JEM &DS

Journal of Education, Management and Development Studies
jemds.cspc.edu.ph
ISSN: 2782-9413
E-ISSN: 2799-0583
Published 31 December 2022

Evaluation Of Esperanza Seaweeds Culture-enterprise Federation: A Livelihood Project In Masbate, Philippines

Alvin M. Mahawan[1*], Roger Y. Ibañez, Jr.[2], and Jacob Frederick F. Velza[3]

[1]Dr. Emilio B. Espinosa Sr. Memorial State College of Agriculture and Technology Mandaon, Masbate, Philippines
[2 & 3]Cawayan Campus, Dr. Emilio B. Espinosa Sr. Memorial State College of Agriculture and Technology Cawayan, Masbate, Philippines

RESEARCH ARTICLE

Abstract
The Seaweeds Culture is one of the livelihood initiatives extended by the FishCORAL Project funded by the United Nations-International Fund for Agricultural Development (UN-IFAD) with the Bureau of Fisheries and Aquatic Resources (BFAR) to the fishing households in Barangay Rizal and Libertad, Esperanza, Masbate, Philippines. The study aimed to analyze the socioeconomic characteristics of household beneficiaries, identify the different types of livelihood assets, and evaluate the critical livelihood performance of the Esperanza Seaweeds Culture-Enterprise Federation. The study included the twenty-one beneficiaries, and data were treated based on cross-sectional quantitative data gathered through focus group discussion and key informant interviews. It was found that the household beneficiaries are mostly potential labor force members. The household income is insufficient, which translates to high poverty incidence. The income and expenditure approach as PSA's measure of poverty confirmed this. The primary livelihood assets are consumer durables, enterprise federation, credits as significant financial capital, and government transfers associated with buffering mechanisms to sustain the family needs. There is relevance and initial impact, which results in improved livelihood and some improvement in women empowerment. The claimed improvement in income could not be associated with project impact as the culture has just started. There are critical challenges to the efficiency and sustainability of the project, especially from the end view of natural and anthropogenic disturbances. These significant risks are appropriately counteracted when the association does have a sustainability plan. The adaptive capacity of the association must be enhanced. Along these ends, BFAR, academe, and other agencies' technical backstopping are vital.

*Corresponding author
ammahawan@debesmscat.edu.ph

Submitted 30 April 2022
Accepted 26 September 2022

Citation
Mahawan, A. M., Ibañez, R. Y., Jr., Velza, J. F. (2022). Evaluation Of Esperanza Seaweeds Culture-enterprise Federation: A Livelihood Project In Masbate, Philippines. Journal of Education, Management and Development Studies. 2(4). 1-12. doi: 10.52631/jemds.v2i4.120

Keywords: Seaweeds culture, Esperanza Masbate

DOI: http://doi.org/10.52631/jemds.v2i4.120

1 INTRODUCTION

Humans around the world have consumed seaweed for centuries, possibly millennia. A recent study suggested that consuming seaweeds might have been essential for the human brain growth of early Homo ancestors who lived along coasts (Kim, Stekoll, and Yarish, 2019). Seaweed cultivation is a good activity for improving the livelihood of coastal communities. Southeast Asian countries such as the Philippines cultivate seaweed with reasonably high production (Kasim,

Balubi, Mustafa, Nurdin, Patadjai, and Jalil, 2019). The cultivation of rheumatoid posed an increased production when subjected to various methods continuously expanding in Asia. Kasim et al. (2019) claimed that grazing by herbivorous fish is widespread in all locations of seaweed cultivation. In India, the seaweeds production farming of the *Kappaphycus alvarezzi* and *Eucheuma denticulatum* species has decreased by around 10% of their growth due to attacks of herbivorous fishes such as *Siganus javus* (rabbitfish), *Acanthurus sp.* (surgeonfish), *Cetoscarus sp.* (parrotfish), and sea urchin *Tripneustes sp.* There were attempts to culture seaweeds in cages to get away from the grazing of these herbivorous fishes.

The Philippines was recognized with the highest production volume of seaweeds-specifically eucheumatoids, in 2011, amounting to 1,840,832 metric tons in fresh weight. However, in the subsequent years, the country was confronted with a steady decline in production which can be attributed to ephiphytisms, loss of genetic diversity due to cultural methods used, political unrest in the main farming areas of the Southern Philippines, and the frequent occurrence of typhoons (Trono and Largo, 2019).

