

Strategic Action for the Seaweed Industry in Bongao, Tawi-Tawi, Philippines

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Abstract

The Philippines is one of the top producers of seaweed in the world and 91% of its farm area is situated in the province of Tawi-Tawi. However, the country's seaweed production has been declining over the years due to various factors. This study focused on identifying a strategic action that will highly influence the sustainability of the seaweed industry in the province through capitalizing on the public and private collaborations. This study has taken the perspective of focusing on the integrative authority of a Local Government Unit (LGU) as a supreme governing body of a locality and utilized an organizational approach in addressing the core issue.

In the province of Tawi-Tawi, almost all the marine products or around 8,000 tons are being transshipped through the ports of Bongao annually. Bongao is the de-facto capital municipality of the province and acts as a conduit of development in the provincial, regional, and national seaweed productions.

On the other hand, the LGU of Bongao has been heavily dependent on the Internal Revenue Allotment (IRA) and needs diversified income streams. One area it can provide potential service deliveries is facility support to the major industry in the province through local enterprises. This service modality will provide an encompassing benefit towards addressing the overarching issues in the seaweed industry and improve the financial health of the LGU.

The analytical tools that were applied are the Problem Tree Analysis (PTA) and Objective Tree Analysis (OTA). The PTA was used to identify the major constraint and the corresponding causes and effects within the scope of the situational analysis. The OTA was employed to determine the strategic action needed through targeting the core issue in the PTA.

Keywords: Internal revenue, Local enterprises, Local Government Unit, Seaweed industry, Strategic action

1. Introduction

Seaweed farming is the fastest growing industry among the various aquaculture sectors around the world. Having a potential direct employment of 50 million jobs which correspondingly suggests an indirect 100 million employment around the world (Yarish et al., 2016). The annual value of the seaweed industry is around USD 6 billion (Nayar and Bott, 2014). Of this, a large fraction of around USD 5 billion is based on the production of human food products (McHugh, 2003) and the other USD 1 billion is credited on seaweed extracts, such as hydrocolloids utilized to produce animal feeds, fertilizers and bioactives (Lee, 2008). Around 98 countries generated a total of USD 2.65 billion in 2019 from foreign exchange through the export of seaweeds (UN Comtrade, 2020). Furthermore, USD 14.7 billion from first-sale of 34.7

million tons was generated in 2019 from production of various edible and non-edible seaweed goods primarily attributed to *Laminaria/Saccharina* (USD 4.6 billion), *Porphyra* (USD 2.7 billion), *Kappaphycus/Eucheuma* (USD 2.4 billion), *Gracilaria* (USD 2 billion) and *Undaria* (USD 1.9 billion) species (FAO, 2021).

The Philippines led the way on the cultivation of the carrageenan-bearing seaweed *Eucheuma* that strengthened the country’s dominance in the international market as a top commercial seaweed producer. Carrageenan is the main product being exported that comprises 94% of the total seaweed export value in pesos (BFAR, 2022). It is estimated that the seaweed-carrageenan industry is valued at USD 252 million in 2019 as one of the primary national marine commodities. It employs more than 200,000 coastal family farmers (Hurtado, 2021), 30,000-50,000 local consolidators, and more than 20,000 small traders (Hurtado, 2013). However, in 2008, the Philippines lost its position when Indonesia outweighed its production. Since its highest recorded production of 1,840,832 MT in 2011, the country’s production has started to decline (BFAR, 2022).

At the regional level, the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) has the most expansive seaweed farm area in the country with a total of 95, 662 hectares. About 91% of the total farm area is situated in the province of Tawi-Tawi. In 2018, Tawi-Tawi has been the number one producer of seaweed in the country. It has recorded total production of 375,617 metric tons which is 26% of the total national production in the year 2020. Moreover, Tawi-Tawi has the widest area of 62,911 hectares which is 61% of the total productive seaweed farms in the country (BFAR, 2022).

Table 1 presents the quantity of transported marine products from the capital municipality – Bongao, Tawi-Tawi. It presents a total of 3,803,820 kg of fish and other aquamarine products transported to other cities in the country like Cebu, Manila, Davao, and Zamboanga, and Pagadian from January to June, 2019. This presents an estimate of almost 8 million kilos of marine products being shipped annually.

