

# Impact Assessment of Seaweeds Culture of the Inter-Island Seaweeds Association in Cawayan-Placer, Masbate

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## RESEARCH ARTICLE

### Abstract

Part of the FishCORAL project is the roll-out of the livelihood projects, which would respond to the objective of reducing poverty in fishing communities. One of these livelihood projects was the inter-island seaweed culture of Cawayan and Placer in Masbate. Descriptive research design and purposive sampling were used in the study. A structured survey questionnaire employed interviews and focus group discussions to collect information from the target respondents. Data revealed that most respondents live in a house with five members and have a monthly income of P10,252.00, which is not enough to finance household expenditures due to many dependents. They don't have possession of the lot where their houses are situated. Many are challenged for sources of safe and affordable drinking water. Women empowerment in the area is fair, although dis-empowerment is high at 51%. Seaweeds project in inter-island barangays does not significantly impact the lives of the beneficiaries because poverty is higher than the set poverty threshold. Its effectiveness and efficiency could not be fully assessed, although there are glaring pieces of evidence of the significant challenges along with these criteria. Putting suitable intervention on the target coastal communities with close coordination with concerned agencies and proper monitoring of the project should be considered by the implementing agency to address the findings in this study. Capability development of livelihood beneficiary association along with financial literacy, basic business management, and record-keeping shall be carried out.

**Keywords:** Impact Assessment, Inter-island Seaweeds, FishCORAL, Poverty, Women Empowerment

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## 1 Introduction

Poverty is one restraining force that pushes a nation to become a progressive country. In the Philippines, fisherfolks posted the second highest poverty incidence (26.2%) among 14 basic sectors identified in 2018 (Philippine Statistics Authority, 2020). The Philippines has 200,000 hectares available for seaweed farming along coastlines, and only 60,000 hectares are being utilized or farmed for seaweeds on coastlines (Seaweeds Industry Association of the Philippines, 2015). In this situation, the Philippines mobilized and ordered the Department of Agriculture-Bureau of Fisheries in collaboration with the International Fund for Agricultural Development (IFAD) to utilize the intended area for seaweed production through livelihood programs or projects to alleviate poverty among fisherfolks. As a response, DA-BFAR implemented the Fisheries, Coastal Resources, and Livelihood Project (FishCORAL) in the four regions of the Philippines,

namely Bicol, Eastern Visayas, CARAGA, and ARMM. The main goal of FishCORAL is to help improve the quality of life for marginalized people like coastal communities by providing them with access to livelihood opportunities, health care, and protection.

One of the livelihood projects implemented in the Bicol region, particularly in the Province of Masbate, is seaweed culture or farming. The main goal of this program is to generate employment and help the fisherfolks of Masbate improve their lives, especially those in coastal areas being hit or affected by typhoons. It is believed that seaweed farming is one of the most economical and eco-friendly livelihoods for fisherfolks because of its economic benefits like food and source of industrial and nutritional natural products (Trono, 2014). Seaweed's culture is easy to establish because it requires only simple techniques and paraphernalia and is cited for small-scale village operations (Philips, 2009). Greener Ideal expounded that seaweed farming is important in generating employment. It encourages local people to protect and value their seawater and its resources, easing pressure on local fish stocks and reducing overfishing by reducing the economic necessity of fishing to survive.

According to the Seaweed Industry Association of the Philippines (SIAP) report in 2015, the Philippines produced 1,566,361 wet metric tons of seaweeds and 101,900 metric tons of dried seaweeds, and the Bicol region ranked 6th with a total production of 55,382.09 metric tons. Moreover, the association also reported that the Philippines earned an export income amounting to 250,000dollars in 2014 and a decline in revenue during 2015. The potential export markets of the Philippine Seaweeds are the USA which imported 12,321.7 metric tons (29.17%), Europe 7,244.3 metric tons (17.15%), China 4,004.5 metric tons (9.48%). In the year 2020, the Philippines got a gross value of 10.60 billion on its seaweeds production (PSA, 2020), and this indicates that seaweeds culture or farming is a vibrant livelihood for fisherfolks and needs to be sustained to boost the Philippine economy because it contributes 33.3% to the total fisheries production of the country.

