



USAID
FROM THE AMERICAN PEOPLE

fhi360
THE SCIENCE OF IMPROVING LIVES

STRIVE Philippines Seaweed Sector Final Evaluation

October 2013



Tumitus Seaweed Farmers and their Families Photo credit: DCG

This report is produced by the Supporting Transformation by Reducing Insecurity and Vulnerability with Economic Strengthening (STRIVE) Program. Managed by FHI 360, under the FIELD-Support LWA, STRIVE represents a consortium of leading organizations committed to advancing the state-of-the-practice of economic strengthening to improve the well-being of vulnerable children.

For more information, please visit www.microlinks.org/strive

This publication was prepared by Diana Rutherford of FHI 360 through the FHI360-managed FIELD-Support LWA. Find out more about FIELD-Support LWA at www.microlinks.org/field-support.

This study was made possible with the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the authors and do not necessarily reflect the views of FHI 360, USAID or the United States Government.

TABLE OF CONTENTS

1. Executive Summary	2
2. Introduction	3
2.1 STRIVE Philippines Seaweed Sector Implementation	4
2.2 Key Research Questions	4
2.3 Seaweed Sector Context	6
3. Findings	9
3.1 Seaweed Farmers and their Farms	9
3.2 Household Well-being.....	9
3.3 Economic Well-Being of Seaweed Farmers.....	10
3.4 Child Well-being.....	14
4. Conclusions	20
5. Recommendations and Lessons Learned	20
5.1 Risk Analysis	20
5.2 Fulfilling a Learning Agenda	21
6. References.....	22
Annex 1: Hypotheses & Research Methodologies.....	23
Annex 2: Descriptive Tables of Paneled Tunitus Seaweed Farmers	26

I. EXECUTIVE SUMMARY

This paper reports findings from an evaluation of STRIVE Philippines activities in the seaweed sector. The goal of STRIVE Philippines is to improve the well-being of vulnerable households – especially for the children and youth within those households – through economic strengthening. Action for Enterprise (AFE) employed a facilitated value chain approach primarily with two seaweed firms between 2008 and 2010 as part of the STRIVE program. Based on AFE’s field assessments and value chain analysis, the seaweed industry had been identified as an appropriate point of entry to a vulnerable coastal population.

STRIVE Philippines’ research agenda examines the outcomes of AFE’s seaweed value chain activities on lead firms, seaweed farmers and their families. Specifically, was there change in the economics of lead firms, income for households, and child well-being? Findings are based on a combination of monitoring and evaluation sources, utilizing a deep dive case study methodology. Because the use of a control group was not feasible in light of the value chain approach taken and preferences of the firms, observed changes may not be attributable to the intervention.

AFE initially engaged three firms in the seaweed sector. Following a downturn in seaweed prices in 2010, the firms were mostly unwilling to cost share activities to grow their businesses, so AFE sought another sector in which to work, ultimately selecting the woven products sector. STRIVE will produce a separate report on evaluation findings from the activities in that sector.

Among the three seaweed sector firms, two launched seedling nurseries, both of which were severely damaged at least once by bad weather, and one dropped out due to lack of capacity. While the lead firms remain active in seaweed, their purchases from the farmers who had access to the nursery seedlings decreased. This is due to a rational economic choice by both firms and farmers who responded to a downturn in price.

Given the market downturn, seaweed income among the seaweed farmers paneled in January 2010 and interviewed again in January 2012 dropped overall, though household income remained relatively stable due to a combination of earned income and a national government social program. Children are in school more, which is clearly a result of the social program. In order to meet the requirements of the program, schools are open more days and kindergarten and pre-school or nursery also came available in 2010 as preparation for the social program roll out.

In conclusion, there were no discernible positive or negative effects on household or child well-being as a result of the launching of seaweed nurseries. Two major lessons were learned from STRIVE Philippines work in the seaweed value chain: 1) facilitating value chains includes risks that may not be acceptable in some contexts or by some donors, so either the value chain should exhibit stability or multiple value chains or sectors should be chosen to mitigate the risk, and 2) fulfilling a strong learning agenda requires clarity and support by all stakeholders.