Item	Destination	Quantity (kilos)	Values (peso)	Transportation
Dried Seaweeds	ZC/Manila	2,586,521	177,768,533	boat
	Pagadian/Davao			
Dried Fish	vao/ ZC	525,347	88,290,088	boat
Fresh Octopus	Zamboanga	133,380	24,226,200	boat
Fresh Fish	Zamboanga	283,707	44,678,900	plane/boat
Live Fish	ZC/Manila	19,481	22,909,400	plane
Crab Meat	Cebu/ZC	24,881	13,260,200	plane/boat
Dried Shells	Cebu/ZC	41,246	570,045	plane/boat
Fresh Abalone	Zamboanga	21,625	2,135,250	boat
Live Sea Mantes	ZC/Manila	5,130	4,919,510	plane
Dried Sea				
Cucumber	Zamboanga	13,775	26,523,750	plane/boat
Salted Fish	Zamboanga	97,376	3,035,768	boat
Fresh Crab	Zamboanga	2,956	629,970	plane/boat
Fresh Cuttlefish	Zamboanga	19,865	3,370,600	boat
Fresh Squid	Zamboanga	1,047	511,890	boat
Dried Bolinao	ZC/Pagadian	16,530	1,123,300	boat
Meat Shells	Zamboanga	370	37,000	boat
Dried Sponges	Zamboanga	1,580	82,400	boat
Dried Squid	Zamboanga	917	605,150	boat
Dried Starfish	Zamboanga	885	7,080	boat
Dried Siganids (boneless)	ZC/Pagadian	4,290	2,200,000	boat
Mangrove Crab	Zamboanga	2,825	1,265,700	boat
Live Lobster	ZC/Manila	86	222,600	boat

Table 1. Transported Marine Products from Bongao, Tawi-Tawi (January to June 2019)

Since the country lost its position as the top producer in 2008, it is imperative for the province of Tawi-Tawi to undertake strategic planning on how to increase the seaweed production in the province and help the country reclaim its position as the top producer of commercial seaweeds. For this, the Local Government Unit (LGU) of Bongao, the de-facto capital municipality of the province, is proportionately responsible for synchronizing efforts in the province. The local governance plays a pivotal role in the success of every industry in its jurisdiction. It is mandated to utilize its powers and resources to build an enabling and sustainable environment where industrial opportunities would develop and grow in continuity. As governed by Republic Act 7160, the LGU of Bongao shares the same mandate to advance the socio-economic status in the province of Tawi-Tawi. It sits at the center of the provincial administrative system and acts as a channel that links the entire province to regional and national governance. Therefore, this study aims to derive a key strategic intervention from the LGU of Bongao, Tawi-Tawi to create a sustainable and enabling environment for the seaweed industry in the area. This is foreseen to combat the decline of production and create a significant contribution to regional and national production and help the country regain its position as the top producer of RDS in the world.

2. Methodology

This study is qualitative research that adopted the Problem Tree Analysis (PTA) and Objective Tree Analysis (OTA) as primary analytical tools. The PTA was used to determine the root cause or problem on the situational analysis as well as its direct effects to the industrial setting. The OTA was carried-out to easily identify the targeted solution to the core problem identified by the PTA, and the presumptive effects it will cause during the implementation of the action. This is expected to derive key strategies that will promote a more robust seaweed industry in the municipality as well as in the entire province of Tawi-Tawi.

Furthermore, this study is supported with primary and secondary data. Key Informant Interviews (KII) were conducted with the key personnel of Bureau of Fishery and Aquatic Resources -Tawi-Tawi and Local Government Unit. Secondary data were based on the seaweed industry roadmaps and other related document and studies.

3. Results and Discussion

Financial Performance of the LGU

The LGU of Bongao has gone through a quandary during the transition of regional governments (from ARMM to BARMM) in 2019 through Republic Act 9054 that resulted to the complications in the devolution of several essential offices such as the Municipal Social Welfare and Development Office (MSWDO), the Municipal Agricultural Office (MAO), and the Municipal Environment and Natural Resources Office (MENRO). Moreover, the LGU has yet to institutionalize some development offices like the Local Environment and Natural Resources Office (LENRO), the Municipal Tourism Office (MTO), and the Local Economic Enterprise which is now known as the Local Economic Development and Investment Promotions Office (LEDIPO) as per the Department of the Interior and Local Government (DILG) Memorandum Circular No. 20-167 issued in 2020. These departments are vital in ensuring inclusive socio-economic growth and environmental protection and conservation in the municipality.