DA-BFAR commissioned Bicol University in partnership with Dr. Emilio B. Espinosa Sr., Memorial State College of Agriculture and Technology (DEBESMSCAT), to conduct a Rapid Project Impact Assessment (RPIA) for Albay, Ragay, and Asid Gulfs on the five-year implementation of the FishCORAL projects specifically on inter-island seaweeds located at Cawayan-Placer, Masbate.

The objectives of this assessment are to; (1) identify inputs, outputs, and outcomes of the seaweed enterprise of the Inter-Island Seaweed Association in Cawayan and Placer, Asid Gulf; (2) analyze the impact pathways of the seaweed enterprise of the Inter-Island Seaweed Association in Cawayan and Placer towards the key performance outcomes of FishCORAL project; (3) assess the economic and social impacts of the seaweed enterprise of the Inter-Island Seaweed Association in Cawayan and Placer; and (4) document lessons to improve the implementation of fishery policies, programs and plans for effective livelihood initiatives.

## **2 METHODOLOGY**

### **2.1 Research Design**

The study used a descriptive research design that sought to accurately and systematically assess or describe the impact of the FishCORAL project in Cawayan and Placer, Masbate. Purposive sampling was used in this study. A total of 189 fisherfolks serve as the respondents of this study, in which they are visited and carefully interviewed to gather first-hand and factual information.

Various methods were utilized to gather data like; field surveys, observation, and focus group discussion (FGD). During the field survey, the researcher visited the households of the project's beneficiaries and interviewed them using a structured survey questionnaire to gather information on socio-economic characteristics, asset ownership, and women empowerment. If the target beneficiaries were not around, a representative from the family who knows the livelihood project was interviewed. The observation was also performed to verify the information obtained from the respondents. FGD resorted to making the most of the substantial presence of respondents. The participants during the FGD were the Officers and members of the organization.

## **2.2 Limitations of the Study**

The main limiting factor of this study is the COVID-19 pandemic which researchers need to comply with all the travel requirements and restrictions before entering the target municipalities. Also, observing health protocols during the interview became difficult for the researcher because the question should be repeated many times for the respondents to hear. Another limiting factor is the peace and order situation, specifically in the municipality of Cawayan, because most of the barangays were allegedly situated wherein the armed conflict is frequently happening. The unavailability of the financial records hampers the smooth data collection process because there are fields in the questionnaire that require financial aspects. These records are important in analyzing the impact of the FishCORAL project. However, some data that cannot be obtained from the respondents are being answered by the community facilitators and MAO of the respective municipalities.

## **2.3 Analytical Design**

Descriptive analysis was used in the analysis of all gathered data. This research used means, frequencies, and percentages to analyze household beneficiaries' socioeconomic features and livelihood asset ownership. Women empowerment was measured based on the ten indicators of the 5DE. The poverty rate was computed and compared with the poverty threshold set by the Philippine Statistics Authority as of 2018. OECD-DAC evaluation criteria were used to assess the project's performance according to relevance, effectiveness, efficiency, impact, and sustainability.

# **3 RESULTS AND DISCUSSION**

## **3.1 Analysis of the Household Socioeconomic Characteristics**

This section analyzes the socioeconomic status of households, focusing on factors such as household size, kind of dwelling and its outside walls, type of roofing, and monthly income. Table 1 displays the socioeconomic status of the 75 project beneficiaries that reside in the municipalities of Cawayan and Placer. According to the data, 69 percent of the population surveyed, or the household members, are between the ages of 16 and 64. This age range was consistent with Tan's (2020) study, which found that average household members are 45 to 52 years old. Additionally, because the fishing industry contributed around 34% of the Philippine economy, this age range is regarded as the working-age population and potential labor force. Ages 15 and under (30%) and 65 and older (or the remaining 31%) are categorized as the household's dependent age group (1 percent). In the youngest and oldest age groups, the age dependency ratio is 45.21 percent, meaning that every worker has two dependents.