Seaweed farming is a popular alternative livelihood development project in many tropical developing countries. It became part of the government's efforts to diversify livelihood opportunities, targeting poverty alleviation among coastal communities. In the study by Sievanen et al. (2005), they examined the various sites in the Southern Philippines and Northern Indonesia on the assumption that as fishers engage in seaweed farming livelihood, there will be a reduction in pressure on the fisheries. It was found that the livelihood source of income of the fishing family was seaweed farming. Also, it became one of the direct interventions to ease fishing pressure for many struggling fisheries.

These twin phenomena of high poverty and depleted fish stocks due to overfishing are present on Masbate Island (Torres et al., 2019; Belardo et al., 2019). It is a good recognition by the BFAR that under its UN-IFACD-funded FishCORAL Project, the seaweeds culture livelihood project was provided to groups of fisherfolks in Barangay Libertad and Rizal, Esperanza, Masbate. Focused on this livelihood project, the study had the following objectives: (1) analyze the socioeconomic characteristics of households covered by the seaweeds livelihood project; (2) identify the different types of livelihood assets owned by the household beneficiaries; (3) evaluate the livelihood key performance of Esperanza Seaweeds Culture-Enterprise Federation and (4) Recommend options to improve the livelihood project further.

2 METHODOLOGY

2.1 Research Design

The study used a descriptive design and a survey questionnaire as its primary data gathering method. Focus group discussions and key informant interviews were used as a backup during field surveys to validate and enrich the data (KII). The availability of fishing-related household members during the field visit was considered while choosing the respondents. Frequency counts, percentages, and cross-sectional quantitative data collected from 21 beneficiaries, along with qualitative data generated during FGDs and KIIs, were used to analyze the data.

The structured survey questionnaire's four sections are background, household characteristics, expenses and other outlay, income and other receipts, and women's empowerment. The final information was analyzed while assessing how well the livelihood project performed. To analyze project performance, the study modified the framework proposed by the Organisation for Economic Co-operation and Development (OECD) in 2002 along the lines of relevance, efficiency, effectiveness, impact, and sustainability.

One of the required components of the study included measuring women's empowerment. The Women's Empowerment in Agriculture Index (WEAI), developed from the study by Alkire, Meinzen-Dick, Peterman, Quisumbing, Seymour, and Vaz, was used for the analysis (2013). Five domains of empowerment (5DE) made up its structure: (1) decisions on agricultural output, (2) access to and decision-making authority over productive resources, (3) control over the use of income, (4) leadership in the community, and (5) time allocation.

2.2 Analytical Design

The study used descriptive analysis, such as frequency counts and percentages, to describe the socioeconomic characteristics of households and the profile of assets that support living. Based on the obtained interview results and the project's relevance, effectiveness, efficiency, and impacts, the livelihood key performance's evaluation and findings were qualitatively examined. The project's effects were analyzed independently. The Philippine Statistics Authority's guidance on the headcount ratio, the percentage of households with per capita monthly income, and the spending approach were used to analyze poverty reduction as of 2018. Lastly, the 5DE's ten indicators used to quantify women's empowerment matched inadequate cutoffs and weights for each category. The article evaluated the relevance, effectiveness, efficiency, impact, and sustainability of the seaweed culture project utilizing the assessment criteria as a whole (OECD-DAC, n.d.).

2.3 Limitations of the Study

The study was conducted when the COVID-19 pandemic was just getting started. Therefore, tight compliance was required with travel restrictions and health and safety procedures. Even though the survey questionnaire was based on limits, it was noticed that the researcher and respondents made physical contact. Specific information, such as the project proposal and financial accounts, was unavailable during the FGDs. Natural disasters jeopardized the most recent operation, which lasted a month, and resulted in unsuccessful seaweed farming. A comprehensive effect evaluation and the critical data gathered during the field trips are not quantifiable. As a result, crucial information from the BFAR-assigned community facilitator and the experiences and perspectives of the beneficiaries of the seaweed culture serve as the basis for evaluating the livelihood initiative.

3 RESULTS AND DISCUSSION

3.1 Analysis of the Household Socioeconomic Characteristics

Twenty-one recipients in total were questioned, and they shared details about their household's socioeconomic makeup. It was discovered that most of the family members ranged in age from 15 to 64 (Table 1). It is clear that people in this age range are economically active and are either now employed or have the capacity to be. The young dependents, who account for 37% of the household members, are those under 14. One percent of the total household members were people 65 and older or elderly dependents. The computed age dependency ratio indicates that there are more young members of the household compared to the old-age dependents. Further, given the result of the working-age household members, there is an approximate estimate of one dependent for everyone working-age household member.