With regards to its financial status, Bongao's average total revenue amounted to Php 167 million over the past five years. Almost 94.29% or Php 157 million came from its share from the national taxes, called the Internal Revenue Allotment (IRA). The business and service income accounted for only 3.64% or Php 6

million of the total revenues, including the collections from the operations of the public market facility. The remaining balance of 2.03% comes from tax revenues, shares, grants and donations. Just like the majority of the LGUs in the country, the municipality of Bongao is heavily dependent on IRA funds. The IRA funds are typically allotted for key expenditures such as the Personal Services (PS), Maintenance and Other Operating Expenses (MOOE) and Capital Outlay (CO). The MOOE and PS accounted for the highest expenditure allocation at 60% and 33%, respectively. In 2014, Bongao had a total deficit of Php 463,685.00 but, subsequently over the next four years, it has maintained a positive financial performance with a significant increase in 2017.

Furthermore, the LGU’s revenue for the last five (5) years was increasing with a compounded annual growth rate (CAGR) of 14.42%. Tax revenue, share from national taxes, and service and business income were increasing with a CAGR of 18.55%, 14.57% and 18.62%, respectively, shares, grants and donations were constantly decreasing to an average of P367,235.00 or 43.41%.

Current operating expenses for the last five years were also increasing with a CAGR of 14.33%, which is high relative to the mentioned increase in revenue. This means that the increase in revenue was not highly sensitive to the increase in operating expenses. Maintenance and Other Operating Expenses (MOOE) increased averagely by Php 13,949,632.00 or 15.74%. From 2014, this was unfavorably incurred in 2015 with increased utilization of 35.95% while the share from national taxes during that time was only increased by 14.41%. This was, however, recovered in 2016 with a 2.61% increased utilization while the share from national taxes increased by 10.46% from 2015.

The total assets were increasing with a CAGR of 11.02%. A significant increase was observed in 2017 with a 42% increase from 2016. This was brought about by the increased cash and cash equivalents because of cash provided by operating activities directly attributed to the inter-agency payables used to acquire additional property plant and equipment and increase in surplus during that year. It was about Php 40 million increase from 2016 that was generated from a share from national taxes.

With the relative performances of revenue, operating expenses and total assets in the last five (5) years, service revenue and business income of LEE were also relatively increasing as shown in the secondary axis in Figure 1. From Php 3.8 million in 2014, it went up to Php 7.7 million in 2018. However, it did not maintain its momentum in 2015 with a significant increase of 61.67% from 2014 as it was decreased by 15.61% in 2016. Recovery was made in 2017 and 2018 with increased by 35.21% and 7.31%, respectively. Along with the constant effort of the management team, LEE’s service revenue and business income have the potential to continually increase its figures in the next years.

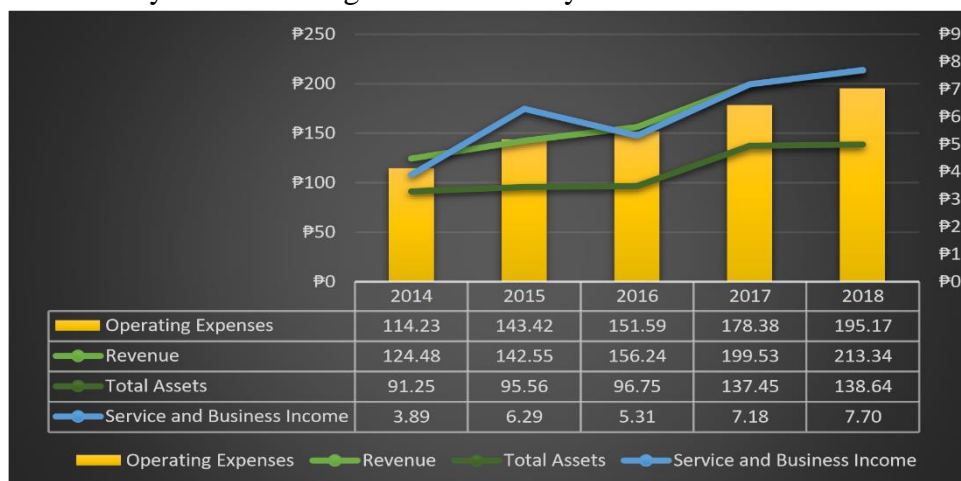


Figure 1. Financial Status of LGU-Bongao (In Million Pesos)