2. INTRODUCTION

Managed by FHI 360 in partnership with Action for Enterprise (AFE), ACDI/VOCA, MEDA, Save the Children, and USAID, STRIVE is implementing four field projects in Africa and Asia between 2008 and 2013 on behalf of the Displaced Children and Orphans Fund (DCOF). Each project was vetted by the STRIVE Technical Advisory Committee (TAC) consisting of USAID, implementing partners and other international development specialists. The TAC's responsibility in the early stage of STRIVE was to review and provide feedback on proposed projects, and eventually approve some of them to go forward. Toward the end of STRIVE, the TAC will be engaged in reviewing learning products and recommending outreach venues.

Each STRIVE project is pursuing a unique economic strengthening approach, ranging from savings-led finance to workforce development to value chain interventions. Coupled with a robust monitoring and evaluation framework and learning strategy, STRIVE is tracking and documenting the impacts of these diverse interventions on child-level indicators related to both economic (financial), and non-economic (health, education, nutrition, etc.) vulnerability factors. As a result, STRIVE aims to identify and demonstrate interventions that can sustainably increase household incomes and/or assets and document how such increases improve (or fail to improve) the lives of children.

Since the ultimate beneficiaries are the children/youth, and activities are aimed at enterprises and caregivers, the study required a methodology that can effectively capture the results at household levels and also show how and how much has translated into child/youth level outcomes. In order to address the complex study, the STRIVE Monitoring and Evaluation/Impact Evaluation (M&E/IE) team developed a three-pronged strategy for monitoring and evaluation: (i) develop program-specific causal models and use them to design monitoring and evaluation methods that measure the project outcomes, consolidate and synthesize learning, and provide a 'taxonomy' of child/youth-level outcomes possible with various types of economic strengthening interventions at the household and child levels, (ii) develop classes of common indicators across all STRIVE projects and incorporate them into the M&E system for each project for comparing results, and (iii) document and examine the implementation processes of the projects by which outcomes and impacts are produced.

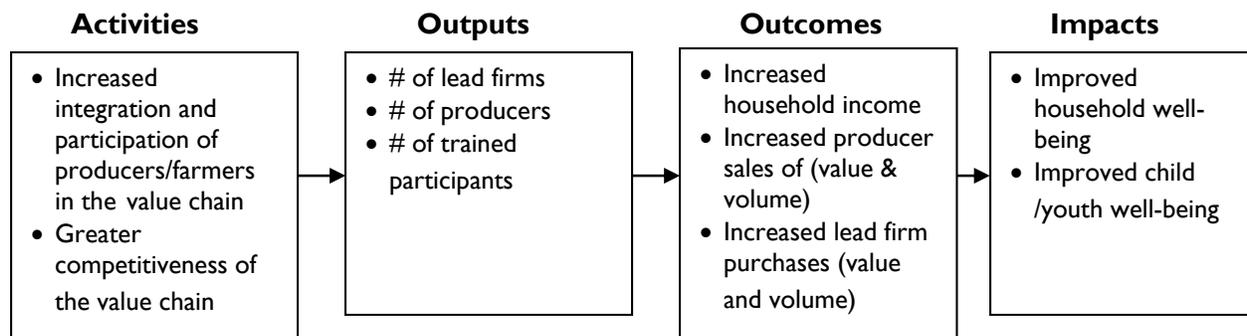
In the Philippines, the STRIVE M&E/IE team worked with Action for Enterprise (AFE). From 2008-January 2012, the STRIVE M&E/IE team consisted of researchers from the IRIS Center at the University of Maryland. Following the closing of IRIS in January 2012, the work reverted to FHI 360, which hired the lead researcher for the Philippines to complete the evaluation.

AFE takes a private sector enterprise development approach to increasing income and benefits of rural farmers or producers¹ by promoting their integration and participation in targeted industries or value chains as well as by promoting greater competitiveness of these value chains.

¹ The terms farmers or producers are used synonymously but the more generic term 'producers' will be used subsequently.

2.1 STRIVE PHILIPPINES SEAWEED SECTOR IMPLEMENTATION

The goal of STRIVE Philippines is to improve the well-being of vulnerable households – especially for the children and youth within those households – through economic strengthening. The causal model for STRIVE Philippines is based on the project facilitating and supporting key private sector actors (Lead Firms) in selected value chains to undertake initiatives to increase productivity and/or expand production of vulnerable producers that supply them. Through improvements in producer production and productivity, it is expected that their income will increase and expand the overall income and economic well-being of their households. In turn, this economic strengthening will contribute to the improved well-being of children and youth within those households.



