question</i>		
Quality/Source of Seedlings	5	5%
Capital Investment	15	15%
Weather Condition	25	24%
Pest and Disease	19	18%
Buying Price	10	10%
Access to Market Information	3	3%
Marketing	2	2%
Logistics	3	3%
Quality/Source of Seedlings	5	5%
Capital Investment	15	15%
Invasion of Animals	1	1%
35. Do you keep records of production, income and expenses in your farm?		
<i>* Only 29 respondents answered this question</i>		
Yes	7	24%
No, why?	22	76%
No time	8	44%
Not practiced to do	7	39%
Inconsistent	1	6%

Changes in Sales	1	6%
The children are asking for it	1	6%
36. Where do you sell your products?		
Local Traders	15	33%
City Traders	16	35%
Consolidators	2	4%
Within the Barangay	12	26%
City Market	1	2%
37. Are you satisfied with the price of your products?		
<i>* Only 28 respondents answered this question</i>		
Yes	23	82%
No	5	18%
38. What are the possible causes of not getting the desired sales of your products?		
<i>* Only 28 respondents answered this question</i>		
Poor Market	9	16%
Poor Farm to Market Road	6	11%
Losses on Handling	18	32%
No Post-Harvest Facilities	16	28%
Lack of Competition	1	2%
Low Buying Price	3	5%
Competition	3	5%
Weather Condition	1	2%
39. What is your main source of funding for farm operations?		
<i>* Only 27 respondents answered this question</i>		
Sales of farm produce	24	67%
Business or another farm investment	1	3%
Off farm employment	2	6%
Loan/Borrowings	6	17%
Personal Money	2	6%
Retail	1	3%
40. Do you borrow money for capital?		
<i>* Only 10 respondents answered this question</i>		
No	10	100%
41. Do you have access to post-harvest facilities?		
<i>* Only 21 respondents answered this question</i>		
No	21	100%

42. Are you a member of a cooperative or association?		
<i>* Only 22 respondents answered this question</i>		
No	15	68%
Yes	7	32%
Bangsamoro Inland Farmers Association	1	20%
Sta. Clara Agrarian Reform Beneficiaries Integrated Development Cooperative	2	40%
Sta. Clara Organic Farmer Research Association	1	20%
Women Organization	1	20%
43. What services are extended/offered by the cooperative?		
<i>* Only 2 respondents answered this question</i>		
Equipment	1	50%
Cash Incentives	1	50%
44. Do you have access to vegetable production information		
<i>* Only 29 respondents answered this question</i>		
No, I would like to have access to this information:	15	52%
High Yielding Varieties	12	48%
Insect Pests and Disease Management	11	44%
Water source	2	8%
Yes, these are:	14	48%
High Yielding Varieties	14	50%
Insect Pests and Disease Management	13	46%
Farm Monument	1	4%
45. Do you have available agricultural extension agencies in the area?		
<i>* Only 27 respondents answered this question</i>		
Yes	6	22%
No	21	78%
46. Are you a beneficiary of any foreign and locally funded projects?		
<i>* Only 22 respondents answered this question</i>		
No	22	100%

47. Do you intent to engaged in vegetable production as business enterprise?		
<i>* Only 26 respondents answered this question</i>		
Yes	26	100%
48. Are there problems in dealing with your customers?		
<i>* Only 27 respondents answered this question</i>		
No	21	78%
Yes, these are:	6	22%
Low buying price	1	20%
Debt	1	20%
Complaints about a damaged product	1	20%
Customers not paying the right price	1	20%
Refusal/Refund upon delivery	1	20%
49. What are your concerns in dealing those involved in production?		
<i>* Only 4 respondents answered this question</i>		
Need more knowledge in planting	1	25%
Has other priorities	3	75%
50. Are there opportunities and benefits in vegetable farming?		
<i>* Only 29 respondents answered this question</i>		
No	2	7%
Yes, these are:	27	93%
Source of income (For basic needs, education, and bills)	24	60%
Pay debt	1	3%
Savings	12	30%
Enhance ability to plants	2	5%
Learning techniques on dealing with customers	1	3%
51. What are your concerns in marketing your product/s?		
<i>* Only 20 respondents answered this question</i>		
Low buying price	15	58%
Buyer	2	8%
Competitors	2	8%
Post Harvest Facility	3	12%
Irrigation	1	4%

