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Research Article

Impact Assessment of Aqua Silviculture of Milagros and Placer, Masbate

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ABSTRACT

With the alarming poverty incidence among fisherfolks communities, the Department of Agriculture – Bureau of Fisheries and Aquatic Resources (DA-BFAR) embarked a project dubbed as Fisheries, Coastal Resources and Livelihood (FishCORAL) funded by United Nations International Fund for Agricultural Development (UN-IFAD) to address the problem by providing livelihood project to the coastal areas of different regions in the country. To assess the impact of the said project in the Bicol region, Bicol University in collaboration with different State Colleges and Universities in the region conducted a project called impact assessment on different project of the FishCORAL livelihood projects. The aim of the study is to assess the key indicators of the project if the goals of the project was met with the implementation of the livelihood project. The study used convenience sampling in the field surveys and focus group discussions to draw conclusion wherein the respondents are the recipient of the aqua silviculture livelihood project. The study reveals that the beneficiaries is under big household category making them hard to financially sustain the basic needs of the family because there is large percentage of dependent individuals. It was also noted that they do not have their own lot where they built their houses and the source of drinking water is unprotected well. In addition, the livelihood project is not sustainable because of various problems such as no profit from the first production cycle, most of the beneficiaries backed out during the implementation and the association itself is not technically prepared to implement the project to sustainable ends. Conduct of more technical capability training along varied aspects of aqua silviculture shall be caried out. Also, trainings on financial literacy, business management and basic record keeping are very necessary. There is also a need to craft a clearcut guideline and operational protocol to guide the aqua silviculture venture. Maybe, a root cause analysis of the previous production cycle should be

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carried-out to highlight lessons and undertake corrective measures. The association must be reorganized, reoriented and retooled.

***Keywords**: Aqua silviculture, Asid Gulf, FishCoral*

Introduction

Livelihood programs and projects are one of the major activities and investment of government and non-government organization to achieve self-sufficiency and self-productivity among its clients. As what a famous saying of a Chinese philosopher Lao Tzu "Give a man a fish and he will eat for a day. Teach a man how to fish and you feed him for a lifetime" this is perhaps one of the guiding principle and philosophy of all livelihood providers such as government and non-government organization because livelihood projects are projects that ensure to empower, nurture and help the beneficiaries to discover their full potential, help them to become more rational and control their environment for self and resource sustainability. In addition, livelihood projects create employment towards its beneficiaries and additional or main source of income in order to combat the very alarming poverty incidence in the country.

The Philippine fisherfolks communities are some of the populations having the highest percentage of people with high poverty incidence (Torres et al., 2019). Factors such as (1) low educational attainment is the main contributor to this big problem in the country which leads to being laggards to the technologies offered to the farmers and fisherfolks; (2) unstable income because of changing weather (typhoon and big waves); (3) reduction of fish stocks and the persistent destruction and deterioration of coastal areas due to irresponsible and unsustainable farming/fishing practices; and (4) climate change are some of the few reasons for this poverty scenario.

To aid alleviate the poverty incidence among fisherfolks families, the Philippine Government through Department of Agriculture – Bureau of Fisheries and Aquatic Resources (DA-BFAR) created a project dubbed as Fisheries, Coastal Resources and Livelihood (FishCORAL). The project aimed to reduce poverty incidence among its beneficiaries while protecting the natural resource and mitigating and adopting climate change phenomenon.

Under the FishCORAL project, aqua silviculture is one of its livelihood projects introduced and given to its fisherfolks beneficiaries. The main concept of this project is the restoration of Philippine mangrove and provide livelihood to the fisherfolks community to mitigate climate change, food security and to alleviate poverty. Aqua silviculture is a type of fish culture system that produces fish (most of the time, crustaceans like mudcrabs are used) without destroying or cutting down mangroves that are natural habitat of various wildlife. The need to protect, preserve and restore mangrove is necessary because it is one of the most valued resources in aquatic system. According to a study the reduction of mangroves in the Philippines is proportionate to the reduction of fishery resources (Dioneda et al., 2019). Due to conversion of mangrove areas to fisheries production such as for fishponds and other forms of utilization, the mangrove area enormously declines from 400 000 -500 000 ha. in 1918 to 120 000 ha in 1994-1995 and 256, 185 ha in 2000 (FishCORAL, 2020). Thus, replanting and protecting mangrove is one key mitigation to problems in the coastal areas to increase income and mitigate climate change in the country.

The aqua silviculture is an aquaculture practice that protect or care for the mangrove while having a fish production. In order to do this, the design of the production follow the standard 70:30 ratio of mangrove to water canal. Figure 1 shows a typical aqua silviculture in Masbate. The main beneficiaries of this project are the fisherfolks who joined the mangrove planting in their respective locality. Masbate is one of the recipients of the aqua silviculture in the country because of the fact that fisheries is one of the major livelihoods in the province and huge hectarage of mangrove swamps abound in the municipalities of Placer and Milagros.