AFE worked with three seaweed firms: NAMSU in the Zamboanga peninsula, Mindanao; Tracks near Bohol Island; and Sitexport in Sulu Province, Mindanao. Sitexport dropped out after struggling to staff their proposed intervention (a seedling nursery); despite other business expansion ideas, the owner was stretched too thin to continue the relationship begun with AFE. AFE's primary intervention with NAMSU and Tracks was cost-shared (70% by AFE, 30% by lead firm) for the creation of seedling nurseries. Seedlings are a key input of seaweed farming, so increasing access and availability of seedling supply, was expected to then increase potential production by either existing (in the case of NAMSU) or new seaweed farmers (Tracks). The following report describes the outputs, outcomes, and impacts of the intervention based on analysis of available data from monitoring, evaluation, and individual interviews.

2.2 KEY RESEARCH QUESTIONS²

Research questions were designed to address if and how STRIVE Philippines' interventions with lead firms in selected value chains affected producers and their families. The major learning questions posed by STRIVE, therefore, were:

- What is the impact of the project on participating production households (HHs)?
- What is the impact of the project on children/youth within the participant households?

² See Annex I for detailed hypotheses, indicators and data sources.

STRIVE is also interested in understanding how results occur at various links in the STRIVE causal chain. Implied by this are the following learning questions:

- How do project activities produce outcomes at the household and child/youth levels?
- How replicable are the activities and corresponding outcomes at the household and child/youth levels to similar value-chain based economic strengthening projects?

Methods - In order to understand why, how, and how much of outputs/outcomes were achieved by the project at the household and child level, the research team used a mixed-method approach with qualitative (why & how mechanics) and quantitative (how much) tools to understand outcomes. After exploring opportunities to examine the counterfactual with AFE, the possibilities were deemed not feasible due to a combination of AFE's value chain approach and lead firms' preference for flexibility. In November 2008, the possibility of a comparison or control group in the seaweed value chain was explored, as AFE had not yet expanded to work in other value chains. There was then no possibility with the firms that AFE thought it might work with at that time. In 2009, AFE signed MOUs with NAMSU and Tracks. Again possible control groups were discussed, but none were amenable to all stakeholders. When AFE started work in the woven products sector in 2009, possible comparison or control groups were examined. Given the numbers of expected new weavers and existing weavers with no possibility to randomize (or lottery) who received training, the team did not see a way to examine the counterfactual. In mid-2010, the numbers of new trainees per location for both woven product lead bear this out in that there were not sufficient numbers of new weavers trained or coming forward requesting to be trained to create a control group. Later, the instability of newly trained groups made comparisons impossible.

Given the remaining design possibilities, a *deep dive* case study methodology was selected. This is a mixed-method study across paneled producer households using a quantitative survey to understand how much change took place, and using qualitative methods like focus group discussions, participatory rapid appraisals, key informant interviews, financial diaries³ and the project's monitoring data as evidence about how and why change took place.

Limitations – Using monitoring and evaluation data without a control group means that no attribution of impact can be made to AFE's intervention. Findings are therefore limited to conjecture based on what is often called a *preponderance of evidence*.

Quantitative Sample – One group of seaweed farmers that was active with NAMSU and receiving seedlings from the new nursery was paneled in January 2010. The panel consisted of 27 households, 23 of whom were interviewed again in January 2012. The only intervention activity they received via AFE was the receipt of nursery-grown seedlings. All the paneled farmers had access to the nursery, and more than half received seedlings.

Key Informant Interviews were conducted in July 2011 with the owner of NAMSU and the manager of Tracks. *Monitoring data* were collected by AFE mostly since 2009 through mid-2011. Due to concerns

³ Financial diaries were designed to be self-maintained with reminders sent by the survey firm via text. The data received were spotty and following the drop in the market price and the resistance to complete the diaries, they were dropped.

about violating confidentiality, raw data are not provided by lead firm. *Community debrief* was conducted in June 2012 to discuss and validate findings.

2.3 SEAWEED SECTOR CONTEXT

Following its 2007 value chain analysis of the seaweed industry and an April 2008 field assessment, AFE presented findings on 28 May 2008 to the STRIVE Technical Advisory Committee (TAC) on the strategic value of the seaweed industry as an appropriate point of entry to a vulnerable coastal population. The TAC's responsibilities at this point in the project included reviewing implementing partners' proposals, providing feedback, and critical commentary to improve the projects' designs. In response, implementing partners revised their proposals. AFE's presentation in May 2008 provided context for the seaweed farmer population, the nature of their vulnerability and the importance of seaweed as a source of income. In addition, it outlined AFE's proposed facilitation activities and the potential challenges to success. Among those challenges was competition in the seaweed market from Indonesia.