In 2018, the LGU recorded a total of 7.21% or Php 15,381,636.00 net surplus from its total revenues. Of this, 3.61% or Php 7,709,774.00 was generated from the operations of service and business income which dominantly contributed by economic enterprises.

a. Revenues

About 94.29% of the total average revenue pertained to the share from the national taxes. The movement of this revenue account remained stable throughout the years. This means that not significant fluctuation was noted in the last five (5) years. Service and business income generated by LEE accounted only to 3.64% of the total average revenue with the highest generation in 2015 with 4.42% of the year's total revenue. Service and business income in 2015 which accounts for 4.42% of the total revenue (the highest in the last five years) helped the LGU to minimize its deficit in that year. The lowest was in 2014 with only 3.13% of the year's total revenue. This remained stable from 2016 to 2018 with 3.40% to 3.61% of the respective year's total revenue.

Of the total revenue, only a few or 1.76% came from tax revenue with the highest generation in 2017 or with 2.15% of the year's total revenue and lowest generation in 2015 or with 1.48% of the year's total revenue. On the other hand, 0.32% of the average total revenue was from shares, grants and donations.

b. Expenditures

The highest operating expenses of the LGU pertain to the MOOE which has an average of 60.41% of the total revenue. It is followed by PS with an average of 33.19% of the total revenue. Years 2014, 2017 and 2018 generated much surplus from operation with 8.23%, 10.60% and 8.52%, respectively. The year 2015 was the lowest with a deficit from the operation of 0.61% mainly due to the high incurrence of PS and MOOE totaling 100.51% of the total revenue. Minimizing expenditures in PS and MOOE is a key practice in increasing the surplus of the LGU.

As indicated in the Comprehensive Land Use Plan (CLUP), the LGU has acknowledged that poor local revenue generation is a constant development constraint over the past years which largely explained the underlying reasons for its dependency on IRA funds. It has pointed out that there is a need to increase awareness on the part of the LGU personnel to maximize its revenue generation capacity. The institutionalization of the LEDIPO serves as one avenue for Bongao to head-start a substantial revenue-generation from economic enterprising initiatives.

Problem Tree Analysis

According to the European Integrated Office (2011), PTA primarily allows the documentation of the core problem and the cause-and-effect relationships between various factors. The key purpose of this tool is to warrant that the root cause, not just the symptoms of the problems, is identified and subsequently addressed in the strategic planning. Figure 2 shows that the core problem of LGU in revenue-generation and lack of integrative support towards the seaweed industry in the province is the absence of an institutionalized Local Economic Development and Investment Promotions Office (LEDIPO) from its organizational structure. The underlying causes for this constraint are lack of strategic planning, devolution conflicts, and lack of industry support initiatives. LEDIPO is the office that is responsible in supervising and organizing local enterprising modalities in the municipality. The absence of this office also means that there are no monitoring and continuous initiatives regarding the income generating facilities of the municipality including facilities that will support the RDS supply and value chains which include coastal resource

management regulations. Internally, the LGU also losses potential revenues from operating these facilities. This contributes to its dependency on the internal revenues.