The household beneficiaries reported an average monthly income of P15,437 (std= P10,358). It is revealed that the highest monthly household income is P51 917, while the lowest monthly household income is P4,150. On average, household beneficiaries were composed of five members. The largest household size recorded was ten members, while the minor household comprised two members.

In terms of the types of dwellings, the majority of the household beneficiaries, 81%, dwell in single-detached houses compared to households in a duplex type composed of 4%.

Furthermore, the household socioeconomic characteristics implied that the beneficiaries of the seaweed culture livelihood initiative are affected in managing the entire farming operation. They are more likely to be affected by the need to provide for their daily food needs, which failed the project. This is an input for investigating their seaweed culture, farming knowledge, and practices since Esperanza is often the area for seaweed farming.

3.2 Analysis of the Livelihood Asset Profile

The livelihood resources of the project's fishing household recipients were examined in this part. As shown in Table 2, physical, social, human, financial, and natural assets are all included (Department of International Development, 2001). When these assets were accessible to every

Table 1. Household Socioeconomic Characteristics

Category	Frequency		Percentage
Age of Household Members			
65 and above		1	1%
15 – 64		70	65%
14 and below		37	34%
Age Dependency Ratio	0.54		
Child Dependency Ratio	0.53		
Old-age Dependency Ratio	0.01		
Household Monthly Income			
Range	P4, 150.00 – P51, 917.00		
Mean	P15, 437.00		
Standard Deviation	P10, 358.00		
Household Size			
Range	2 – 10		
Mean	5.1		
Standard Deviation	2.1		
Types of Dwelling			
Single House		17	81%
Duplex		4	19%

home, they could generate money and would be helpful to the livelihood project's successful completion.

3.2.1 Physical Assets

Physical capital is a thing with economic worth that is material in nature. Examples include the tools and equipment that a household needs to function effectively. It also comprises the necessary infrastructure for daily activities, including access to electricity, suitable housing, sufficient water supply, and sanitary conditions.

All consumer durables, including mobile phones (86 percent), motorcycles/tricycles (62 percent), CD/VCD/DVD players (52 percent), motorized boats/Bancas (43 percent), and others, are included in the physical assets owned by households. This merely indicates that it helped the families be able to finance other forms of recreation, transportation, and fishing. This leads to increased household productivity, linked to the advantages of owning durable consumer goods. According to Bridgman (2016), home items are more likely to be held due to less time spent on household chores and increased labor force participation in the household's main source of income.

3.2.2 Social Assets

In times of need, social assets relate to the resources attributed to the values provided by social institutions, organizations, and other productive individuals (Mailath and Postlewaite, 2006). The formal and informal relationships and their participation in associations are among the home beneficiaries' social assets in this study.

It was shown that among the homes, the Seaweeds Culture-Enterprise Federation is the most significant source of social capital (87 percent). Additionally, it is the origin of less active social assets in mutual aid or insurance groups, 40 percent of religious organizations, and 13 percent of credit or microfinance organizations. Therefore, there is ample proof that each participant belongs to a community organization, demonstrating that these social resources provide a way for the beneficiaries to collaborate to achieve the goals of the livelihood project.

3.2.3 Human Assets

The economic value of a worker's expertise and talents is their human asset. This comprises resources like education, training, and skills that improve the project's or program's quality and effectiveness (Kenton and Sonnenshen, 2020). It was discovered that elementary graduates (43 percent) and elementary undergraduates made up the majority of the households (24 percent). Despite this, skilled workers predominated in households, as it is known that household heads frequently worked as food vendors, carpenters, masonry workers, livestock and poultry farmers, and construction workers. This demonstrated the requirement for talents that necessitate a more physical approach to their work.

In addition, 20% of women who received benefits completed high school, 40%, and 27%, respectively, are undergraduates, and some are elementary graduates. Because some women (13%) work as government officials or as fish and food vendors, which need fundamental management, problem-solving, entrepreneurship, marketing, and networking abilities, their skills were tested.