Figure 1. Aqua-silviculture Livelihood Project in Milagros, Masbate: Asid Gulf

In order to assess the implementation, and the impacts of the livelihood created within the five-year implementation of FishCORAL project (2016-2020) in Bicol Region the Bicol University in partnership with Dr. Emilio B. Espinosa Sr. Memorial State College of Agriculture and Technology (DEBESMSCAT) and other state universities in Bicol were tapped to conduct conducted the Rapid Project Impact Assessment (RPIA) for Albay, Ragay and Asid Gulfs. Under this program is the study on the impact assessment of aqua silviculture of Milagros and Placer Masbate.

The objectives of this assessment are to: (1) Identify inputs, outputs and outcomes of aqua silviculture in Milagros and Placer, Asid Gulf; (2) Analyze the impact pathways of the aqua silviculture in Milagros and Placer towards the key performance outcomes of FishCORAL project; (3) Assess the economic and social impacts of the aqua silviculture in Milagros and Placer; and (4) Document lessons to improve the implementation of fishery policies, programs and plans for effective livelihood initiatives.

Methods

Research Design

In order to achieve the objectives of this study the following are the methods of data collection. Field surveys were undertaken to fishing households wherein the respondent households are those aqua silviculture beneficiaries. Convenience sampling was employed. Focus group discussion (FGD) were also carried-out as members of each aqua silviculture beneficiaries were gathered and engaged in discussion about key vital aspects of the operation of the livelihood project.

To gather the information on the socio-economic characteristics, asset ownership and women empowerment, the structured questionnaire was utilized wherein the detailed information such as socioeconomic status, different assets of the family, source of income and their expenditure were obtained and used as part of bases in assessing the level of impact of the project.

Analytical Designs

Data collected on socio-economic characteristics and assets of the beneficiaries were subjected to descriptive analysis such as frequencies and percentage. On the other hand, the result on the women empowerment was measured using the ten indicators of the 5DE. Lastly, to assess the performance of the livelihood project, the criteria set by the OECD-DAC were utilized. These are the relevance, effectiveness, efficiency, impact, and sustainability.

Limitations of the Study

CoViD-19 Pandemic was considered as one of the limitations on this study because of some travel restrictions and safety protocols which gives the researchers a hard time in gathering respondents. Limited number of days in the field also a hampered study because of the pandemic and sometimes peace and order reasons.

Project proposal and financial statement were not also made available despite of repeated requests from concerned holders. This is supposedly important in the process of project impact assessment.

Results and Discussion

Analysis of the Household Socioeconomic Characteristics

The respondents from the 34 households represented a total household population of 188 individuals. Majority (60%) of this population are at a broad age class of 16-64 years old (see Table 1). Younger (15 years old and younger) represent 37% while those that are older than 64 are negligible (3%), The selection of the 16-64 year old is based on the disclosure of active fishing engagement of this age class by the respondents during FGDs. This data tells us that there are higher working age population in the coastal areas than the "dependent population". From an economic asset standpoint, this is advantageous as there are plenty of potential workforce that could support any economic activities in the community.

Overall, the age dependency ratio incurred by both the youngest and oldest age classes account to 67.87. This is 12.7 higher compared to the Philippine age dependency ratio and 14.57 higher compared to the world average (Word bank, 2021). The youth dependency ratio (15 years old and below age class) comprised a 63.39% while the old-age dependency ratio is just 4.46%. The age dependency ratio tells us the connection between the three age groups. The higher the values the greater level of age-related dependency within the population. With the data from the respondents, its apparent that there is a significant dependency burden detected in the community. This is despite of the presence of potential livelihood workforce to support varied economic activities.

Table 1. Households' Socioeconomic Characteristics

Socio-Economic Characteristics	Frequency	Percentage
Age Group		
15 and below	71	37
16 – 64	112	60
65 and above	5	3
Age Dependency Ratio	67.85	
Youth Dependency Ratio	63.39	
Old-age Dependency Ratio	4.46	
Household Size		
1-5	16	47
6-10	18	53
Household Monthly Income		
Range	2,200-37,000.00	
Mean	7,168.72	
Median	6,433.00	

Household size of families that are beneficiaries of the aqua silviculture are relatively big which majority are composed of 6-10 members representing 53% while those households that are composed of 1-5 members just comprise the 47%. families with 1-5 household size and 53% with 6-10 household size. Monthly household income ranged from P2,200-37,000.00. Mean and median measures of these incomes are just within P6,400-P7200/month which is very low and consistent to the findings in Asid Gulf (Torres et al., 2019).