The calculated reliance ratio is significantly lower than the age dependency rates in the Philippines (55%) and the rest of the globe (54.57%). (World Bank, 2021). The majority of households receiving benefits (61%) had five people, similar to the average household size in the Bicol Region, which has five members. (PSA, 2012). The recipients' average household income is P10,788.31, considered low income, and only a small number of households (P44,904.00) are considered middle-income (PIDS, 2018). Compared to the 19% of households that live in duplexes or attached kinds, the majority of household beneficiaries (81%) reside in a single home. A total of 43% of the dwelling wall was built of material, followed by 37% of light materials, 11% of mixed but mostly strong materials, and 9% of composite but primarily light materials. Strong materials made up the majority of residential roofs (77 percent), followed by light materials (16 percent), mixed but mostly strong materials (4 percent), and mixed but primarily light materials (3 percent).

**Table 1. Households' Socioeconomic Characteristics**

<b>Socio-Economic Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Household Members Age Group</b>		
15 and below	117	30
16 – 64	272	69
65 and above	3	1
Age Dependency Ratio		44.11
Child Dependency Ratio		43.01
Old-age Dependency Ratio		1.10
<b>Household Size</b>		
1-5	46	61
6-10	28	37
10 and up	1	1
<b>Types of Dwelling</b>		
Single House	17	81
Duplex	4	19
<b>Types of Outer Wall</b>		
Strong Materials	32	43
Light Materials	28	37
Mixed but predominantly strong materials	8	11
Mixed but predominantly light materials	7	9
<b>Types of Roofing</b>		
Strong Materials	58	77
Light Materials	12	16
Mixed but predominantly strong materials	3	4
Mixed but predominantly light materials	2	3
<b>Household Monthly Income</b>		
Range	1,733-44,904	
Mean	10,788.31	
Median	8,800.00	

### 3.2 Analysis of the Utilities and Sanitation

This section offers the analysis of household utilities and sanitation, focusing on the sources of electricity, drinking water, and toilet facilities. The islands of Cawayan and Placer have access to power, and all households there do so (Table 2). The majority (46%) of houses are connected to electric cooperatives, 33% have their generators, 20% are related to electric distribution firms, and 2% have accessed electricity from their neighbors through any of these sources. Even while the power connection seems to be strong, it is crucial to emphasize that the time they are powered is limited because the majority of them only have it at dusk and till midnight majority of houses (69 percent) obtain mineral water from nearby water refilling stations, which is greater than the 24.90 percent recorded by Tores et al. in 2019. The difference results from the latter covering the entire Asid Gulf. Eleven (11) percent of families have access to unprotected water sources, putting them at risk of contracting severe diseases because the water is easily contaminated with germs and other pollutants. According to WHO (2019), 485,000 people die yearly from diarrhea illness. Six percent of the homes are connected to a community water supply through a pipe

within the home or through public taps. A deep communal well is accessible to one percent (1%) of the homes, while the remainder draws their water from the creek.

In Cawayan and Placer, over half (52%) of the household respondents stated that they had a septic tank or protected restrooms. However, 16 percent of the families do not have toilets, so they dispose of human waste in the field. The remaining households (representing 32% of respondents) used pit latrines (8%) with flushing capabilities, neighborhood toilets (5%), public restrooms (5%), buckets (3%), open pits (3%), flushing capabilities to open drains (3%), flushing capabilities to anywhere (3%), empty bowls (1%) and pit latrines with slabs (1%). More than one-third of the families affiliated with the association promoting seaweed culture appear to lack secure, sanitary latrines.

**Table 2. Utilities and Sanitation**

<b>Socio-Economic Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Source of Electricity</b>		
Electric cooperatives	21	46
Generators	15	33
Utilities (Electric distribution companies)	9	20
Neighboring household	1	2
<b>Source of drinking water</b>		
Mineral water	52	69
Unprotected (open dug well)	8	11
Developed spring	5	7
Protected well/tube	4	5
well/borehole/water pump		
Community water system piped into dwelling	2	3
Community water system piped into public taps/standpipe	2	3
Community deep well	1	1
Creek	1	1
<b>Toilet Facilities</b>		
Bucket	2	3
Flush to don't know where	2	3
Flush to open drain	2	3
Flush to the pit latrine	6	8
Flush to septic tank	39	52
No facility/bush/field	12	16
Open pit	2	3
Pit latrine with slab	1	1
Bowl open	1	1
Neighborhood	4	5
Public toilet	4	5

### 3.3 Analysis of the Livelihood Asset Profile of Households in the Study Area

The assets of Cawayan and Placer's inter-island seaweed beneficiaries were carefully gathered and assessed. When it comes to the seaweed project, evaluating the various investments is crucial in figuring out how the recipients' lives are going. Five assets are identified, and these are physical assets, social assets, human assets, financial assets, and natural assets.