The global seaweed market experienced up and down trends, but as of 2007 it had been experiencing price stability and some supply shortage⁴ making it an attractive possibility for growth. The ADB commissioned a study, completed in 2007, on the viability of aquaculture in poverty reduction. The report notes that seaweed production is limited by three interrelated factors: 1) biological constraints and bad farming practices, 2) adverse environmental factors, and 3) socioeconomic factors.⁵ As AFE pointed out, access to high quality seed supply is a major factor in the growth of seaweed, and lack of it contributes to unsustainable farms due to growing seaweed varieties that do not fare well in local conditions (weather, disease, current strength) or early harvesting or splitting for sale to other farmers or for cash. The adverse environmental and socioeconomic factors described in ADB's report include:

...(i) poorly understood sustainability issues, (ii) poor peace and order situations, (iii) inadequacy of gathering and reporting of production statistics (including Philippine RDS going unrecorded from Sitangkai to Malaysia), (iv) complex and sometimes inequitable interactions all along the chain of supply from farmers through traders to processors and purchasers of different products, and (v) international competition.⁶

The primary intervention undertaken by AFE-supported lead firms in the seaweed industry was the establishment of seedling nurseries, something the ADB report advocates, and the ADB report recognized the high cost and the risks involved due to environmental factors, e.g., the weather and disease.

⁴ ADB (2007). Philippines: Strategy for Sustainable Aquaculture Development for Poverty Reduction Project, 20.

⁵ ADB (2007), 35.

⁶ ADB (2007), 35.

Tracks – The nursery was established with cost share between AFE (70%) and Tracks (30%) in June 2009. Due to floods shortly thereafter, it had to be re-established in late 2009/early 2010.⁷ The nursery's location is near the Operations Manager's base of operations and where he was developing relationships with new, part-time seaweed farmers. Most of these new farmers already held jobs and were interested in the potential to supplement their income through seaweed farming.

The manager expected that the nursery would work on a cash basis, but the reality has been that the culturally-popular *utang* is the farmers' means of acquiring nursery seedlings. *Utang* consists of loans that create a reciprocal relationship in which the manager or stocker loans supplies or funds to the farmer who is then beholden to that person, typically by promising to sell part of his harvest to him out of which the loan amount is taken. Thirteen farmers received seedlings: 560 kg in 2009 valued at approximately \$88, and 999 kg in 2010 valued at approximately \$111. Following the first batch of seedling distribution the number of seaweed lines at 120 meters long each grew from 26 to 87 after one month. Volume sold to Tracks from Busalian farmers, however, decreased over time, as did the number of farmers, which dropped from 30 to 20, likely due to the decreasing value of seaweed and other opportunities for income generation. Tracks manager indicated that this is not entirely unexpected: approximately three years is required to develop a sustainable farmer group from which the firm can purchase consistent and sufficient volume to see returns on investment from the group.



NAMSU – The nursery⁸ was established with cost share between AFE and NAMSU in November 2009 in order to increase the volume of the 60-70 farmers already selling to NAMSU in the Tumitus area. NAMSU distributed seedlings between late November 2009 and January 2010. Like the Tracks nursery, NAMSU's experienced similar weather-related disruptions, causing seedlings to deteriorate and eventually die around February 2010. NAMSU and AFE revived the nursery in the third quarter of 2010, permitting distribution of seedlings in late 2010. According to NAMSU, the nursery was successful in increasing the volume of seaweed farmers made available for sale (30% volume increase).

⁷ Busalian, the nursery's location off Bohol, is prone to environmental hazards, like flooding, as it is close to a dam and the current is strong. AFE staff noted that the nursery was placed there because of its proximity to Tracks Manager's base of operations. The manager concurred.

⁸ NAMSU's nursery is near Tictapul (the closest town to Tumitus) approximately 85 km northeast of Zamboanga City center.