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

As per evaluation of input, output and outcome of aqua silviculture in Milagros and Placer, Masbate, the different assets of the beneficiaries were evaluated. Livelihood asset profile is very useful in understanding the situation

of a community why they belong to the poor sector. The asset of each family will give the livelihood project planner to have a bigger picture that low income is not just the reason of their poverty, but rather a holistic framework of their assets. Based on literatures, the following are the five key assets or capital that are essential not just for the poor but for all families in order to make for living. The physical assets, social assets, human assets, financial and natural assets. Each of these were the data collected from the respondents to draw some inferences about the livelihood project.

***Physical Assets*.** Physical assets or physical capital are those basic infrastructure that people need to make a living and these includes shelter, water and sanitation system, energy, communication system, and household conveniences. Table 2. Shows that 100% of the families who are beneficiaries of aqua silviculture do not have their own lot where they built their houses. On the other hand, 92% of that families have their own houses but they do not own the lot. It is very critical and dangerous because some of them spend hundreds of thousands for their houses but if the owner of the lot will tell them to leave, they do not have the claim to stay. This situation will hinder their development since they do not have the sense of ownership in their "properties".

With regards to the drinking water, only 12% of the families can afford to buy mineral water as their drinking water, the remaining 65% relied on deep well as their source of drinking water and other household uses. This is worse compare to the report (Torres et al., 2019) in Asid Gulf which 24% families as source of their drinking water and only 45.14% relied on deep well. Toilet facilities was also identified in this study as physical asset The result shows that 76% of the families have their own toilet facilities that is flush to the septic tank. But the data also reveals that the remaining 24% does not have a good sanitary toilet facility which is very necessary in health and sanitation in the family. The common cause of morbidity in Asid Gulf households were viral infection, hypertension and other disease symptoms such as fever and stomachache (Torres et al., 2019). Furthermore, in the United Nation General Assembly last 2010, UN recognizes the access to safe and clean drinking water and sanitation as human right and called international efforts to help countries to provide safe, clean, accessible and affordable drinking water and sanitation. This is very necessary because according to World Health Organization (WHO), 827,000 people in different countries die as a result of inadequate water, sanitation, and hygiene, 60% of that figure was caused of diarrhea deaths and poor sanitation represents the remaining deaths (WHO, 2019).

In terms of household conveniences, the top five assets that each families have are, cellular phone (94%), television set (71%), motorcycle/tricycle (53%), motorize boat/banca (47%), radio/ radio cassette (47%). It shows that only few families have the other remaining convenience assets.

Table 2. Households' Physical Assets

Household Physical Assets	Frequency	Percentage
Tenure status		
Own house, rent-free lot with consent of the owner	19	56
Own or owner-like possession of house and lot	6	18
Own house, rent lot	5	15
Rent-free house and lot with consent of the owner	2	6
Own house, rent-free lot without consent of the owner	1	3
Rent-free house, lot rent	1	3
Source of Drinking water		
Mineral water	12	35
Protected well/tube well/borehole/water pump	12	35
Unprotected (open dug well)	7	21
Neighborhood with water line	2	6

Household Physical Assets	Frequency	Percentage
Developed spring	1	3
Toilet Facilities		
Flush to septic tank	26	76
No facility/bush/field	3	9
Flush to open drain	1	3
Hanging toilet/hanging latrine	1	3
Open pit	1	3
Pit latrine with slab	1	3
Basin	1	3
Household Conveniences		
Cellular phone/mobile phone	32	94
Television Set	24	71
Motorcycle /Tricycle	18	53
Motorized boat/banca	16	47
Radio/radio cassette	16	47
Washing machine	4	12
CD/VCD/DVD player	3	9
Refrigerator/freezer	2	6
Stove with oven/gas range	2	6
Component/Stereo set	1	3
Personal computer	1	3
Air conditioner	1	3
Sewing Machine	1	3
Bike/Bicycle	1	3

Social Assets. Another livelihood assets/capital that affect or have an impact of the livelihood of a given community is the social asset. This is referring to social resources such as networks, membership of a groups, relationships of trust, access to wider institution of society (Mailath & Postlewaite, 2006). In the municipality of Milagros and Placer, Masbate, it shows that 74% of the respondents (aqua silviculture beneficiaries) are members of a livelihood association (Table 3). This membership will have a major impact on the livelihood of a member because most of the livelihood and other opportunities from the government are channeled to organized and recognized associations. Being a member then to recognized associations will provide access to host of opportunities. The data also tells us that 26% of the respondents are member of a credit or microfinance group. Credit has a big role in the development of livelihood since without finances its impossible to start or continue a livelihood engagement. However, the data does not show us what type and what credit or microfinance group are available in the community. This is vital as this might also a factor why people in the coastal area are poor because of its big interest as in the case of loan sharks. Furthermore, religious group has also a good impact in the community since this institution will help the community to have hope and values and continue to live despite of challenges they are facing.