	Rentals	1	4%
	Farm Inputs	1	4%
	Damages during delivery	1	4%
52.	Destination of your product/s		
	<i>* Only 28 respondents answered this question</i>		
	Within the barangay	11	38%
	Withing Lamitan City	10	34%
	Nearby Municipality	1	3%
	Isabela City	6	21%
	Centero	1	3%
53.	Do you pay for the information you get about the market?		
	No	25	83%
	Yes	5	17%
	The information was useful because:		
	<i>* Only 8 respondents answered this question</i>		
	To know/monitor the prices	5	56%
	Can increase/demand prices	1	11%
	Basis for pricing	2	22%
	To have a constant buyer	1	11%
54.	Do you experience problems in marketing?		
	<i>* Only 28 respondents answered this question</i>		
	Yes	13	46%
	No	15	54%
55.	What are the factors beyond your ability/control that actually affect your operations and success in your enterprise?		
	<i>* Only 29 respondents answered this question</i>		
	Government Regulations	7	11%
	City Ordinances	5	8%
	Cooperative Policies	1	2%
	Peace and Order	1	2%
	Weather/Environmental Factor	28	44%
	Internet Connectivity	1	2%
	Electricity	2	3%
	Market Information	19	30%

Table 66: Activities in Vegetable Farming (30 Farmers)

Activity	Worker			No. of hours per worker	Total hours work	Ave. wage rate	No. of workdays
	Male	Female	Youth				
1. Land Preparation	2	1	2	4.78 hours	4.96 hours	Php 266.67	4.53 days
2. Maintenance <i>* Only 26 respondents answered this question</i>	1	1	2	3.77 hours	3.87 hours	Php 258.33	4 days
3. Harvesting	1	1	2	3.67 hours	3.67 hours	Php 150.00	10 days
4. Marketing	1	1	2	2.86 hours	2.97 hours	Php 155.00	9 days
5. Sowing <i>* Only 2 respondents answered this question</i>	1	1	1	5.75 hours	5.75 hours	Php 200.00	1.5 days
6. Seedling <i>* Only 3 respondents answered this question</i>	1	1	-	5.67 hours	5.67 hours	Php 200.00	2 days
7. Transplanting <i>* Only 1 respondent answered this question</i>	1	1	1	3 hours	3 hours	Php 200.00	1 day

FISHERFOLKS

Table 67: Summary of Fisherfolks' Responses (30 Fisherfolks)

Items	Average	Frequency	Percentage
1. Age	41.5 years old		
2. Household Size	6		
3. Sex			
Male		28	93%
Female		2	7%
4. No. of Children Attending School	3		
<i>* Only 21 respondents answered this question</i>			
5. Civil Status			
<i>* Only 28 respondents answered this question</i>			
Married		22	79%
Single		5	18%
Live-in		1	4%
6. Ethnicity			
<i>* Only 28 respondents answered this question</i>			
Bisaya		5	18%
Sama Bangingi		7	25%
Sama Siasi		1	4%
Tausug		12	43%
Yakan		2	7%
Zamboangueño		1	4%
7. Religious Affiliation			
<i>* Only 29 respondents answered this question</i>			
Islam		26	90%
Roman Catholic		3	10%
8. Highest Educational Attainment			
<i>* Only 29 respondents answered this question</i>			
College Graduate		1	4%
College Undergraduate		1	4%
High School Graduate		7	25%
High School Undergraduate		4	14%
Elementary Graduate		2	7%
Elementary Undergraduate		11	39%
Did not go to school		2	7%
9. Occupation			
<i>* Only 29 respondents answered this question</i>			
Fisherman		23	79%
Farmer		5	17%
Housewife		1	3%
10. Nature of Operation – Fishes/Cephalopods			
Daily		30	100%
11. Estimated Harvest	3.29 kg		
12. Value	Php 166.42		