In an interview with NAMSU's owner in July 2011, a question about the nursery's sustainability was sidestepped as the owner quoted their current number of lines and indicated that a nursery would do well in another location where NAMSU purchases from more farmers than in Tunitus. The nursery "sold" (*utang*) nearly 18,000 kg of seedlings worth approximately \$2,300 to 26 farmers. While NAMSU's owner said that the volume of output from the study participants increased, according to AFE's monitoring information, NAMSU's purchase volume declined considerably from 720,000 kg in 2008, climbed a little in 2009 to 735,000, and dropped to 185,000 kg in 2010, or 74% less in 2010 than in 2008. NAMSU's reported number of seaweed farmers remained relatively constant throughout the intervention period.

2.3.1 Seaweed Farming Community, Tunitus

Tunitus is a village that includes three small adjacent islands – Kabug 1, Kabug 2, and Duhul Alip – in the northeastern part of Zamboanga City. While basic services such as education, health and water are available in the mainland portion of Tunitus, residents of Kabug 1 and 2, and Duhul Alip do not have easy access to these services. They must travel about 30 minutes by boat to obtain services and basic supplies, like water. One resident indicated that one of his wishes is to have a bakery on the island so that they can buy bread locally. Sanitation facilities and electricity are largely absent and residents survive by making do with what the sea has to offer in terms of livelihood and subsistence. There are rumors of plans to bring the island onto the electrical grid.

Despite outside interventions such as international grants from non-government organizations, Tunitus is still characterized by lack of knowledge on sustainable management of their resources and lack of access to financing facilities. Residents expressed the need for finance in order to strengthen their main sources of income: seaweed farming, fishing and aquaculture. Even though the seaweed industry seems to be one of the most lucrative business ventures in the region to date, with the Philippines as one of the top seaweed producers in the world, it has not moved the inhabitants of Tunitus out of poverty.

3. FINDINGS

3.1 SEAWEED FARMERS AND THEIR FARMS

Seaweed farmers are linked to a seaweed firm by means of informal affiliations including *utang*, a Filipino reciprocity (give-and-take) system, whereby a stocker forms the link between firm⁹ and farmers. The stocker is frequently the farmers' source of inputs, and in return, they agree to sell the stocker their harvest. A similar relationship may exist between the firm and the stocker, though sometimes the stocker is a family member. The affiliations are often shored up by family connections and long-term relationships. The 23 seaweed farmer households paneled between January 2010 and 2012 largely perceived themselves to be affiliated in a farmer organization in 2010 (65%), but in 2012 they no longer do (78% said they have no membership), which may reflect a disintegration of the existing ties between NAMSU and the farmers.¹⁰ This may be related to their sense of the lack of current credit to purchase inputs for seaweed farming and experiencing a lack of buyers. These farmers have historically sold to NAMSU almost exclusively, but NAMSU's owner indicated in mid-2011 that they "could sell to other buyers to get a little cash to see them through" until he was ready to buy from them again. This too suggests the ties between NAMSU and the farmers are loosening due to the market conditions.

In 2010, about half the farmers expected to obtain seedlings from the nursery or stocker. Currently, about half the farmers expect to obtain seedlings from other farmers, and another 39% say they will produce seedlings themselves – meaning they plan to produce beyond their sales needs and take on the risks associated with maintaining viable seedlings themselves.¹¹ None of the 23 farmers indicate they will obtain seedlings from a nursery. This process of "saving" seedlings from existing lines is the conventional practice for seaweed farming during the season. A farmer will rarely sell all of his lines unless he can be assured of seedlings for replanting or it is the very end of the season. At the beginning of the new season, farmers must source seedlings from those who have them available¹².

In terms of farm size and yield, there were no statistically significant differences between reporting of key indicators (number of lines, size of lines, and yield) between 2010 and 2012. Farmers would not now engage paid labor (83%) if they had the resources available, though many said they would in 2010. This is likely due to the drop in seaweed price resulting in the loss of income from seaweed.

3.2 HOUSEHOLD WELL-BEING

STRIVE hypothesized that economic strengthening projects would increase household income and thereby improve child well-being. AFE's value chain causal model includes links between the volume and value of seaweed sales and income, poverty and enterprise-based assets, e.g., boats and boat engines.

⁹ Firm is a buyer or a larger trader.

¹⁰ Statistically significant at 0.1%.

¹¹ Statistically significant at the 0.5% level.

¹² Unlike some crops, like rice, seed cannot be retained between seasons to start the next planting season.

In terms of income, farmers experienced no overall change. Income from seaweed dropped substantially, replaced mostly by fishing and other aquaculture. Only half of the 23 paneled farmers (52%) now rank seaweed as their most important source of income. Whereas all of the seaweed farmers ranked seaweed farming as number one in 2010, in 2012, 22% ranked it second and another 22% ranked it third. One of the 23 farmers is no longer in seaweed farming.