### 3.3.1 Physical Asset

Thirty-three percent of households that own homes also have possessions on the property (Table 3). As of 2019, 50.97 percent was the figure given by Torres et al. Thirteen (13) percent of respondents said they owned their home but frequently rented. The finding of Torres et al., 2019 is almost identical to the four percent (4%) of the respondents who occupied the house and land they did not own for free (3.89 percent). The remaining two (2) percent of respondents own their homes on lots without the owner's approval (1%), or they own their homes but rent the property (1%). Given that all houses, regardless of their energy source, have access to electricity. It is not unexpected that most (87%) household assets are electrical, such as television and cell phones (68 percent). The primary piece of equipment utilized by the responders for fishing and conveying their catch to purchasers is motorized boats (65 percent). To reduce travel costs, the respondents' primary transportation modes for land travel are motorcycles or tricycle (27%) and bicycles (11%). Other domestic items include stoves with an oven or gas range (27%), radios (23%), CD/VCD/DVDs player (17%), washing machines (11%), refrigerators/freezers (9%) components/stereos (7%) computers (3%) sewing machines (3%) and air conditioners (1%).

**Table 3. Household Physical Assets**

Household Physical Assets	Frequency	Percentage
<b>Tenure status</b>		
Own house, rent-free lot with the consent of the owner	34	45
Own or owner-like possession of house and lot	25	33
Own house, rent lot	10	13
Rent-free house and lot with the consent of the owner	3	4
Own house, a rent-free lot without consent of the owner	1	1
Rent-free house, lot rent	1	1
<b>Household Conveniences</b>		
Cellular phone/mobile phone	65	87
Television Set	51	68
Motorized boat/banca	49	65
Motorcycle/Tricycle	20	27
Stove with oven/gas range	20	27
Radio/radio cassette	17	23
CD/VCD/DVD player	13	17
Washing machine	8	11
Bike/Bicycle	8	11
Refrigerator/freezer	7	9
Component/Stereo set	5	7
Personal computer	2	3
Sewing Machine	2	3
Air conditioner	1	1

### 3.3.2 Social Assets

Social capital networks are characterized by the Organisation for Economic Cooperation and Development (OECD) together with shared norms, values, and understandings that promote cooperation inside or among groups. Beneficiaries in Cawayan and Placer had outstanding loans at the time of the study, according to Table 4. The majority of respondents (86%) gave gratitude to their livelihood association, indicating that their group actively assists its members during difficult times. Some (49%) have unpaid loans from microfinance organizations, religious organizations (22%) and agricultural/fishery producers' organizations (11%), LGU (8%), insurance groups (3%),

civic groups (3%) and other women's group (3%). They borrow money from various financial institutions and organizations to finance their fishing operations. To augment their income, coastal communities frequently borrow money, particularly in the months when fishing and other economic pursuits are either impractical or nonexistent.

**Table 4. Household Social Assets**

Household Social Assets	Frequency	Percentage
Livelihood Associations	32	86
Credit or microfinance group	18	49
Religious group	8	22
Agricultural/livestock/fisheries producer's group	4	11
Local Government	3	8
Mutual help or insurance group (including burial societies)	1	3
Civic groups (voluntary associations)	1	3
Other Women's group	1	3

### 3.3.3 Human Assets

Simply put, a community's or nation's human resources are its labor force. Human capital is one of the production components required for producing products and services. The majority of respondents in Cawayan and Placer are classified as being in the working or active labor force based on the data collected. The beneficiaries of the inter-island seaweeds were shown in Table 5, with their educational attainment statistics broken down by sex. Most men (42%) and women (35%) have completed their elementary education. Compared to Torres et al. findings, it is substantially lower, which is 53 percent in each case. Males (23%) and females (24%) have completed their secondary school, whereas males (20%) and females (19%) have not finished their elementary and secondary education. Three percent of men and women were enrolled in college as first-year students, and the other three percent of both men and women graduated from college.