13. Other source of monthly income		
<i>* Only 7 respondents answered this question</i>		
Employment	3	38%
Retail/Merchandizing	1	13%
Remittance	4	50%
14. Family Expenses on Monthly Basis		
Food	Php 4,795.00	
Education of Children	Php 2,366.36	
<i>* Only 22 respondents answered this question</i>		
Household Needs	Php 1,126.92	
<i>* Only 26 respondents answered this question</i>		
Medicine	Php 973.50	
<i>* Only 20 respondents answered this question</i>		
Bills	Php 422.22	
<i>* Only 27 respondents answered this question</i>		
Payment of Credit	Php 2,277.78	
<i>* Only 9 respondents answered this question</i>		
Total Monthly Expenses	Php 9,219.00	
15. Are you a member of any farming organization or association?		
Yes	30	100%
16. What organization or association?		
Malo-ong Coral Fisherfolk Association	8	27%
Ulame Fisherfolks Association	10	33%
Luksumbang Fish Worker Association	2	7%
Tumakid Agri-Fisheries Association	9	30%
MCPA	1	3%
17. No. of Years as Member		
<i>* Only 29 respondents answered this question</i>		
	3.40 years	
18. Benefits/Services Aailed		
<i>* Only 2 respondents answered this question</i>		
Cash Incentives	1	50%
Trainings	1	50%
19. What is your status in your organization?		
<i>* Only 29 respondents answered this question</i>		
Active	29	100%

20. Have you or any of your household members attended any trainings/seminars related to Horticulture or Agriculture?		
<i>* Only 28 respondents answered this question</i>		
Yes	1	4%
No	27	96%
21. No. of years in fishing	21.28 years	
<i>* Only 29 respondents answered this question</i>		
22. What attracted you to the fishing industry?		
Family Business	9	26%
Hobby	2	6%
Limited Availability of Jobs	17	49%
Lifestyle	1	3%
Source of Income	5	14%
Inheritance	1	3%
23. How often do you go out to sea at normal condition?		
Daily	29	97%
2 – 6 times per day	1	3%
24. How many persons accompany you in fishing?		
<i>* Respondent 22 answered both I'm alone and More than 3</i>		
I'm alone	13	42%
One person	5	16%
2-3 persons	12	39%
More than 3	1	3%
25. What determines how often you go out to sea?		
Weather Conditions	27	56%
Health Conditions	15	31%
Moon or Tide Conditions	5	10%
Fish Season	1	2%
26. Form of assistance provided under the program		
<i>* Only 4 respondents answered this question</i>		
Trainings for production technology	1	14%
Training for marketing	1	14%
Training for business enterprise	1	14%
Cash assistance	3	43%
Crab Pastening	1	14%
27. Method of fishing used		
Banking	2	3%
Trawling	1	1%
Seine	1	1%
Bingit	28	41%
Pukot	10	14%

Nylon	6	9%
Palangre	12	17%
Bintul	1	1%
Lambat	1	1%
Sapung	6	9%
Tingga	1	1%
28. What are the main challenges in fishing?		
<i>* Only 19 respondents answered this question</i>		
Poor infrastructure	2	8%
Theft of engines	1	4%
Small market	1	4%
Competition	1	4%
Overfishing	3	12%
Weather/Environmental Factor (e.g. Alon, Hangin)	4	15%
Equipments/Materials	10	38%
Stealing materials	3	12%
Low Buying Price	1	4%
29. Where do you sell your products?		
<i>* Only 28 respondents answered this question</i>		
Households/Neighbors	4	9%
Wet Market	3	6%
Local Traders	8	17%
Traders Outside Lamitan	1	2%
Sta. Clara	7	15%
Malo-ong Canal	8	17%
Baungus	7	15%
Within the Barangay	9	19%
30. What are the possible causes of not getting the desired sales of your products?		
<i>* Only 20 respondents answered this question</i>		
Poor Market	11	44%
Poor Farm to Market Road	1	4%
Losses on Handling	6	24%
No Post-Harvest Facilities	4	16%
Lack of Competition	1	4%
Market Price	1	4%
Customer's Preferences	1	4%
31. What is your main source of funding for farm operations?		
<i>* Only 27 respondents answered this question</i>		
Sale of farm produce	24	86%
Remittances	1	4%
Loan/Borrowings	2	7%
Personal Money	1	4%