Table 3. Households' Social Assets

Household Social Assets	Frequency	Percentage
Livelihood Associations	14	74
Credit or microfinance group	5	26
Local Government	3	16

Household Social Assets	Frequency	Percentage
Religious group	2	11
Agric'l/livestock/fisheries producer's group	2	11
Other Women's group	1	5

Human Assets. Human assets are considered as the skills, knowledge, ability to work. It also includes the education, trainings, intelligence and health of a person (IFAD, 2015). Table 4 shows the disaggregated data on the educational attainment of the respondents and spouses. The data shows that 52% of the male are in the elementary graduates or have not finished elementary. This is just 16% in case of females. High school graduates and undergraduates is 35% for males while it is a remarkable 63% for females. For college graduate and undergraduate, females again have higher percentage (21%) than the 13% for males. Overall, there are more females that are well-educated than males. In the context of Masbate, majority of the males are the head of the family. The dismal educational preparation of the heads of the families might have been the cause of high poverty incidence among fisherfolks of Masbate. Nevertheless, because of the livelihood given to the beneficiaries, there are trainings and seminars that some members were able to attend for their additional knowledge which will lead to skills development for their livelihood.

Table 4. Households' Human Assets

Household Human Assets	Male		Female	
Educational Attainment	f	%	f	%
College Graduate	1	3	3	16
College Undergraduate	3	10	1	5
High School Graduate	5	16	5	26
High School Undergraduate	6	19	7	37
Elem Graduate	8	26	3	16
Elem Undergraduate	8	26	0	0

f – Frequency, % - Percentage

Financial Assets. Financial assets are the savings, access to financial services, and regular inflows of money. The data collected on the financial assets of the respondents are the regular inflows of money in the fisherfolks families. Data shows that majority or 68% of the income of the family are from husbands out of works in fisheries-related jobs. Some incomes are from services as laborer/unskilled workers and barangay kagawad. It was reported an average household income of P10,271.26/month for the entire Asid Gulf. Considering the enormity of fisheries -related sources of income the beneficiary families are very vulnerable to adverse impacts of weather disturbances such as typhoons (Torres et al., 2019).

On the other end, 42% of the women are simply housewives and the remaining 58% have their other sources of supplementary income other than fishing. Thus, it helps the families to have other source of income. Nevertheless, the data on Table 5, highlights that the average family income of fisherfolks are indeed low.

Table 5. Households' Financial Assets

Financial Assets	f	%
Female Occupation		
Housewife	8	42
Others	5	25

Financial Assets	f	%
No response/Unknown/Cannot Remember	2	11
Officials of Government, Corporate Managers	2	11
Day Care Worker	2	11
Male Occupation		
Fisherman	21	68
Laborers/ Unskilled workers	2	6
No response/Unknown/Cannot Remember	4	13
Brgy. Kagawad	2	6
Others	2	6

f – Frequency, % - Percentage

Natural Asset. Natural assets are the resources that people can draw on for their livelihoods which comprise or land, forests, and water. So basically, as they are fisherfolks and living in the coastal area, their main natural asset is the body of water or the sea. According to the Fisheries Statistics of the Philippine year 2016-2018 report, the total area and the possible fishing ground for Masbate Fisherfolks along Asid Gulf 2476 km2 (Dioneda et al.). Moreover, the total hectarage of mangrove in the Asid Gulf is around 686 hectares and 61% of this mangrove is from one of the aquasilviculture sites which is the Municipality of Placer (Guiriba et al., 2019).

Evaluation of the Livelihood Key Performance

To evaluate the performance of the aqua silviculture livelihood project, the methods in the manual of performance evaluation of IFAD (IFAD, 2015) was used. This evaluation manual is in line with the practices set out in OECD/DAC Glossary Key Terms in Evaluation and Results-Based Management. This is carried out as they would be useful in assessing the impacts of the project along social and economic status of beneficiaries and to identify input, output and outcomes.

For this purpose, this paper followed the evaluation base on impact and performance of the project namely: (1) relevance; (2) effectiveness; (3) efficiency; (4) impact; and (5) sustainability.

Relevance. According to manual subject IFAD performance evaluation manual, relevance is the extent to which the objectives of the development intervention are consistent with beneficiaries' requirements, country needs, institutional priorities and partner and donor polities. It also entails an assessment of project design and coherence in achieving its objectives. As assessment should also be made of whether objectives and design address inequality, for example, by assessing the relevance of targeting strategies adopted.