Table 1: Comparison of Key Demographic Characteristics

	Average Household Size (n=23 HHs)	Average Number of Children 18 years and below in Household (n=18 HHs)	Average Farmer's Education Attainment	Reported Annual Household Income (pesos)	Reported Annual Income from Seaweed (pesos) (% of total income)
Baseline 2010	4.02	5.49	Between some elementary and elementary graduate	37,922	31,217 (82%)
End line 2012	4.17	5.70		41,818	22,042 (53%)

*Note that the four households that could not be interviewed in 2012 were dropped from the baseline-endline comparison analysis.

3.3 ECONOMIC WELL-BEING OF SEAWEED FARMERS

Overall, the seaweed farmers are very poor, as evidenced by their Progress Out of Poverty (PPI)¹³ scores, asset index and income¹⁴. As seen in the table above, income has not increased and seaweed as a source of income has dropped dramatically. This is due to numerous elements in the hydrocolloid market.

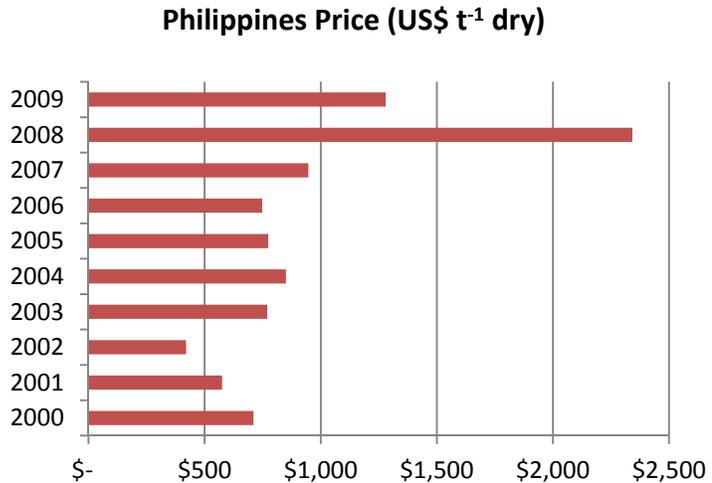
The seaweed hydrocolloids industry has been hit by a number of shocks in recent years including high and erratic energy and chemical costs, but none has been more unpredictable and disruptive than availability and costs of seaweeds, particularly for carrageenan producers and those marketing this hydrocolloid. Anyone in the carrageenan business these days is constantly being reminded of how important seaweed availability, cost, and quality are to a profitable enterprise, and none is in a very favorable range at this writing (December 2009).¹⁵

¹³ The PPI is a score that determines the likelihood that a household is below a given poverty line. The PPI score is based on a series of questions from the Philippines Annual Poverty Indicators Survey. For more information see <http://www.povertytools.org/project.html> and <http://progressoutofpoverty.org/>.

¹⁴ Income data may not be reliable, as most researchers agree that income is very difficult to measure given the multiple sources, seasonality, lack of records, etc. The questions used to derive income from this survey are a fairly straightforward series of questions about earnings from major sources by a short time period in order to estimate the annual income. We also asked respondents for an annual income, which many gave, and then were asked to break it down by source.

¹⁵ Bixler and Porse (2011), 330.

Project stakeholders indicate that sources of the downturn include increasing market share from Indonesia, which sells lower-quality seaweeds at a lower price, compared with the Philippines, and China’s peculiar purchasing behavior, which resulted first in a huge increase in demand and then a corresponding drop. This is further supported by Bixler and Porse, whose research finds that *cottonii*, one variety of seaweed, production in the Philippines has declined at least in part due to “unfavorable weather conditions and political unrest in farming areas”. They further state that “Filipino farmers have also cut back on the average farm size in part to drive up the price, but also enjoy the lifestyle higher income per hectare has brought them. Only time will tell if the downward trend [in price] can be reversed.”¹⁶ With regard to price, Bixler and Porse show *cottonii* prices from 2005 through 2009 in the Philippines and Indonesia with a significant spike in 2008, so that 2009 prices look like a severe drop in comparison, but not as low (though steady) as 2005-2007 prices (see graph).¹⁷



NAMSU was purchasing seaweed from the farmers in Tumitus in early 2011 for 60-70p/kg, but only 52-54p/kg by mid-2011.¹⁸ As of June 2012, farmers say they cannot plant seaweed, as they have no seedlings and no sources of credit. The latter suggests that NAMSU’s stocker, who is also a relative of NAMSU’s owner as well as the owner of the island’s sole source of fuel and the *sari sari* (side-of-the-road small convenience) store, is not lending. This in turn suggests that NAMSU is not buying or does not plan to buy from Tumitus. NAMSU’s primary source of seaweed is another group of farmers on another island closer to home.