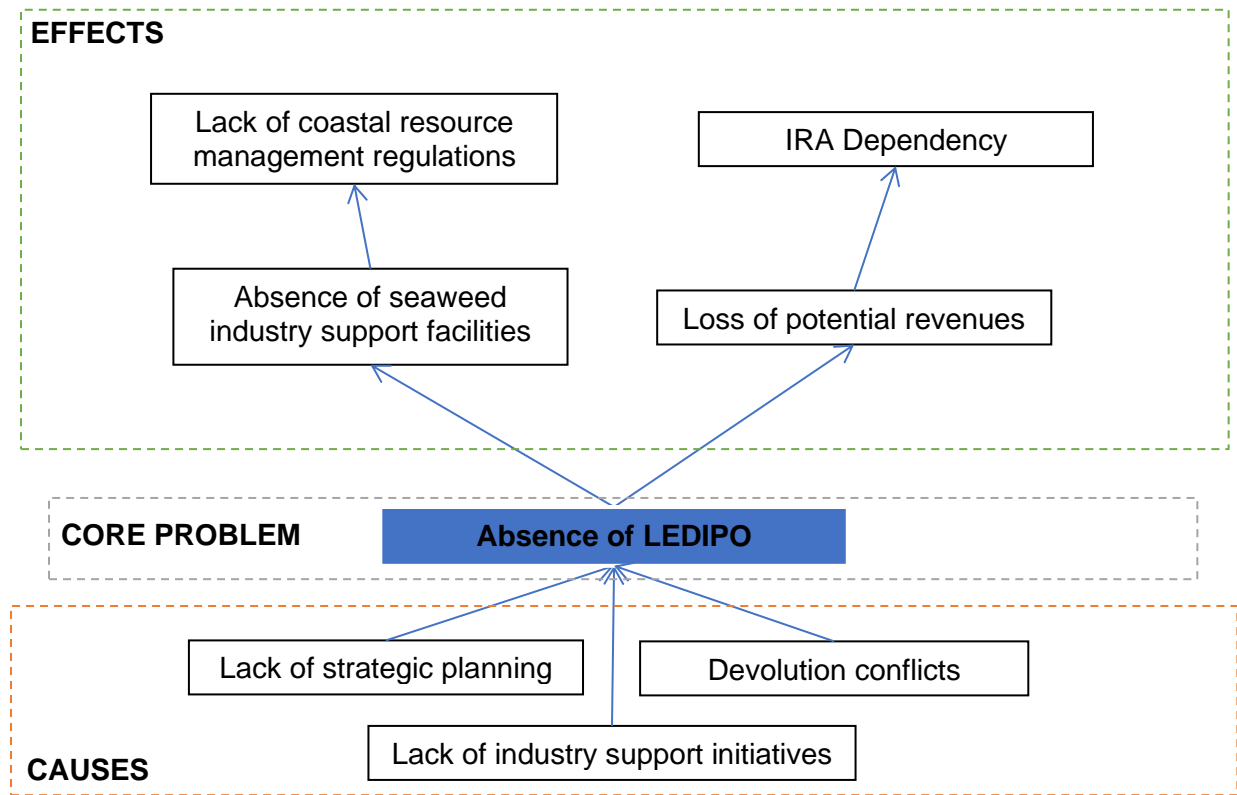


Figure 2 Problem Tree Analysis

Objective Tree Analysis

OTA has an identical structure with the PTA in the sense that it contains positive statements converted from the latter's negative statements leading towards the composition of the program's narrative description (Australian Agency for International Development, 2000). In this study, the OTA (Figure 3) has identified the institutionalization of the LEDIPO as the most appropriate strategic action to address the core problem in the situational analysis with regards to the development of municipality's seaweed industry and its critical role to the development of the seaweed industry in the entire province of Tawi-Tawi as one of the major producers of raw dried seaweeds (RDS). It accounts for about 91% seaweed farmable area in the BARMM region, and its employment is mostly substantial to the provincial socio-economic status. Processing of RDS usually takes place in Denmark, France, USA, and Philippines to produce three major types: alcohol processed refined carrageenan; potassium chloride processed RCs; and SRC, also known as Philippine Natural Grade (PNG) usually used as binders, stabilizers, or emulsifiers in different industries (BFAR, 2000). However, most of the RDS in the province is brought to Zamboanga and Cebu for processing. It has been the aspirations of the stakeholders to have processing plants, buying stations, drying facilities, storage facilities and other support facilities in the province; they believe that these initiatives are viable to be long-term solutions that may combat challenges in the industry caused by the complex seaweed supply chain (BFAR, 2018).