Compared to the other identified assets, human capital is the primary indication at the household level. The availability and quality of work are therefore considered required, even while insufficient, to attain livelihood outcomes. It is consequently productive when practiced in livelihood chances in the case of the necessary skills. It is crucial to remember that formal education provides more extensive access to options in the economic market, even though educational achievement may not be the only factor.

3.2.4 Financial Assets

A liquid asset, such as cash, stocks, bonds, mutual funds, and bank deposits, derives value from contractual rights or ownership claims (Chen and James, 2021). In this study, it is used to refer to the materials households employed to fulfill their targeted livelihood goals. Savings by households, credit availability, productive assets, or government transfers are the causes.

It was discovered that most households' financial capital came from bank savings and credit (100 percent of respondents) (81 percent). Certain families listed refrigerators (24%) and motorized boats/bancas (43%) as productive items. Additionally, it should be emphasized that government transfers (52 percent) dominate their source of funding, including financial aid and Pantawid Pamilyang Pilipino Program participants (4Ps). These are support measures, notably for people living in severely underprivileged households. These act as protective buffers against potentially harmful natural or manufactured events, including tragedies, pandemics, illness, etc. Together, these resources will power their coping technique to maintain the family's standard of living and consumption.

3.2.5 Natural Assets

The biological resources, the land, and the water areas are assets of the natural environment that produce extra advantages that sustain livelihoods (OECD, n.d.). Forty-eight percent of the household beneficiaries had land, which shows that their capital strengthened their ability to enlarge the available resources to attain their desired aim for their livelihood. It is a resource used as a support mechanism in raising livestock and poultry. The total area and the possible fishing ground for Masbate Fisherfolks along the Asid Gulf area are 2476 km^2. (Dioneda et al., 2019) Likewise, seaweed beds abound in the gulf vouching for the suitability of the coastal water of Esperanza for seaweed culture (Guiriba et al., 2019).

Table 2. Household Livelihood Asset Profile

Household Assets		Frequency	Percentage
Physical			
	Cellular phones	18	86
	Television Set	2	8
	Motorcycle/Tricycle	14	62
	CD/VCD/DVD Player	11	52
	Motorized boat/banca	9	43
	Radio/radio cassette	7	33
	Washing machine	6	29
	Refrigerator/freezer	5	24
	Stove with oven/gas range	4	19
	Component/stereo set	1	5
	Bike/bicycle	1	5
Social			
	Livelihood Associations	19	87
	Credit or microfinance group	8	40
	Religious group	3	13
	Mutual help or insurance group (including burial societies)	2	7
Human			
	Elementary Undergraduate	5	24
	Elementary Graduate	9	43
	High School Undergraduate	4	19
	High School Graduate	2	10
	College Undergraduate	1	4
Financial			
	Credit	21	100
	Bank Savings	17	81
	Government transfer	11	52
Natural			
	Landowner	10	48

3.3 Evaluation and Findings of the Livelihood Key Performance

The OECD-DAC was primarily used in this study's evaluation of the livelihood key performance, particularly in ongoing projects like the seaweeds cultural livelihood project in the municipality of Esperanza. According to the DAC Principles for Evaluation of Development Assistance (OECD, 1991), the focus of evaluation should be along (1) relevance and fulfillment of objectives, (2) development efficiency, (3) effectiveness, (4) impact, and (5) sustainability. As a result, the key performance of Seaweeds Culture-Enterprise Federation using the indicators above is applied in this study.

3.3.1 Relevance

Relevance is the degree to which the livelihood program is in line with the needs of the beneficiaries, the needs of the nation, the priorities of the world, and the partner's policies. The Philippine government has made numerous efforts to improve the socioeconomic situation of Filipinos. The Fisheries, Coastal Resources and Livelihood Project (FishCORAL) was recently launched to improve food and nutrition security, reduce poverty, and raise household incomes in the nation's economically distressed coastal and island regions. One of the top fishing grounds for this FishCORAL initiative was the Asid Gulf.

Executive Order No. 27, Series of 2017, was used to implement the Bureau of Fisheries and Aquatic Resources' livelihood programs or projects (PPs). Along with government-owned or controlled enterprises, the PPs of implementing agencies likewise adhere to this order. These initiatives align with the current top development priorities, including Ambisyon Natin 2040 and

inclusive government development. The livelihood initiatives also directly address significant demands outlined in the Sustainable Development Goals (SDGs).