**Table 5. Household Human Assets**

Educational Attainment	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Elem Graduate	28	42	13	35
High School Graduate	15	23	9	24
Elem Undergraduate	13	20	7	19
High School Undergraduate	6	9	4	11
College Undergraduate	2	3	3	8
College Graduate	2	3	1	3

### 3.3.4 Financial Assets

One of the key production aspects is a financial asset because, without money, no aspect of a firm can be established. The majority of inter-island seaweed survey participants in Cawayan and Masbate are concerned about their financial situation. Income sources are carefully examined and precisely recorded while the study is conducted. According to Table 6 and the findings of Torres et al., the respondents' primary source of income is fishing (76%). Some sources of income included masonry (6%), public officials (6%), farming (3%), clerks (2%), and trading (2%). The average monthly income of beneficiaries is P10,252.00, comparable to the P10,271.26 monthly income reported by Torres et al. Because of their geographic position, respondents in Cawayan and Placer are particularly sensitive to weather disruptions like typhoons and monsoons. Positively,

women's primary responsibilities are assisting their spouses in employment and caring for their children (62%). They managed to prepare and serve food before and after work to feed their husbands. Women conduct additional jobs (24%) and engage in farming (8%) to supplement their family's income because their husbands' salaries are insufficient to cover the family's daily costs. In Cawayan and Placer, some women are elected as barangay officials and receive monthly wages to complement their husbands' incomes.

**Table 6. Household Financial Asset**

<b>Female Occupation</b>	<b>Frequency</b>	<b>Percentage</b>
Housewife	23	62
Others	9	24
Farmer	3	8
Brgy. Official	2	5
<b>Male Occupation</b>		
Fisherman	50	76
Laborers/ Unskilled workers	4	6
Officials of Government, Corporate Managers	4	6
No response/Unknown/Cannot Remember	2	3
Others	2	3
Farmer	2	3
Clerks	1	2
Traders and related workers	1	2

### 3.4 Evaluation of the Livelihood Key Performance

The lack of post-implementation evaluation is one of the causes of project failure. Although evaluation is laborious, it is essential to the project's success. This study employed the OECD-DAC evaluation standards, which give a normative framework to analyze the merit or worth of an intervention laid out by IFAD. It used the IFAD 2015 Evaluation Manual to evaluate the performance of the inter-island seaweeds livelihood project in Cawayan and Placer. The project's performance was judged according to the following standards: (1) relevance, (2) effectiveness, (3) efficiency, (4) impact, and (5) sustainability.

### 3.5 Relevance

According to recent data, the Philippines' poverty rate was 16.6% as of 2018. (PSA, 2019). Masbate is the second-poorest province in the Bicol area, according to Regional Office V of the DSWD. The Philippines is organizing its agencies to provide suitable steps to reduce poverty in light of the current scenario.

To lessen the prevalence of poverty in the province of Masbate, the DA-implementation BFAR's of the FishCORAL project couldn't have come at a better time. The project's main objectives are to improve food and nutrition security, decrease poverty in underdeveloped coastal communities, and raise household incomes. The seaweed business is one of the livelihood initiatives identified and provided to the island barangays of Cawayan and Placer under FishCORAL. This line of work is appropriate or pertinent to the target respondents' economic activity. It was discovered during the field trip that those growing seaweeds could be profitable if done at the proper time and location. Additionally, Cawayan and Masbate are now the locations of this thriving firm because they are closest to the target market of Cebu. Together, residents of the island's barangays set up seaweed enterprises in their communities to meet market demand and supplement income during these difficult economic times. However, fishermen have expressed concerns that the standards established by BFAR did not carry out projects. Some seedlings have already passed away, but some are still being disseminated. In addition, community facilitators rarely return to the region

following distribution. This is concerning because beneficiaries must be regularly informed about the steps involved in producing seaweed and given the necessary skills. According to respondents, the lead agency should keep a close eye on the project and offer technical support.