For example, one of the opportunities is the establishment of seaweed buying station facilities that may be regulated by the LGU through the LEDIPO as economic enterprises. Since the province does not have any buying stations yet, there is no existing record of the seaweed export in the province since it is being

shipped from the ports of Zamboanga City, Cagayan de Oro, and Cebu City (BFAR, 2018). Buying stations may also help in standardizing the quality and regulate the demand and supply of the RDS.

Most importantly, the LEDIPO may act as a supervising unit in overseeing the development of the seaweed industry in the municipality of Bongao and in facilitating similar development activities to promote the said industry in the entire province of Tawi-Tawi. It can coordinate with various line agencies like DOST, BFAR, and DTI, International organizations, and financial institutions to create programs that will address the underlying issues and constraints in the seaweed sector. The LEDIPO will also act as the responsible unit to promote a participatory governance through stakeholder participation in planning and policy development, ensure technology transfer from the academe and make sure that the service delivery requirements of the private sector are met.

One potential opportunity for revenue generation of the LGU-Bongao is to establish seaweed facility in the fish port areas. The LGU can construct a seaweed storage or buying station within local docking areas. It may offer a post-harvest facility to accommodate raw dried seaweeds from different parts of the province. Fees that will be imposed will contribute to the local revenues of the LGU.

The facility may also serve as a hub for economic activities, a venue for skills training, information generation, a center for sharing sustainable and disaster-resilient fishery-based livelihoods and resource management, and for monitoring fish catch stocks assessment. This would result in conservation and protection of the aquatic resources and limit detrimental practices on the coastal resources of the province.