In light of the current economic climate in Acid Gulf's coastal villages, seaweed culture is a suitable livelihood solution. The Esperanza FGD with responder members of the member beneficiaries revealed a very high level of positive perception for the seaweed culture project. Respondents indicated that seaweed culture might significantly impact the fishing community's income when adequately carried out and managed. Most female responders are also excited to help turn livelihood involvement into a self-sustaining and revenue-generating enterprise for their families.

3.3.2 Effectiveness

Effectiveness is the degree to which the objectives of a development intervention are met by the time of evaluation. During the on-site visit, it was noted that the project's biggest problem was maintaining constant monitoring from the beginning of the seaweed culture until harvest. The FGD found that the project's effectiveness was hardly measurable due to the significant impact of natural disturbances. These include bad weather, which frequently interferes with field setups, excessive summertime sea surface temperatures, and the incidence of ice-ice illness.

Interestingly, beneficiaries of the Rizal Fisherfolk Association said that their household consumption has increased by 70% since they actively participated in the initiative, with seaweed culture accounting for most of their livelihood. Training in entrepreneurship, post-harvest processing, and other cultural skills was sufficiently extended to encourage active participation in the program. Because of this, the project's effectiveness gives recipients the chance to reap immediate benefits and be productive while earning additional cash.

3.3.3 Efficiency

Efficiency refers to how economic resources and inputs (such as money, knowledge, and time) are transformed into outcomes. Esperanza's seaweeds culture-enterprise federation was put into action by first providing planting and other necessary culture materials, training people in seaweed-related livelihoods, and releasing the seaweeds for plantation in Barangay Rizal and Libertad in January and February of 2021, respectively. Not much could be learned about the project's efficiency because of the recent assessment period. But the project implementers' provision of baseline data started to cause issues. The association may not yet have a mechanism for capturing, archiving, and storing pertinent livelihood data.

3.3.4 Impacts

Given that the project has only recently begun and is currently in progress, an impact analysis is inappropriate. No baseline data for the livelihood intervention can be used to estimate its overall impact. Information that would support and enhance the examination of household earnings, assets, and women's empowerment is inadequate. Tracking the performance, advancement, or successes of the seaweed-growing enterprise is, thus, in part, impossible. Some preliminary measurements were acquired and are shown below to act as the baseline for future impact assessment:

Household Income. During the surveys, fifteen of the association's 21 members (74.1 percent) reported increased household income. On the other hand, six individuals (28.5%) reported no improvement in their household's financial situation. Given that the initiative is new and has only produced one crop, the respondents' observations of an increase in revenue from various sources may not necessarily be related to the project. Once too, beneficiaries could not produce any paperwork about the livelihood program. Similar terms were reported for Barangay Rizal, which had already experienced two harvests when the study was conducted. However, the association could not furnish records about its claim of income. There does appear to be a tendency for associations to overlook record keeping, indicating insufficient associational preparedness before the livelihood roll-out.

Poverty Reduction. According to the Philippines Statistics Authority's 2020 report on the prevalence of poverty in the province of Masbate, 87.5 percent of the member respondents have yearly per capita income or expenditures below the per capita cutoff and are therefore

categorized as poor. These are the households whose annual income is less than P22,907, the poverty line. This shows that the households' basic demands for food and non-food items are not supported by their income.

The measures of poverty incidence utilized by PSA are shown in Table 3. The poverty incidence was 86% using the income and spending approaches. Regarding the expenditure method, six or 28.6% of the households said they only spent enough to cover their essential dietary and non-nutritional needs. Two out of every eleven (9.5%) households found it challenging to meet both needs. The spending technique used the household income's ensuing trend and curved to measure poverty. As a result, non-food items are continuously available and are not explicitly connected with eating as the primary food in low-income homes. Their household assets, which served as coping mechanisms for the extreme difficulty in earning more significant incomes, create the flow of their income.

Table 3. Poverty Measures

Poverty Measure	Poverty Incidence (%)	Subsistence Incidence (%)
Subsistence	86	86
Incidence	14	14

[1] *Based on PSA 2018 annual per capita poverty threshold in Masbate.*
[2] *Based on PSA 2018 annual per capita food threshold in Masbate.*

Women Empowerment. The Women Empowerment in Agriculture Index (Alkire et al., 2013) was developed to gauge women's empowerment in the agriculture industry. Production, Resources, Income, Leadership, and Time comprise its five empowerment domains (5DE). The empowerment ratio, which identifies a woman who has attained "adequacy" in at least 80% of the weighted indicators - 5DE - is calculated using each indicator in this study.