FishCORAL is a Philippine Government project funded by the IFAD. The project aims to reduce poverty incidence among rural areas specifically in the coastal communities while eyeing for food security and increase the household income to its target households. On the other hand, the IFAD is an internal financial institution and specialized united nation agency with goals and objectives to increase food security, improve nutrition and increase income among rural people. To achieve such, IFAD invest in rural people and empower them with different programs and projects. Furthermore, its projects aim to transform rural communities economically, socially and promote gender equality.

Following the above contention, FishCORAL project, specifically the livelihood engagements it rolled-out is very relevant to both objectives of inclusive development of the government and to the IFAD objectives. The aim to reduce poverty among rural people, particularly to the fisherfolk is the common goal of both. Livelihood projects like this aquasilviculture are very relevant specially in the case of Masbate province where incidence of poverty is high. Diversifying livelihood options is indeed a key step to open-up economic activities for the growing fishing communities. It is however important to stress that these economic

opportunities are well planned and systematically implemented. Based on the FGD conducted, member beneficiary respondents hinted that the design on aqua silviculture project implementation was not appropriate. They simply find it hard to implement the project as some of its members are not serious about the project. It seems that there is insufficiency in the adapter association's readiness in running the project. They said that from a member of 45 only 10 members are participating in livelihood project and mustering cooperation of most of the members is indeed a struggle. They had these experiences before in several livelihood engagements rolled out to them by key government and non-government agencies. It is feared that after the FishCORAL project, the livelihood project will also die down. It was learnt that capability development and organizational preparation was inadequate as only few or the president of the association were allowed to attend the capability orientation and trainings. However, on the overall impression, having the initiative on livelihood projects for the fisherfolks would help them in fighting poverty if it will be carried our accordingly.

Effectiveness. Effectiveness is the extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance. The objective of the FishCORAL project particularly aqua silviculture project is to provide livelihood and eventually provide additional income to the fisherfolks families, improve their living, and reduce poverty incidence. Nevertheless, the project on aqua silviculture did not help the fisherfolks in terms of their economic status since the project never make any money out of the labor of the member and finances/inputs given by the government. Out of 500 crablets released in the 500 square meter pond some group in Milagros, Masbate, Only (5) crabs were harvested. in Placer, Masbate one group harvested nine (9), while the other group got nothing out of the stocks. Basically, the project is bound to fail as the associations could invest again for the next culture cycle. In this case funds for the procurement of more crablets, repair of enclosures and feeds for the crabs would indeed be a major impediments. This observation was seconded by the BFAR personnel (I forgot the name hehe) that 70% of the aqua silviculture livelihood failed.

Respondent fisherfolks suggested that if the government will give them chance to have livelihood again, they will rather go got milkfish or tilapia culture. They argued that crab culture under the aquasilviculture scheme would be very hard for the associations without the conventional earthen dike of ponds. This point further confirmed the lack of readiness and insufficient knowledge on cultural management of mudcrabs under aquasilviculture model of the associations. This can be further traced from failure of appropriate agencies to capacitate fully the groups of beneficiaries, squabbles inside the associations and lack of business plan to guide the project to sustainability.

However, on the goal of the project to protect the existing mangroves in their livelihood, the project seemed to have contributed to achieve this as the project is lodged right at the heart of the mangrove forest that are protected from cutting and other disturbances.

Efficiency. This provides a measure of how economically important resources/inputs (funds, expertise, time, etc.) are converted into results (IFAD, 2015). The researchers were not provided with the copy on the financial report of the project, despite of repeated requests. However based on the actual interview with beneficiaries in focus group discussion, they say they don't have any profit out of the expenses and labor investments for the project because of the dismal harvest they got out of the production cycles they had. The presidents of the two recipient organizations in Placer, reiterated the dismal harvest they had. This was about the 5-9 crabs harvested out of 500 crablets stocked. This is worse than the experience about aquasilviculture in the province of Bataan that only harvested 28 % crabs from the 300 crablets stocked (Flores et al.,2015).

Impacts. The household income, poverty reduction, and women empowerment are parts of the assessment of the social and economic impacts of aqua silviculture livelihood projects. Furthermore, this part of the discussion also infers the lessons gained from the implementation of the project. The Impact is defined as the changes that have occurred or are expected to occur in the lives of the rural poor (whether

positive or negative, direct or indirect, intended or unintended) as a result of development interventions (IFAD, 2015). For this study the following impacts were evaluated (1) household income; (2) poverty reduction; (3) women empowerment; and (4) enterprise development.