### **3.6 Effectiveness**

According to respondents, Cawayan and Placer's integrated seaweed cultures failed in some aspects and were ineffective. Beneficiaries did not benefit significantly from the project that was given to them, it was discovered during field validation, due to the following reasons: 1) Members did not cooperate during the project's beginning; 2) Community facilitators did not receive clear instructions on what to prepare and how to do it; 3) The distribution of seaweed seedlings was chaotic, and there were non-members of the organization who purportedly received seedlings when they should not; 4) Seedlings arrived not in the time frame expected; 5) Most seedlings are already dead upon arrival and there are already manifestations of ice-ice disease on them; 6) Due to its vulnerability to typhoons and monsoons, the area is not the best place to grow seaweed; 7) Community facilitators don't regularly check on the project; 8) Seedlings were provided not out of a sense of need but rather to ensure that the project manager would submit the required report.

Respondents emphasized the importance of submitting the proposal individually rather than in a group. Since certain members rely only on the officers or people passionate about a particular cause, they should also have the proper training and tools to complete the assignment successfully.

### **3.7 Efficiency**

The efficiency of Cawayan and Placer's inter-island seaweed venture was not yet quantifiable. It was mentioned that the project began with planning and consultation, distributed resources for sustaining livelihoods, delivered training on seaweed growing and distributed seaweed seedlings in the middle of February and March 2020. The project was no longer in existence during the site visitation for this study for various reasons, including complaints from the beneficiaries. The initiative's failure can be attributed, in part, to the project implementers' mistakes, according to an examination of the replies. The poor monitoring and technical service delivery by the project initiators only worsen matters. Other crucial association documents, such as financial and production records, were unavailable or provided during the inspection. As a result, it is challenging for academics to assess the project's success and efficiency. Although there are some apparent signs of inefficiency, it is difficult to prove this at this time because records and crucial empirical data are not yet in place.

### **3.8 Impacts**

The absence of the association's papers prevented an accurate assessment of the project's effects. Impact analysis is, therefore, virtually tricky. However, much information is being acquired that can be used to provide a preliminary assessment of the project's effects on the Cawayan and Placer recipients. The study assessed the impact on household income, poverty reduction, women's empowerment, and enterprise development, among other factors.

#### *Household Income*

Based on the data gathered, 11 out of 75 (14.67 percent) of the inter-island seaweed beneficiaries reported receiving income from the initiative, according to data collected from them. For the first three months of business, an average income of P1,619.09 was reported. This indicates that the project must be implemented successfully to give coastal communities a reliable source of income.

#### *Poverty Reduction*

The inter-island beneficiaries' poverty incidence in Cawayan and Masbate was displayed in Table 7. According to an income approach, most respondents (87.13 percent) experienced poverty. When using the spending model, this changes to an incidence of poverty of 89.19 percent. The poverty incidence in the province of Masbate as of 2018 is substantially higher (29.4%). (PSA, 2018). Additionally, statistics showed that family expenses increase with

household size. The majority of households (65.57 percent) who experienced subsistence incidence did so based on an income approach, while 62 percent of families did so based on an expenditure approach.

Respondents in this year's (2021) survey had a greater poverty rate (87.13%) than the baseline (64%) of the FishCORAL survey (Torres et al., 2019). Data showed that the intervention did not lower the prevalence of poverty in Cawayan and Placer. The seaweed culture livelihood project has a generally poor influence on the elimination of poverty and therefore has to be reviewed to see what went wrong with its implementation.

**Table 7. Poverty Incidence**

Poverty Measure	Poverty Incidence	Subsistence Incidence
	(%)	(%)
Income Approach	87.83	67.57
Expenditure Approach	89.19	62

Source: PSA 2018

### Women Empowerment

Women's empowerment in the agricultural industry was evaluated using the Women Empowerment in Agriculture Index (WEAI). To assess the level of women's empowerment in the workforce, a score of at least 80% overall must be reached. Production, Resources, Income, Leadership, and Time comprise empowerment's five domains (5DE).