Table 4 revealed that just seven (47%) of the recipients are women, even though eight (53%) are female. It was evident that women had greater access to and influence over financial decisions (0.87), leadership (0.87 for group members, 0.80 for public speaking), and leisure activities (0.87). Decision-making is heavily influenced by women in these communities, which helps them produce resources and money. A study by Mahawan et al. (2022) asserted that most women in the Asid Gulf possessed the necessary skills to obtain and manage their financial resources and build relationships with other organization members.

Most of the women in Barangay Rizal hold leadership positions in local organizations, demonstrating their involvement in the neighborhood and comfort speaking in front of visitors. Women are less productive and have less control over production (0.27). The bulk of them, according to the FGD, lack productive assets like animals, farm machinery, or equipment for fish processing. Disempowered women have limited access to and control over credit in terms of resources (0.13). The male, who serves as the family's head, makes the majority of the decisions. Back then, women had no control over how their money was used (0.00). Along with production autonomy, empowered women also have a weak point (0.33), but if handled, it will be one of the productive prospects in the beneficiary community.

Table 4. Women Empowerment Ratios

Indicators	Adequacy Level	
	Empowerment Ratio	Disempowerment Ratio
Production		
Input in productive decisions	0.60	0.40
Autonomy in production	0.33	0.77
Resources		
Ownership of assets	0.73	0.27
Purchase, sale, or transfer for assets	0.67	0.33
Access to and decisions on credit	0.87	0.13
Income		
Control over the use of income	1.00	0.00
Leadership		
Group member	0.87	0.13
Speaking in public	0.80	0.20
Time		
Workload	0.53	0.47
Leaisure	0.87	0.13
Disempowerment Headcount Ratio	0.53	
Empowerment Headcount Ratio	0.47	

[1] *Based on Women Empowerment Agricultue Index, Alkire., et al., 2013*

3.4 Sustainability

This seaweed culture project began in January and February of 2021 at the Barangays Libertad and Rizal. Members of the implementing organization are already facing numerous obstacles at the start of the seaweed project. Typhoons, high sea surface temperatures, and powerful waves pose these risks. Despite the COVID-19 concern, association members do not view this as a threat because the project site is in an open area, and there are not many congregations of people as they do in the seaweed culture. The pervasive "ice-ice illness" was also a problem observed.

Key components of sustainability include the prevalent high poverty among members, the significant inherent environmental threats to the culture setup, relatively equitable women's empowerment, and the ongoing challenge for the association to engage in self-sustaining seaweed culture; in the long run, it's own. Since there weren't many successes when the assessment was done, this is still up in the air.

Generally, this study indicates that the fishing households' socioeconomic conditions in Esperanza's municipality are limited compared to the issuances of poverty and food thresholds set by the PSA. This shows that the beneficiaries of the livelihood initiative are still considered poor. This is evident with the livelihood assets owned by the beneficiaries, which are inadequate to sustain their food and non-food items. Additionally, the livelihood performance showed an avenue to further engage researchers in identifying the factors affecting the organization's management, awareness of how seaweed farming is performed, and financial literacy

4 CONCLUSION

Based on the results and findings, preliminary conclusions and recommendations can be forwarded:

The socioeconomic status of the household members covered by the seaweed livelihood project was dominated by the economically active population, the actual and potential labor force members. Most household incomes are below the poverty incidence threshold in Masbate Province. Therefore most of these members belong to the poor household category. In terms of livelihood

assets, the beneficiaries' owned consumer durables, increasing their productivity in household and livelihood activities. The organizations were their source of social capital as every member formed a network and connections. Moreover, the federation was manned by very experienced yet elementary graduates. This can be associated with issues in the productivity of livelihood operations and opportunities. The households' significant financial capital was derived from credits from government and non-government transfers. Still, the household assets served as a coping mechanism to sustain the day-to-day consumption in the family. The livelihood initiatives immediately assisted the association members in purchasing food and non-food items.