Household income. Based on the data collected from the respondents or aqua silviculture beneficiaries, 8.8% or 3 out of 34 beneficiaries have income from the project in aqua silviculture with a mean income of P650.00 for 6 months project duration. This income is very far from their income from other sources. In as much as the harvest was very poor, it is indeed expected that the project would have negatively impacted the income of the households. This is so as the time investment of the fisherfolks that ended-up on losing ends is an outright lost economic opportunities (i.e., forgone economic benefit) as the fisherfolks could have attended to other more economically productive engagement.

Poverty Reduction. Based on the report of 2018 official poverty statistics of the Philippines in the province of Masbate, the result of the study shows that there are still large number of poverty incidence among the beneficiaries of the aqua silviculture project. In the table below it shows that 91% or 31 out of 34 families experience poverty based on income approach. This went down a bit to 88% or 30 out of 34 families who experience poverty based on expenditure approach. On the other hand in subsistence incidence the data shows that 74% or 25 out of 34 families experience poverty based on income approach while 67% or 23 out of 34 families experience subsistence based on expenditure approach. Using a threshold of ₱2,257 as the per capita poverty threshold per month (from Family Income and Expenditure Survey for a household with five members, 2018), it was revealed that 64% of the households in Asid Gulf are poor (Torres et al (2019). This is comparably higher than the average poverty incidence in province (33% in 2015 to 29.4% in 2018). This poverty threshold is higher compared to the 42% baseline of the FishCORAL project. Specific to the two municipalities, the same report in 2019 estimated poverty incidence specific in Milagros to be at 61% while in Placer, 65%.

To tap it all, the aquasilviculture could hardly contribute to reduce poverty incidence by 5% from the 42% baseline since the project did not yielded productive harvest on their operations. It is noteworthy to mention though that the project has just started operations in 2020, hence full economic impact leading to poverty reduction maybe too untimely to do. But the lessons in the initial operations are vital and obviously be direct impediments for a socially and economically productive and sustainable livelihood of the community.

Table 6. Poverty Incidence

Poverty Measure	Poverty Incidence (%)	Subsistence Incidence (%)
Income Approach	91	74
Expenditure Approach	88	67

Source: PSA 2018

Women empowerment. To measure women empowerment, this study used the Women Empowerment in Agriculture Index (WEAI). In order to conclude if the woman is empowered or not, the respondents must attain adequacy rating of 80% or more of the weighted indicators. The indicators are the five domains of empowerment (5DE), the production, resources, income, leadership, and time (Alkire et al., 2013).

Table 7 presents the summary of the computations for the indicators of WEAI of the aqua silviculture beneficiaries. It shows that in some indicators, women are empowered. It shows that there are more women who attain desirable level of empowerment in terms of ownership of assets, access to decision on credit, control over the use of income, leadership and time. However, based on the overall 5DE there are only 26.32% or 5 out of 19 women are empowered. Perhaps the reason why these women are not yet empowered because there are less project/activity being given to the

women beneficiaries. Likewise, the dismal harvest manifested its impact here, as women empowerment level was very low in terms of production (5.3-36.8) and in purchase, sale, or transfer for assets (47.4). In terms as well of time or workload investment of women, very little is afforded to them (57.9). These findings on disempowerment of women is similar to a certain study that most of women in Asid Gulf showed inadequacy along agricultural production, access to an control of productive resources, leadership in the community and time allocation (Mahawan et al., 2022).

Table 7. Women Empowerment Ratio

Indicators	Empowerment Ratio	Disempowerment Ratio
Production		
Input in productive decisions	36.84	63.16
Autonomy in production	5.26	94.74
Resources		
Ownership of assets	63.16	36.84
Purchase, sale, or transfer for assets	47.37	52.63
Access to and decisions on credit	68.42	31.58
Income		
Control over the use of income	73.68	26.32
Leadership		
Group member	73.68	26.32
Speaking in public	73.68	26.32
Time		
Workload	57.89	42.11
Leisure	78.95	21.05
Disempowerment Headcount Ratio	73.68	
Empowerment Headcount Ratio	26.32	

Source: Women Empowerment in Agriculture Index – WEAI, (Alkire et al, 2013)