Table 8 revealed that 16 of the 37 women who benefited from the inter-island seaweed program—or less than half (43 percent)—are empowered. These could be ladies who have been allowed to participate in various community activities in their barangays. During the FGD, it was noticed that the majority (94 percent) of the women beneficiaries served on the barangay council and oversaw a few organizations with a solid local presence.

Because it was customary for men to send their earnings straight to their wives, beneficiaries of the inter-island seaweeds project said that women had greater financial autonomy (97 percent). The majority of Cawayan and Placer recipients who are women (92 percent) are empowered in terms of leadership, according to the data. Table 8 also showed that 82% of the female recipients chose to use their downtime through household chores and other work-related pursuits.

Women beneficiaries had less control over production in terms of decisions about inputs (43%) and autonomy of output (30%), which was confirmed by a focus group discussion (FGD). Moreover, there is a need to empower women in these indicators, which is supported by the study by Mahawan et al. (2022) that the majority of women in fishing households in the Asid Gulf are disempowered. The social status of the women beneficiaries in their particular communities will be much improved when they are given more control over production issues.

Women still experience less empowerment than men do. On the basis that gender role stereotypes persist in the Philippines and restrict women from entering the workforce. The majority of women who received benefits from Cawayan and Placer are now on the path to parity with males in terms of economic activity, according to interviews and observations made in the region.

**Table 8. Women Empowerment Ratio**

Indicators	Empowerment Ratio	Disempowerment Ratio
<b>Production</b>		
Input in productive decisions	43	57
Autonomy in production	30	70
<b>Resources</b>		
Ownership of assets	65	35
Purchase, sale, or transfer of assets	49	51
Access to and decisions on credit	62	38
<b>Income</b>		
Control over the use of income	97	3
Leadership		
Group member	92	8
Speaking in public	73	27
<b>Time</b>		
Workload	89	11
Leisure	76	24
Disempowerment Headcount Ratio	57	
Empowerment Headcount Ratio	43	

### 3.9 Sustainability

One of a livelihood project's most crucial components is ensuring sustainability. Beneficiaries of the inter-island seaweeds project were unable to continue because of serious problems discovered at the very beginning of its execution. The project's culture setups were implemented throughout the course of various months. Some beneficiaries began their projects in 2020, while others did so in the middle of February or March of the following year. The timing and geographic location of the individual sites, vulnerable to siltation, destructive wave action, and increasing seawater temperature, are two of the main concerns that hampered the project's viability. The quality of the seaweed seedlings is another element that hinders the project's sustainability. The majority of the seedlings were already dead when they were sent to or received by the recipients. There is a sizable amount of incapacity inside the association to steer the seaweed culture project toward long-term and lucrative goals. A sizable chunk of the membership currently exhibits a high level of apathy, and many will stop participating in the livelihood initiative. These would have significant adverse effects on the project's long-term beneficial durability. The DA-BFAR advised the seaweed association to apply for PCIC insurance to ensure the sustainability of the provided livelihood projects. This way, if the seaweeds were damaged by extreme weather, they could receive a sum of money and purchase new seedlings to begin again without needing assistance from the BFAR. However, after confirmation from PCIC, they discovered that they did not have insurance data on the seaweeds of the livelihood project's target recipients, and they are now urging those beneficiaries to purchase PCIC insurance.

## 4 CONCLUSIONS AND RECOMMENDATIONS

The project's goal, which is to reduce the poverty of coastal communities, was not materialized due to some significant reasons obtained from the respondents. It was concluded that the seaweed enterprise was a potential livelihood project that would help the fisherfolks augment their family income if appropriately implemented. None of the beneficiary's income is higher than the set poverty threshold of ₱2,257.00 per month. The household size is composed of 5 members with two dependents per provider. Most beneficiaries have access to electricity, which is alarming regarding access to safe drinking water. Households have outstanding loans from different credit institutions. Some fishers' associations were able to support their members through granting of

financial loans with minimal interest. Women, although with still high disempowerment (51%), appear to have become active agents of changing the family's economic activities landscape. Community facilitators don't need regularly coordinate with concerned LGUs and the beneficiary association; therefore, project implementation was not properly guided and monitored. Respondents also noted poor responses to the problems and concerns sent by the beneficiaries about the project. LGU officials expressed some frustrations as it appeared that the responsibility for the project was turned over to them fully. The effectiveness, efficiency impacts, and sustainability of the project could not be fully assessed now. However, glaring indicators that may hinder its attainment are readily observable from the project site, inside the association, and its peripheral support system. In totality, the seaweed project in inter-island barangays does not have significant impacts (yet) on the lives of the beneficiaries, specifically on income generation aspects and the poverty reduction objective.