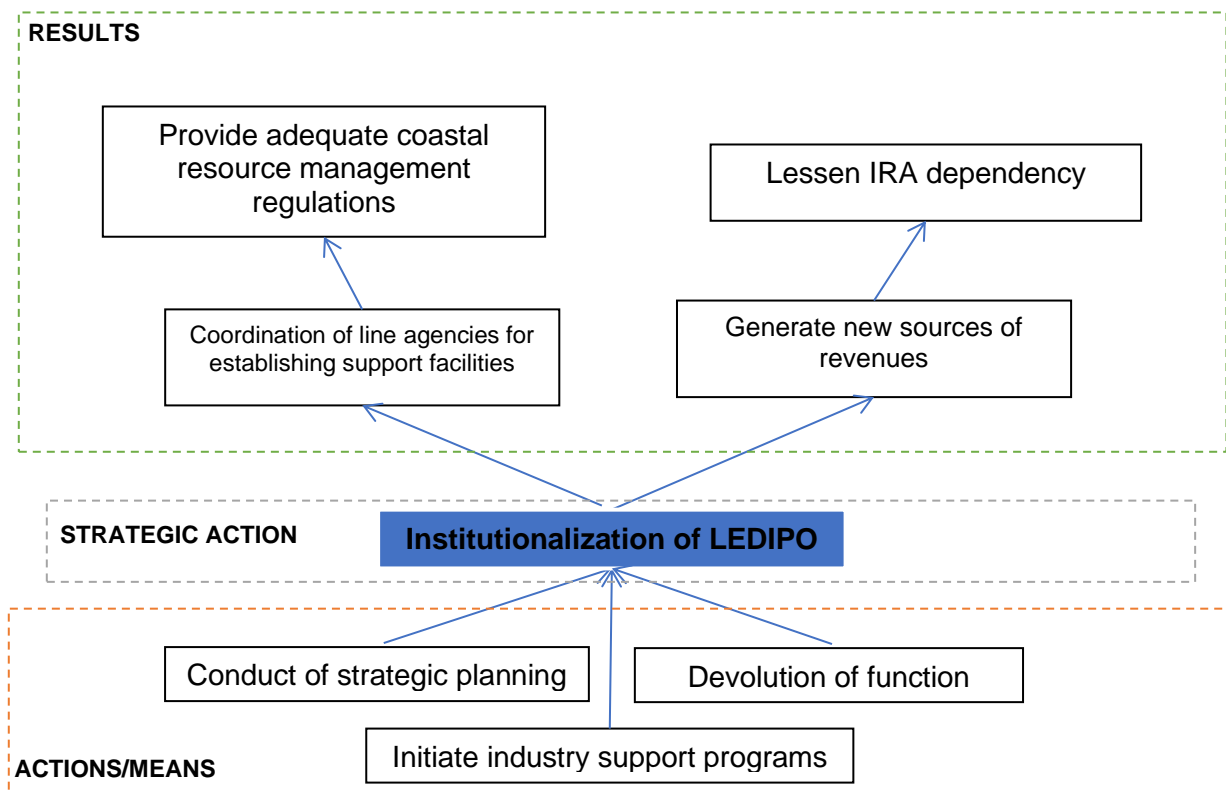


Figure 3 Objective Tree Analysis

4. Conclusion

The encompassing influence of the LGUs in the sectoral development is vested by the government and inspired by the needs of the people. Capitalization in the socio-economic sector is imperative since the

output will project an impact on the national production. The seaweed industry is deemed as the most important sector in the socio-economic status in the province of Tawi-Tawi. Particularly, the provincial fishery and aquaculture products are being transshipped from the municipality of Bongao. Therefore, the LGU of Bongao must employ its authority to create and develop a sustainable economic environment for its stakeholders.

This study identified the institutionalization of the LEDIPO as a vital strategic action towards strengthening the socio-economic status of Bongao through the development of its seaweed industry. Given this, the LEDIPO may create various modalities to provide service deliveries or facility support to reinforce developmental initiatives in Bongao for the seaweed industry. Bongao is also expected to take the lead in coordinating programs that may solve the overarching issues in the major industry of the province since it may directly or indirectly address issues and challenges through linking line agencies and tapping different institutions. Moreover, the strategic action is also beneficial to the financial health of the municipality of Bongao. It may diversify and create new streams of income for the LGU through operationalizing economic enterprises. It is expected to support the LGU's positioning in lessening its reliance on the IRA. Overall, the institutionalization of the LEDIPO is foreseen to highly contribute to the economic standing of the provincial, regional, and national levels through creation of jobs and development of a supportive environment for businesses to thrive and prosper.

References

1. Yarish, C. et al. (2016). Seaweed Aquaculture for Food Security, Income Generation and Environmental Health in Tropical Developing Countries. World Bank Group. <https://doi.org/10.1596/24919>
2. Nayar, S. and Bott, K. (2014). Current Status of Global Cultivated Seaweed Production and Markets. World Aquaculture.
3. McHugh, D. (2003). A Guide to the Seaweed Industry. FAO Technical Paper 441. Food and Agricultural Organisation of the United Nations, Rome. www.fao.org/docrep/006/y4765e/y4765e00.htm
4. Lee, B. (2008). Seaweed - Potential as a marine vegetable and other opportunities. Rural Industries Research and Development Corporation (RIRDC). p34. Publication no. 08/009, Kingston, ACT, Australia. rirdc.infoservices.com.au/downloads/08-009
5. United Nations. (2020). UN Comtrade. <http://comtrade.un.org>
6. Food and Agriculture Organization of the United Nations. (2021). Seaweeds and Microalgae: An Overview for Unlocking Potential in Global Aquaculture Development. 11-12.
7. Bureau of Fisheries and Aquatic Resources. (2018). Fisheries Commodity Road Map: Seaweeds. Tawi-Tawi.
8. Hurtado, A.Q., et al. (2021). Commercial production of carrageenophytes in the Philippines: ensuring long-term sustainability for the industry. *Journal of Applied Phycology*, 25: pp, 733–742.
9. Hurtado, A.Q., et al. (2021). Towards a Robust and Resilient Seaweed Aquaculture in the Philippines.
10. Bureau of Fisheries and Aquatic Resources. (2022). The Philippine Seaweed Industry Roadmap 2022-2026.
11. European Integration Office. (2011). Guide to the Logical Framework Approach. Republic of Serbia Government. Belgrade.

12. Asian Development Bank. (2005). Guidelines on Preparing a Design and Monitoring Framework. <http://dx.doi.org/10.22617/TIM200275-2>
13. Bureau of Fisheries and Aquatic Resources. (2000). Information on Fisheries Management in the Republic of the Philippines. <http://www.fao.org/fi/oldsite/fcp/en/phl/body.htm>