32. What percentage of your capital is borrowed?		
<i>* Only 1 respondent answered this question</i>		
60%	1	100%
33. Do you have access to post harvest facilities?		
No	27	90%
Yes, these are:	3	10%
Post-harvest storage	2	33%
Ice box	3	50%
Direct selling	1	17%
34. Are you a member of a cooperative or association		
<i>* Only 25 respondents answered this question</i>		
No	25	100%
35. Do you have access to fishing information?		
<i>* Only 28 respondents answered this question</i>		
No, I want access to the following information:	22	79%
Fishing Gadgets	21	39%
New Technique in Fishing	22	41%
Areas of Abundant Fishes/Cephalopods	6	11%
Weather Condition (Waves)	5	9%
Yes, these are:	6	21%
Fishing Gadgets	3	33%
Technology	1	11%
Price	4	44%
Fishing Materials	1	11%
36. Do you have available fishery extension agencies in the area?		
<i>* Only 27 respondents answered this question</i>		
No	27	100%
37. Are you a beneficiary of any foreign and locally funded projects?		
<i>* Only 28 respondents answered this question</i>		
No	27	96%
Yes, these are:	1	4%
Mangrove Association	1	100%
38. Have you observed any changes in the fish catch recently?		
<i>* Only 28 respondents answered this question</i>		
No	2	7%
Yes, the changes are:	26	93%
Increase in catch or size	1	4%
Decrease in catch or size	26	96%

The causes of this changes are:		
Pollution	1	3%
Over fishing	8	26%
Changes in weather condition	22	71%
39. Are there problems in dealing with your customers?		
<i>* Only 29 respondents answered this question</i>		
No	16	55%
Yes, the problem is:	13	45%
Low buying price	13	100%
40. What are your concerns in dealing with those involved in production?		
<i>* Only 7 respondents answered this question</i>		
Health Conditions	6	86%
Price	1	14%
41. Are there opportunities and benefits in fishing?		
Yes, these are:	30	100%
Source of income	30	97%
Savings	1	3%
42. What are your concerns in marketing your product(s)?		
<i>* Only 23 respondents answered this question</i>		
Transportation	9	29%
Equipment Failure	8	26%
Price	9	29%
Low Buying of Product	5	16%
43. Destination of your product(s)		
Within Barangay	8	27%
Nearby Barangay	3	10%
Within Lamitan City	19	63%
44. Do you pay for the information you get about the market?		
<i>* Only 28 respondents answered this question</i>		
Yes	3	11%
No	25	89%
45. Do you experience problems in marketing?		
<i>* Only 28 respondents answered this question</i>		
Yes	18	64%
No	10	36%
46. What are the factors beyond your ability/control that actually affect your operations and success in your enterprise?		
<i>* Only 28 respondents answered this question</i>		
Weather/Environmental Factor	28	54%
Internet Connectivity	7	13%

Electricity	9	17%
Market Information	8	15%

Table 68: Products Sold by Fisherfolks (30 Fisherfolks)

Items	Total Produce per Harvest	Volume Sold	Selling Price	Total Sales
1. Cephalopods <i>* Only 16 respondents answered this question</i>	7.81 kg	7.19 kg	Php 242.31	Php 1,335.00
2. Fish (Fresh) <i>* Only 29 respondents answered this question</i>	13.21 kg	11.62 kg	Depends on the specie	Php 1,953.08
3. Crabs <i>* Only 3 respondents answered this question</i>	3.33 kg	3.33 kg	Php 200.00	Php 533.33

Table 69: Activities in Fishing (30 Fisherfolks)