These households have experienced no poverty reduction in the last two years, where nearly all fall below the \$2.50/day line and most fall below the national poverty line. The only other income-generating opportunities available on Tumitus are crab-catching and fishing. Catches are becoming increasingly smaller due to over-fishing.

¹⁶ Bixler and Porse, 333. The Chinese drove the price up by greatly increasing their purchasing, then the price dropped dramatically when ceased buying the same quantities.

¹⁷ Bixler and Porse, 333.

¹⁸ Interview with NAMSU owner 23 July 2011. Mr. Pingli further said that he purchased the seaweed at the higher price in early 2011 in the hopes that the price would increase later in the year, but it did not. In addition, farmers typically harvest before Ramadan to have cash on hand, but very little was done this year due to the low price of seaweed.

Table 2: Poverty Likelihood of Paneled Study Participants in Tunitus

Line, pesos/day	Households falling below the line 2010 (n)	Households falling below the line 2012 (n)
National line, 39.52 pesos/day	84% (19)	83% (19)
Food line, 25.72	58% (13)	58% (13)
USAID "extreme" line, 27.59	52% (12)	54% (12)
\$1.25/day/PPP, 28.36	63% (15)	64% (15)
\$2.50/day/PPP, 56.72	94% (22)	94% (22)

3.3.1 Assets

Changes due to time and normal wear-and-tear replacement occurred among the paneled farmers. Nine farmers replaced motors for their boats. Three have “new” homes: one bought a second home, one bought a new but smaller home, and one moved following marriage. One person also purchased a television and runs it off a battery, which must be charged on another island.

3.3.2 Mitigating Factor

Half of the paneled farmers were participants in a national-government sponsored social program called *Pantawid Pamilyang Pilipino Program (4Ps)*¹⁹, which provides conditional cash grants to extremely poor households for health, nutrition, and education, particularly of children age 0-14. Income from the 4Ps accounted for 20-88% of the total income for 14 households in 2011. Three of these families participated for one full year, while the other 11 had been beneficiaries for six months. Beneficiaries reported receiving income every two months in amounts ranging from 500p to 2800p (\$12-66). The June 2012 debrief was delayed a couple of hours as the mothers were on the mainland receiving their 4Ps allotment. They said the program means a great deal, as one woman said, “yesterday we had no rice and today we can buy rice.”

According to the 4Ps website, to avail themselves of the cash grants, beneficiaries should comply with the following conditions:

1. Pregnant women must avail of pre- and post-natal care and be attended during childbirth by a trained health professional;
2. Parents must attend Family Development Sessions (FDS);
3. 0-5 year-old children must receive regular preventive health check-ups and vaccines;
4. 3-5 year-old children must attend day care or pre-school classes at least 85% of the time.
5. 6-14 year-old children must enroll in elementary or high school and must attend at least 85% of the time.
6. 6-14 year-old children must receive deworming pills twice a year.

¹⁹ <http://pantawid.dswd.gov.ph/index.php/about-us>

The cash grants provided are:

- P6,000 a year or P500 per month per household for health and nutrition expenses and
- P3000 for one school year or 10 months or P300/month per child for educational expenses for a maximum of three children per household.

A household with three qualified children receives a subsidy of P1,400/month during the school year or P15,000 annually as long as they comply with the conditions. The cash grants are to be received by the most responsible person in the household, usually the mother, through a Land Bank cash card. The families in 4Ps are profiled in the table below.