Sustainability. To probe the long-term productive economic activity of community through the aqua silviculture project, aspects of sustainability were assessed. According to the IFAD evaluation manual (IFAD, 2015) sustainability is the likely maintenance of net assistances from a development intervention beyond the phase of external funding support. There is the emphasis here of the project to become self-sustaining using the initial seed money provided from the project under the FishCORAL scheme. This simply mean that the project is expected to be operating on succeeding production cycles using the revenues it would generate from previous/initial operation/s. Sustainability also includes an assessment of the likelihood that actual and anticipated results will be resilient to risks beyond the project's (FishCORAL) life. Based on their present status, the project on aqua silviculture in Milagros and Placer, Masbate, will unlikely to continue on a long term since the implementers are not equipped on technical and entrepreneurial capabilities to run the project on productive ends. The organizations need to fix the lack of cohesiveness to implement the project fueled further by the dismal turn-out of the initial production operation. In fact some of the member beneficiaries already backed-out from the project. However, if the DA-BFAR will still allocate fund for the production inputs of the next cropping cycle, these organizational dilemmas shall first be addressed. Certainly, it would not be going anywhere if the same scheme will prevail. There are lots of rebuilding and overhauling of the project plan and the capability enhancement of the recipient organizations before further support (again) from the government is made possible

Conclusion

The study assessed the economic and social impacts of the aquasilviculture beneficiaries in the municipalities of Placer and Milagros. The livelihood recipient families have bigger family memberships and generally low income. This makes resulted to high poverty incidence in the subject households.

The result also shows that the respondents does not have their own lot or real property where their houses were built on. Majority of the beneficiary household draw their drinking water from the unprotected deep well which is vulnerable to contamination and could be a health hazard. It was also revealed in the study that even the main source of income of the family is fishing their convenience assets is lees useful in their livelihood. The connection and membership to associations and credit groups are notable remarks on the social assets.

Most of the respondents and their spouses do not have enough educational preparation with high school as the highest attainment and with only 13% of them reaching or finishing college degree. The variety of possible source of income, respondent households have several alternative livelihoods to supplement income from fishing, especially during lean months. Natural assets such as the huge fishing area and expansive mangroves and other coastal habitats abound.

The project performance was evaluated based on the five-point criteria of IFAD. In terms of relevance, the conceptual objective of the FishCORAL-supported livelihood is very consistent to poverty alleviation and inclusive development. Aqua silviculture could further widen economic opportunities in the community. But it seems that the beneficiary associations are not ready and prepared for the livelihood project as evidenced from the dismal harvest they generated and the apprehensions now of some members to continue their engagement. The project is also neither effective based on the dismal performance during harvest. A good consolation though is that the aqua silviculture set-up may have protected the mangroves from further perturbation as mere presence of the project and the monitoring association would have prevented varied forms of human perturbations. The aqua silviculture project on its short implementation became inefficient as it failed to translate the financial investment into income. It is now a big issue for the association on where they would source out all the required production inputs if ever they would embark again for another cycle.

The impacts of the project was evaluated based on varied criteria as well. Very little to almost none in terms of household income was generated by association members in the first culture cycle. In fact with the poor harvest the project would have negatively impacted the income of the households. The time they invested for the culture that ended-up on losing end can be considered forgone economic benefit if it had been invested to something else. The aquasilviculture could hardly contribute to the reduction of poverty incidence by 5% from the 42% baseline since the project did not yielded productive harvest on their operations. It is noteworthy to mention though that the project has just started operations in 2020, hence full economic impact leading to poverty reduction maybe too untimely to do. In terms of women empowerment, the aquasilviculture just translated to 26.32% empowerment level which is still very low from the empowerment adequacy rating reference of 80%.

The project on aqua silviculture in Milagros and Placer, Masbate, is not likely to continue on a long term since the implementers are not equipped on technical and entrepreneurial capabilities to run the project on productive ends. The organizations need to fix the lack of cohesiveness to implement the project fueled further by the dismal turn-out of the initial production operation. In fact some of the member beneficiaries already backed-out from the project. There are lots of rebuilding and overhauling of the project plan and the capability enhancement of the recipient organizations before the association ventures for the next culture.

Recommendations

Based on findings and conclusions, the following are hereby recommended:

1. Conduct of more technical capability training along varied aspects of aqua silviculture shall be caried out. May be other fish to be culture not crabs since based on the

experiences of other livelihood projects on aqua silviculture, they failed as well. Also trainings on financial literacy, business management and basic record keeping are very necessary.

2. Crafting of clearcut guideline and operational protocol to guide the aqua silviculture ventures to productive operation. Maybe, a root cause analysis of the previous production cycle should be carried-out to highlight lessons and undertake corrective measures.
3. The association must be reorganized, reoriented and retooled. Values formation shall be infused before giving the livelihood is a must for the sustainability of the project.

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References

Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., Vaz, A., (2013) The women's empowerment in agriculture index. World Development, 52, 71-91. https://doi.org/10.1016/j.worlddev.2013.06.007.