Activity	Worker			No. of hours per worker	Total hours work
	Male	Female	Youth		
1. Buying of fish for bait	1	-	-	2.33 hours	70 hours
2. Preparation of fishing gears	1	-	1	0.96 hour	28.83 hours
3. Fishing	2	-	1	5.28 hours	155 hours
4. Fish catch segregation/sorting/sizing <i>* Only 26 respondents answered this question</i>	2	-	1	0.95 hour	28.37 hours
5. Weighing of fish caught <i>* Only 19 respondents answered this question</i>	1	-	1	0.98 hour	29.30 hours
6. Fish preservation <i>* Only 24 respondents answered this question</i>	1	1	1	0.82 hour	24.49 hours
7. Unloading and hauling of fish <i>* Only 24 respondents answered this question</i>	1	-	1	0.89 hour	26.57 hours
8. Transporting <i>* Only 26 respondents answered this question</i>	1	-	-	0.94 hour	28.33 hours
9. Selling/Marketing <i>* Only 28 respondents answered this question</i>	1	1	1	2.19 hours	65.83 hours

**APPENDIX B
RUBBER TRADER**

Table 70: Summary of Rubber Traders' Responses (5 Traders)

Items	Average	Frequency	Percentage
1. Type of Trader			
Contract Buyer		2	33%
Consolidator		3	50%
Barangay Trader		1	17%
2. Age	51.4 years old		
3. Sex			
<i>* Respondent No. 3 did not answer this question</i>			
Male		2	50%
Female		2	50%
4. Civil Status			
Married		5	100%
5. Ethnicity			
Bisaya		1	20%
Zamboangueño		1	20%
Yakan		3	60%
6. Religious Affiliation			
<i>* Respondent No. 3 did not answer this question</i>			
Islam		2	50%
Roman Catholic		2	50%
7. Highest Educational Attainment			
Highschool Undergraduate		1	20%
College Undergraduate		1	20%
College Graduate		2	40%
Graduate Studies		1	20%
8. Membership in any organization			
No		3	60%
Yes		2	40%
Philippine Rubber Industries Association		1	20%
Bangsamoro Marketing Operations		1	20%
9. No. of years in Rubber Trading	15 years		
10. Who determines the price?			
<i>* Respondent No. 4 answered both Traders and World Market</i>			
Traders		3	50%
Malaysia Rubber		1	17%
World Market		2	33%
11. What are the possible causes of not getting the desired sales of your rubber products?			
Quality/Source of Rubber		3	21%

Capital Investment	2	14%
Weather Condition	4	29%
Buying Price	2	14%
Logistics	1	7%
Rubber Disease	1	7%
Credit	1	7%
12. What are the possible causes of not getting the desired sales of your vegetable products?		
Poor Market	1	20%
Losses in Handling	3	60%
No post-harvest facilities	1	20%
13. Are there problems in dealing with your customers?		
No	3	75%
Yes	1	25%
Strict terms when it comes to payment	1	100%
14. Opportunities that benefit in trading your products		
Source of income	5	100%
15. Destination where the products reach		
Within Lamitan City	1	13%
Isabela City	1	13%
Zamboanga City	2	25%
Cebu	1	13%
Manila	1	13%
Malaysia	1	13%
Malanggas	1	13%
16. Do you pay information about the market?		
Yes	1	20%
No	4	80%
17. Problems experienced in trading		
Bad quality of rubber	1	13%
High maintenance	1	13%
Capital investment	1	13%
Early wintering	1	13%
Strict standards	1	13%
Price	2	25%
Low collection due to extreme heat	1	13%
18. Factors beyond your ability/control that actually affect your operations and success in the enterprise		
Government Regulations	3	27%
Peace and Order	1	9%

Weather/Environmental Factor	4	36%
Electricity	2	18%
Market Info	1	9%

Table 71: Products Managed by Rubber Traders (5 Traders)

Items	Total Produce per Harvest	Selling Price
1. Cup Lumps <i>* Respondent No. 2 did not answer for Cup Lumps</i>	9.3 tons	Php 43.25
2. Crumb Rubber <i>* Only Respondent No. 3 answered for Crumb Rubber</i>	10 tons	Php 70.00
3. Latex <i>* Only Respondent No. 5 answered for Latex</i>	700 kg	Php 30.00
4. Wet Rubber <i>* Only Respondent No. 2 answered for Wet Rubber</i>	50 tons	Php 37.00

Table 72: List of Vehicles used in Rubber Trading (5 Traders)