Site suitability studies should be conducted to identify the most appropriate location for the farming site. Likewise, relevant advice on the timing of farming should be afforded to avoid losses due to inclement weather conditions. There is a need to review the membership and allow only those who would unselfishly commit to participating and not just depend on those who would work. The DA-BFAR community facilitators should coordinate better with LGUs and provide regular monitoring and technical service provision to the association for smooth implementation, monitoring, and evaluation of the projects. Again, facilitators should address the beneficiaries' problems and concerns to avoid project failure. Capability training should be provided to all project beneficiaries, specifically on financial literacy, record keeping, and basic business management, to meet the ultimate purpose of the laid intervention.

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## References

- 2010 census of population and housing reports | philippine statistics authority. (n.d.). Retrieved from <https://psa.gov.ph/statistics/census/population-and-housing/2010-CPH>
- Author, G. (2012, 11). *The environmental benefits of seaweed farming* | greener ideal. Retrieved from <https://greenerideal.com/food/1102-the-environmental-benefits-of-seaweed-farming/>
- Authority, P. S. (2018). *Fisheries statistics of the philippines*. <https://psa.gov.ph/>. Retrieved from <https://psa.gov.ph/sites/default/files/Fisheries%20Statistics%20of%20the%20Philippines%2C%202016-2018.pdf>
- Authority, P. S. (2020). *Fisheries situation report, january to december 2020*. <https://psa.gov.ph/>. Retrieved from <https://psa.gov.ph/sites/default/files/Fisheries%20Situation%20Report%2C%20January%20to%20December%202020.pdf>
- Calculating the women's empowerment in agriculture index*. (n.d.). Retrieved from <https://agrilinks.org/sites/default/files/resource/files/WEAI%20Presentation%20110912.pdf>
- Fisheries, coastal resources, and livelihood project*. (n.d.). Retrieved 2020, from <http://fishcoral.bfar.da.gov.ph/about-us>

- International fund for agriculture development.* (n.d.). Evaluation Manual, Second Edition. Retrieved 2015, from <https://www.ifad.org/documents/38714182/39748829/manual.pdf/bfec198c-62fd-46ff-abae-285d0e0709d6>
- Mahawan, A. M., Velza, J. F. P., Ibañez, R. Y., Jr., Dioneda, R. R., Sr., Belardo, S. B., & Agonos, E. M. (2022, 07). Women empowerment in selected fisheries-related livelihoods in asid gulf, masbate, philippines. *International Journal of Multidisciplinary: Applied Business and Education Research*, 3, 1219-1230. doi: doi: 10.11594//ijmaber.03.06.24
- Oecd glossary of statistical terms - natural assets definition.* (2001, 09). Retrieved from <https://stats.oecd.org/glossary/detail.asp?ID=1729>
- Organization, W. H. (2022, 03). *Sanitation*. World Health Organization: WHO. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/sanitation>
- Pazzibugan, D. Z. (2014, 09). *Marine scientist pursues 47-yr study, uses of seaweeds*. Retrieved from <https://newsinfo.inquirer.net/635863/marine-scientist-pursues-47-yr-study-uses-of-seaweeds>
- Reports, S. (2020, 11). *Seaweed farming in the philippines*. Retrieved from <https://www.borgenmagazine.com/seaweed-farming-in-the-philippines/>
- Site, T. S. (2022, 10). *Information on marine algae*. Retrieved 2022-12-05, from <https://www.seaweed.ie/algae/algae.php>
- Wassilieff, M. (2006, 06). *What is seaweed? - te ara encyclopedia of new zealand*. Retrieved 2019-09-20, from <https://teara.govt.nz/en/seaweed/page-1>