On the aspect of key performance of the Seaweeds Culture-livelihood, it was found to be highly relevant to the socioeconomic status of the targeted household in Esperanza, Masbate. The project showed effectiveness in household consumption which was perceived to be better. Efficiency is hard to glean as the project has just started. But in future assessments, there is a need to establish good physical records for benchmark data covering the material, financial and intangible inputs. Further, the impact on household income bared positive improvements, indicating the availability of food and non-food items. However, it is not very likely that these improvements directly impact the project as it has just started operation during the assessment. Poverty incidence was not reduced due to dependency on household assets as a mechanism to sustain family consumption. Further, most women are disempowered (53%), but a considerable proportion of those more adequately empowered (47%) to participate in productive agriculture-based economic activities.

5 RECOMMENDATION

Seaweed culture in the municipality of Esperanza encountered huge problems from cultivation to production and continued the role of the members in the association. The sea-based culture is vulnerable to many natural (typhoons, high sea surface temperature, disruptive wave actions, and seaweed disease outbreaks). The distribution of seaweeds should not be during the summer season as extreme natural environmental factors affect the growth of the seaweeds. Furthermore, Human disturbances such as fishing, destructive fishing, propeller strike to set-up, and others should be addressed by allowing them to be informed through the BFAR, they shall assist the members of the association by providing more markers for easy identification and more so, the cultivation of seaweeds should be in the undisturbed area and should not be passable by fishing boats. Also, the adaptive capacity of the association must be enhanced. There should be proper technical training and assistance to the association members in how to properly culture the seaweeds, planting, production, and even marketing strategies. These significant risks are appropriately counteracted when the association does have a sustainability plan to ensure an impact of the livelihood project on the fishing families. To this end, the technical backstopping of BFAR, academe, and other agencies is vital. Lastly, A more comprehensive study may focus on the knowledge, systems, and practices of fishing households in Asid Gulf along seaweed culture production.

6 ACKNOWLEDGEMENT

The authors extend their gratitude to the Regional Office and Masbate Province field office of the Bureau of Fisheries and Aquatic Resources (BFAR) for funding the project through the United Nation-International Fund for Agriculture and Development (UN-IFAD), Bicol University, Office of the Vice President for Research, Development, and Extension, component leaders, project leaders, and study leaders of Rapid Project Impact Assessment team, and especially to Dr. Emilio B. Espinosa Sr. Memorial State College of Agriculture and Technology for the collaborative assistance to the study leaders, participants and to all the people who made this study possible. Thank you very much, and Godspeed.

References

Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., & Vaz, A. (2013, December). The Women's Empowerment in Agriculture Index. *World Development*, *52*,

71–91. Retrieved 2022-12-06, from https://linkinghub.elsevier.com/retrieve/pii/S0305750X13001629 doi: doi: 10.1016/j.worlddev.2013.06.007

Bak, U. G., Gregersen, , & Infante, J. (2020, August). Technical challenges for offshore cultivation of kelp species: lessons learned and future directions. *Botanica Marina*, *63*(4), 341–353. Retrieved 2022-12-06, from https://www.degruyter.com/document/doi/10.1515/bot-2019-0005/html doi: doi: 10.1515/bot-2019-0005

Bridgman, B. (2016, October). Home productivity. *Journal of Economic Dynamics and Control*, *71*, 60–76. Retrieved 2022-12-06, from https://linkinghub.elsevier.com/retrieve/pii/S0165188916301348 doi: doi: 10.1016/j.jedc.2016.08.003

Chen, J. (2019). *Financial Asset Definition.* Retrieved from https://www.investopedia.com/terms/f/financialasset.asp

Dioneda R.R., Asejo, R.B., Burce, R.B., Balangawan, R.R., & Tumbaga, B.S. (n.d.). *Status of Corals and Coral Reefs Fishes in Acid Gulf*.

Dioneda R.R., Asejo, R.B., Burce, R.B., Balangawan, R.R., & Tumbaga, B.S. (2019). Status of Corals and Coral Reefs Fishes in Acid Gulf. *Bicol University Center for Policy Studies and Development*, 33–51.

FishCORAL Project, (n.d.). (About us). (n.d.). Retrieved from http://fishcoral.bfar.da.gov.ph/about-us

Guiriba, M.A.B., R.B. Asejo, M.T.B. Bron and G. Espinosa, H.L. Marana and D.N. Sy. (2019). *Status of seagrass and seaweeds communities in Acid Gulf, Philippines*. Legazpi City: Bicol University Center for Policy Studies and Development.