Mode of Transport of the Products	Number of Transportation	Capacity of Transportation Unit
1. Isuzu Elf <i>* Only Respondents No. 2 and 3 answered this question</i>	1	6.3 tons
2. Canter <i>* Only Respondent No. 2 answered this question</i>	1	7 tons
3. Forward Isuzu <i>* Only Respondent No. 3 answered this question</i>	1	10 tons
4. Prime Mover <i>* Only Respondent No. 1 answered this question</i>	6	21 tons
5. Truck Trailer <i>* Only Respondent No. 1 answered this question</i>	6	6 tons
6. Willy <i>* Only Respondent No. 2 answered this question</i>	1	1,000 kg
7. 10-wheeler <i>* Only Respondent No. 3 answered this question</i>	2	25 tons
8. Top Down <i>* Only Respondent No. 5 answered this question</i>	1	700 kg

Table 73: Activities in Rubber Trading (5 Traders)

	Hauling	Transporting of Products	Drying <i>* Only Respondent No.4 answered this question</i>
1. Number of workers			
Male	7	2	3
Female	5	-	-
2. No. of hours per worker	4.5 hours	4 hours	8 hours
3. Tota hours work	7 hours	4.67 hours	8 hours
4. Average wage rate	Php 4,696.88	25 cents per kg	Php 4,000.00
5. No. of workdays	1.33 days	1.33 days	1 day

COCONUT TRADER

Table 74: Summary of Coconut Traders' Responses (5 Traders)

Items	Average	Frequency	Percentage
1. Type of Trader			
<i>* Respondent No. 1 answered both Contract Buyer and Consolidator</i>			
Contract Buyer		4	67%
Consolidator		2	33%
2. Age	55.6 years old		
3. Sex			
<i>* Respondents No. 1 and 5 did not answer this question</i>			
Male		3	100%
4. Civil Status			
Married		5	100%
5. Ethnicity			
Bisaya		2	40%
Zamboangueño		1	20%
Yakan		2	40%
6. Religious Affiliation			
<i>* Respondent No. 2 did not answer this question</i>			
Islam		1	25%
Roman Catholic		3	75%
7. Highest Educational Attainment			
Elementary Graduate		1	20%
Highschool Undergraduate		1	20%
College Undergraduate		1	20%
College Graduate		1	20%
Graduate Studies		1	20%
8. Membership in any organization			
No		2	40%
Yes		3	60%
Bangsamoro Marketing Cooperative		1	33%
Philippine Coconut Authority Association		2	67%
9. No. of years in Coconut Trading			
	26.25 years		
<i>* Respondent No. 2 did not answer this question</i>			
10. What coconut products do you trade?			
Copra			
Total Produce per Harvest	175,500 kg/month		
Selling Price (Php)	Php 25.05		
11. Who determines the price?			
Processors		1	17%
Traders		1	17%

Manufacturers	1	17%
Bodega	3	50%
12. What are the possible causes of not getting the desired sales?		
Poor Market	2	40%
No post-harvest facilities	1	20%
Marketing	1	20%
Coconut Trader	1	20%
13. How many trips do you have in a month?	3 trips	
14. Volume per trip in tons	44.6 tons	
15. Are there problems in dealing with your customers?		
No	1	25%
Yes	4	75%
Rejection of the product	2	50%
Delay delivery that causes delay of payment	2	50%
16. Opportunities that benefit in trading your products		
Source of income	5	100%
17. Destination where the products reach		
Within Lamitan City	2	33%
Zamboanga City	4	67%
18. Do you pay information about the market?		
Yes	-	
No	5	100%
19. Problems experienced in trading		
Delay delivery that causes delay of payment	3	50%
Price Fluctuation	1	17%
Lack of capital	1	17%
Quality of the products from the farmer	1	17%
20. Factors beyond your ability/control that actually affect your operations and success in the enterprise		
Government Regulations	1	11%
Weather/Environmental Factor	3	33%
Electricity	1	11%
Market Information	4	44%

Table 75: List of Vehicles used in Coconut Trading (5 Traders)