Calculating the Women's Empowerment in Agriculture Indext, (N.D). https://agrilinks.org/sites/default/files/resource/files/WEAI%20Presentation%20110912.pdf

Castaño, M. 1997. An Aquasilvufarm in the Philippines. AFDEC Asian Aquaculture Vol. XIX No. 5. 18-20 https://aquadocs.org/bitstream/handle/1834/35111/castanos1997-aquasilvifarm-in-the-philippines.pdf?sequence=1&isAllowed=y

CHED_Philippine_National_Aquasilviculture_Program_in_Bataan_A_Strategy_for_Mangrove_Rehabilitation

Chen, J. & James, M., (2021, March 20). *Financial asset*. Investopedia. https://www.investopedia.com/terms/f/financialasset.asp

Dieta, R.E. and Dieta, F.C. 2014. The Philippine National Aqua silviculture Program. National Brackishwater Fisheries Technology Center, Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Quezon City, Philippines, 77-83. https://core.ac.uk/download/pdf/77980931.pdf

Dioneda R.R., Asejo, R.B., Burce, R.B., Balangawan, R.R., & Tumbaga, B.S. 2019. Status of Corals and Coral Reef Fishes in Asid Gulf, pp. 33-51. *In* Dioneda, R.R., Naz, G.A.A. & Torres, E.E. (Eds), Participatory Resource and Socio-Economic Assessment of Asid Gulf. Terminal report submitted for the Fisheries, Coastal Resources and Livelihood Project, Department of Agriculture Bureau of Fisheries and Aquatic Resources, Quezon City. Bicol University Center for Policy Studies and Development, Legazpi City. 144 pp.

Dioneda, R.R., Naz, G.A.A. & Torres, E.E. (Eds), Participatory Resource and Socio-Economic Assessment of Asid Gulf. Terminal report submitted for the Fisheries, Coastal Resources and Livelihood Project, Department of Agriculture Bureau of Fisheries and Aquatic Resources, Quezon City. Bicol University Center for Policy Studies and Development, Legazpi City. 144 pp.

Fisheries, Coastal Resources, and Livelihood Project (FishCORAL), 2020. http://fishcoral.bfar.da.gov.ph/about-us

Flores, R.C, et al., 2015. BFAR-CHED Philippine National Aquasilviculture Program in Bataan: A Strategy Towards Fisheries Sustainability and Excellence. https://www.researchgate.net/publication/280627611_BFAR-

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 Asid Gulf, Philippines. Pp 52-69. *In*

Hayes, A. (2019, July 8). *Physical asset.* Investopedia. https://www.investopedia.com/terms/p/physicalasset.asp

International Fund for Agriculture Development (IFAD), (N.D). Fisheries, Coastal Resources and Livelihood Project.

International Fund for Agriculture Development (IFAD), 2015. Evaluation Manual, Second Edition.

https://www.ifad.org/documents/38714182/39748829/manual.pdf/bfec198c-62fd-46ff-abae-285d0e0709d6

Kenton, W. & Sonnenshen, M., (2020, September 4). *Human capital*. Investopedia. https://www.investopedia.com/terms/h/humancapital.asp

Mahawan, A. M., Velza, J. F. P., Ibañez, Jr. , R. Y., Dioneda, Sr. , R. R., Belardo, S. B., & Agonos, E. M. (2022). 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. https://doi.org/10.11594//ijmaber.03.06.24

Mailath, G. & Postlewaite, A., (2006). Social assets. International Economic Review, *47*(4), 1057-1091. https://www.jstor.org/stable/3877453

Organization for Economic Co-operation and Development [OECD], (n.d.). *Natural assets*. Glossary of Statistical Terms. https://stats.oecd.org/glossary/detail.asp?ID=1729

Philippine Statistics Authority, Volume 27, 2018. https://psa.gov.ph/sites/default/files/Fisheries%20Statistics%20of%20the%20Philippines%2C%202016-2018.pdf

Rao, B.M, et al., 2017. Aqua silviculture: A Strategy to Preserve the Future for Next Generation Farming. Central Institute of Fisheries Education, Mumbai-400061, India. Central Institute of Freshwater Aquaculture,Bhubaneswar-751002,India. https://www.researchgate.net/publication/340266137_aquasilviculture-23-26

Torres, E.E., Carrillo, A.J.G., & Lopos, M.A. 2019. Socio-Demographic and Economic Assessment of Coastal Communities in Asid Gulf, pp 1-12. *In* Dioneda, R.R., Naz, G.A.A. & Torres, E.E. (Eds), Participatory Resource and Socio-Economic Assessment of Asid Gulf. Terminal report submitted for the Fisheries, Coastal Resources and Livelihood Project, Department of Agriculture Bureau of Fisheries and Aquatic Resources, Quezon City. Bicol University Center for Policy Studies and Development, Legazpi City. 144 pp.

World Health Organization, 2019. Sanitation. https://www.who.int/news-room/fact-sheets/detail/sanitation