Hayes, A. (2019, July). *Physical asset.* Retrieved from https://www.investopedia.com/terms/p/physicalasset.asp

Kasim, M., Muis Balubi, A., Mustafa, A., Nurdin, R., Sofyan Patadjai, R., & Jalil, W. (2020, June). Floating Cage: A New Innovation of Seaweed Culture. In Q. Lu & M. Serajuddin (Eds.), *Emerging Technologies, Environment and Research for Sustainable Aquaculture*. IntechOpen. Retrieved 2022-12-06, from https://www.intechopen.com/books/emerging-technologies-environment-and-research-for-sustainable-aquaculture/floating-cage-a-new-innovation-of-seaweed-culture doi: doi: 10.5772/intechopen.90035

Kenton, W. & Sonnenshen, M. (2020, September). *Human capital.* Retrieved from https://www.investopedia.com/terms/h/humancapital.asp

Kim, J., Stekoll, M., & Yarish, C. (2019, September). Opportunities, challenges and future directions of open-water seaweed aquaculture in the United States. *Phycologia*, *58*(5), 446–461. Retrieved 2022-12-06, from https://www.tandfonline.com/doi/full/10.1080/00318884.2019.1625611 doi: doi: 10.1080/00318884.2019.1625611

Mahawan, A. M., Velza, J. F. P., Ibañez, R. Y., Jr., Dioneda, R. R., Sr., Belardo, S. B., & Agonos, E. M. (2022, July). Women Empowerment in Selected Fisheries-Related Livelihoods In Asid Gulf, Masbate, Philippines. *International Journal of Multidisciplinary: Applied Business and Education Research*, *3*(6), 1219–1230. Retrieved 2022-12-06, from https://ijmaberjournal.org/index.php/ijmaber/article/view/430 doi: doi: 10.11594//ijmaber.03.06.24

Mailath, G. J., & Postlewaite, A. (2006). Social Assets. *International Economic Review*, *47*(4), 1057–1091. Retrieved 2022-12-06, from http://www.jstor.org/stable/3877453

Mateo, J. P., Campbell, I., Cottier-Cook, E. J., Luhan, M. R. J., Ferriols, V. M. E. N., & Hurtado, A. Q. (2020, June). Analysis of biosecurity-related policies governing the seaweed industry of the Philippines. *Journal of Applied Phycology*, *32*(3), 2009–2022. Retrieved 2022-12-06, from http://link.springer.com/10.1007/s10811-020-02083-7 doi: doi: 10.1007/s10811-020-02083-7

OECD Glossary of Statistical Terms - Natural assets Definition. (n.d.). Retrieved 2022-12-06, from https://stats.oecd.org/glossary/detail.asp?ID=1729

Philippine Statistics Authority | Republic of the Philippines. (n.d.). Retrieved 2022-12-06, from https://psa.gov.ph/poverty-press-releases/nid/162559

Rebours, C., Marinho-Soriano, E., Zertuche-González, J. A., Hayashi, L., Vásquez, J. A., Kradolfer, P., … Robledo, D. (2014, October). Seaweeds: an opportunity for wealth and sustainable livelihood for coastal communities. *Journal of Applied Phycology*, *26*(5), 1939–1951. Retrieved 2022-12-06, from http://link.springer.com/10.1007/s10811-014-0304-8 doi: doi: 10.1007/s10811-014-0304-8

Sievanen, L., Crawford, B., Pollnac, R., & Lowe, C. (2005, January). Weeding through assumptions of livelihood approaches in ICM: Seaweed farming in the Philippines and Indonesia. *Ocean & Coastal Management*, *48*(3-6), 297–313. Retrieved 2022-12-06, from https://linkinghub.elsevier.com/retrieve/pii/S0964569105000670 doi: doi: 10.1016/j.ocecoaman.2005.04.015

Sustainable livelihoods guidance sheets Sustainable livelihoods guidance sheets (Tech. Rep.). (n.d.). Retrieved from https://www.livelihoodscentre.org/documents/114097690/114438878/Sustainable+livelihoods+guidance+sheets.pdf/594e5ea6-99a9-2a4e-f288-cbb4ae4bea8b?t=1569512091877

Trono, G. C., & Largo, D. B. (2019, September). The seaweed resources of the Philippines. *Botanica Marina*, *62*(5), 483–498. Retrieved 2022-12-06, from https://www.degruyter.com/document/doi/10.1515/bot-2018-0069/html doi: doi: 10.1515/bot-2018-0069