Mode of Transport of the Products	Number of Transportation	Capacity of Transportation Unit
1. Isuzu Self <i>* Respondent No. 2 did not answer this question</i>	1	7,000 kg
2. Bonggo Mazda <i>* Only Respondent No. 5 answered this question</i>	1	80 sacks
3. Multicab <i>* Only Respondents No 4 and 5 answered this question</i>	1	12.5 sacks
4. Truck <i>* Only Respondents No. 1 and 3 answered this question</i>	1	20 tons
5. Tricycle <i>* Only Respondent No. 2 answered this question</i>	1	30 kg
6. Ship <i>* Only Respondent No. 1 answered this question</i>	1	11 tons

Table 76: Activities in Coconut Trading (5 Traders)

	Redrying	Selling <i>* Respondent No. 3 did not answer this question</i>	Hauling <i>* Respondent No. 3 did not answer this question</i>	Transporting <i>* Respondents No. 3 and 4 did not answer this question</i>
1. Number of workers				
Male	2	1	4	2
Female	-	-	-	-
2. No. of hours per worker	5 hours	4 hours	6 hours	4.67 hours
3. Total hours work	78.25 hours	66.5 hours	65.5 hours	83.3 hours
4. Average wage rate	Php 645.00	Php 693.75	Php 720.00	Php 408.33
5. No. of workdays	10 days	9.5 days	16 days	12.33 days

VEGETABLE TRADER

Table 77: Summary of Vegetable Traders' Responses (5 Traders)

Items	Average	Frequency	Percentage
1. Type of Trader			
Contract Buyer		1	20%
Striker		1	20%
Consolidator		1	20%
Barangay Trader		2	40%
2. Age	48 years old		
3. Sex			
Male		1	20%
Female		4	80%
4. Civil Status			
Married		5	100%
5. Ethnicity			
<i>* Respondent No. 4 did not answer this question</i>			
Bisaya		2	50%
Zamboangueño		1	25%
Yakan		1	25%
6. Religious Affiliation			
Islam		2	40%
Roman Catholic		3	60%
7. Highest Educational Attainment			
Elementary Graduate		2	40%
Highschool Graduate		2	40%
College Graduate		1	20%
8. Membership in any organization			
No		3	60%
Yes		2	40%
Sta. Clara Women's Association		1	50%
Bohe Nange		1	50%
9. No. of years in Rubber Trading	7.6 years		
10. Who determines the price?			
<i>* Respondent No. 5 did not answer this question</i>			
Farmers		4	100%
11. What are the possible causes of not getting the desired sales of your rubber products?			
Weather Condition		3	50%
Buying Price		2	33%
Deterioration		1	17%
12. What are the possible causes of not getting the desired sales of your vegetable products?			
Losses in handling		3	38%

No post-harvest facilities	4	50%
Low protection	1	13%
13. How many trips do you have in a month?	7 trips	
<i>* Respondent No. 4 did not answer this question</i>		
14. Are there problems in dealing with your customers?		
No	2	40%
Yes	3	60%
Bargains	1	33%
Low buying price	1	33%
Complaints from the customer	1	33%
15. Opportunities that benefit in trading your products		
Yes	5	100%
16. Destination where the products reach		
Within Lamitan City	4	44%
<i>* Respondent No. 2 did not answer this question</i>		
Isabela City	3	33%
<i>* Respondents No. 3 and 4 did not answer this question</i>		
Within the barangay	2	22%
<i>* Only Respondents No. 3 and 4 answered this question</i>		
17. Do you pay information about the market?		
<i>* Respondent No. 5 did not answer this question</i>		
No	4	100%
18. Problems experienced in trading		
Low harvest or availability of products	2	33%
Price	3	50%
Deterioration	1	17%
19. Factors beyond your ability/control that actually affect your operations and success in the enterprise		
Government Regulations	1	20%
Peace and Order	1	20%
Weather/Environmental Factor	3	60%

Table 78: List of Vehicles Used in Vegetable Trading (5 Traders)

Mode of Transport of the Products	Number of Transportation	Capacity of Transportation Unit
1. Topdown <i>* Only Respondent No. 3 answered this question</i>	1	6-10 sacks
2. Tricycle <i>* Only Respondent No. 5 answered this question</i>	1	50 kg

Table 79: Activities in Vegetable Trading (5 Traders)

	Packing/ Repacking	Selling	Hauling <i>* Respondents No. 1 and 4 did not answer this question</i>	Transporting <i>* Respondents No. 1 and 4 did not answer this question</i>
1. Number of workers				
Male	-	-	1	1
Female	2	1	-	1
2. No. of hours per worker	1.75 hours	6.25 hours	1 hour	3.5 hours
3. Total hours work	2.4 hours	6.5 hours	1 hour	3.5 hours
4. Average wage rate	Php 120.00	Php 150.00	Php 116.67	Php 150.00
5. No. of workdays	5 days	30 days	6.67 days	6.67 days

FISH/CEPHALOPODS TRADER

Table 80: Summary of Fish/Cephalopods Traders' Responses (5 Traders)

Items	Average	Frequency	Percentage
1. Type of Trader			
Contract Buyer		2	40%
Striker		1	20%
Consolidator		1	20%
Barangay Trader		1	20%
2. Age	45.4 years old		
3. Sex			
Male		3	60%
Female		2	40%
4. Civil Status			
Married		5	100%
5. Ethnicity			
Sama Bangingi		2	40%
Yakan		3	60%
6. Religious Affiliation			
Islam		5	100%
7. Highest Educational Attainment			
Elementary Undergraduate		1	20%
Elementary Graduate		1	20%
Highschool Graduate		2	40%
College Graduate		1	20%
8. Membership in any organization			
No		4	80%
Yes		1	20%
Tumakid Agri-Fishery Association		1	100%
9. No. of years in Fish Trading	17.8 years		
10. Who determines the price?			
<i>* Respondent No. 5 answered both Traders and Bodega</i>			
Traders		4	67%
Bodega		2	33%
11. What are the possible causes of not getting the desired sales of your fish/cephalopod's products?			
<i>* Respondent No. 2 did not answer this question</i>			
Quality of Fish/Cephalopods		1	9%
Capital Investment		2	18%
Weather Investment		3	27%
Buying Price		3	27%
Logistics		2	18%

12. What are the possible causes of not getting the desired sales of your fish/cephalopod's products?		
<i>* Only Respondents 4 and 5 answered this question</i>		
Losses in Handling	1	33%
No post-harvest facilities	2	66%
13. Are there problems in dealing with your customers?		
No	3	60%
Yes	2	40%
Strict buyers	1	50%
Late payments	1	50%
14. Opportunities that benefit in trading your products		
Source of income	5	100%
15. Destination where the products reach		
Within Lamitan City	1	20%
Isabela City	1	20%
Zamboanga City	3	60%
16. Do you pay information about the market?		
Yes	1	20%
No	4	80%
17. Problems experienced in trading		
Weather	2	29%
High standards	1	14%
Price	3	43%
Lack of capital	1	14%
18. Factors beyond your ability/control that actually affect your operations and success in the enterprise		
Weather/Environmental Factor	4	57%
Electricity	3	43%

Table 83: List of Vehicles used in Fish/Cephalopods Trading (5 Traders)

Mode of Transport of the Products	Number of Trips per Month	Capacity of Transportation Unit
1. Motorized Bangka <i>* Only Respondent No. 1 answered this question</i>	8	7.5 boxes kg
2. Motor <i>* Only Respondent No. 3 answered this question</i>	30	20 kg
3. Sea Buti <i>* Only Respondent No. 4 answered this question</i>	8	700 kg
4. Multicab <i>* Only Respondent No. 5 answered this question</i>	12	500

Table 82: Activities in Fish/Cephalopods Trading (5 Traders)

	Sorting <i>* Respondent No. 2 did not answer this question</i>	Weighing <i>* Respondent No. 2 did not answer this question</i>	Hauling <i>* Respondent No. 2 did not answer this question</i>	Transporting <i>* Respondent No. 2 did not answer this question</i>
1. Number of workers				
Male	3	4	3	3
Female	1	1	-	-
2. No. of hours per worker	0.83 hour	0.83 hour	0.83 hour	1.92 hours
3. Tota hours work	25 hours	25 hours	22 hours	18.33 hours
4. Cost	Php 200.00	Php 187.5	Php 287.5	Php 412.50



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