Table 3: Families in 4Ps

# of children in household	Months in program	Amount received from 4ps every 2 months	4Ps % of income	sources of income	Seaweed Income Rank	4Ps income rank
1	6	1200	49%	seaweed, fishing	3	1
2	6	500	77%	seaweed	2	1
2	6	2100	84%	seaweed	2	1
7	6	1800	57%	seaweed	1	2
2	6	1600	27%	seaweed, vending, remittances	3	2
8	6	2800	43%	seaweed, fishing	3	2
1	6	1600	88%	seaweed, fishing	3	1
6	6	2300	70%	seaweed, fishing	2	1
2	6	1000	52%	seaweed	1	2
5	6	2300	20%	seaweed, madrasa teacher	1	2
5	6	2800	78%	seaweed	2	1
5	12	1200	50%	seaweed	1	1
2	12	2800	37%	seaweed, fishing	3	2
4	12	2000	45%	seaweed	1	2

For these families, the income from this social program was highly significant to their well-being, especially given that families mostly indicated they are no better off than two years ago, and two families said they were worse off. In addition, in order to meet the 4Ps requirements, the school is open more days than it was previously and there is day care available on Tunitus. Day care is available half days Monday through Friday. Kindergarten is also now available on Tunitus, which was not the case before June 2010.

3.4 CHILD WELL-BEING

As stated above, STRIVE surmises that changes in household economic well-being should result in changes at the child level. Given the lack of change in the economics of seaweed farmer households, it seems unlikely changes will be seen at the child level. Child well-being measures include nutrition, hunger, school attendance, aspiration for education, use of health care, and how children spend their time. The following table represents the distribution of children among the paneled households interviewed in both 2010 and 2012.

	0 to 7 Years of Age	8 to 11 Years of Age	12 to 15 Years of Age	16 to 18 Years of Age	Total
Endline 2012	30	20	15	11	76
Baseline 2010	35	19	13	14	81

3.4.1 Education²⁰

While most children were not enrolled in school at baseline, 61% are in 2012. The large increase is not significant, however, as it is due largely (75%) to children coming of age for school and to overcoming safety concerns (20%). Those 24 children not currently enrolled are either too young (29%) according to their families; cost is high (33%), or they are needed for work (25%) or childcare (8%). Only one child chooses not to go to school. Distance, means of transportation and cost of school are unchanged. The school itself, located on mainland Tunitus, is open longer. In 2010, it was only open Tuesday-Thursday. It now rotates between being open five days per week the first and third weeks of the month and four days per week the second and fourth weeks of the month.

Children report an increase in the number of hours per week they spend in school: in 2010, 8-15 year olds reported being in school 19.5 hours weekly, while in 2012, they reported 25 hours weekly. The 16-18 year olds also reported an increase from 10 hours per week (relying on only one student in 2010) to 30 hours per week (three of 11 children) in 2012. The field team noted that the school's sanitary facilities had also improved. This could have had some effect on school attendance, as the lack of sanitary facilities can be a barrier, especially for girls.

²⁰ As of the start of this school year in June 2012, the Philippines has extended public schools from 10 to 12 years, and will require two years of kindergarten starting at age 4. Children, who graduated grade 6 in March 2012, will be the first to start junior high schools.

The seaweed farmers' children missed little school in the month before the 2010 baseline: seven children each missed 2 days, three of them likely due to illness. In 2012, however, 29 children missed school for a total of 55 days. Missed school was mostly due to fever (55%) and bad weather (27%), which prevents boats from safely taking children to the mainland for school. Some reportedly missed school due to a lack of cash (14%), which could mean they lacked boat fare, engine fuel, or school fees. One child missed school due to work.²¹

While all of the enrolled children at baseline were in public school, five students (11%) are now either attending madrasa (4) or private elementary school (1). Their caregivers all hope they will complete madrasa training. All five currently have only “some elementary” as their highest education attainment to date; they are 12-17 year old youth; four boys and one girl; three are from the same household.

3.4.2 Health Care

As hinted at above, more children reportedly missed school in the month preceding the 2012 survey (45 children) than in the 2010 survey (17 children). We find that while 22% of the children experienced illness in the six months preceding the survey in 2010, 60% experienced illness prior to the 2012 survey. Flu/fever accounted for two-thirds of the incidence, compared with 29% at baseline. Cold/cough was about the same at 24%. Asthma incidence was down from 12% to 4%. When asked during the June 2012 debrief, parents said children are no less healthy than they were in the past.

Health care use and cost: As in 2010, parents sought medicine more frequently than medical care, but in 2012, parents were likely to seek both (29%) compared with none in 2010. Few parents did “nothing.” In 2010, for three incidences no action was taken: once because parents felt the illness was not severe and twice due to cost. In 2012, one illness was not considered sufficiently severe to merit action.

Parent/caregiver aspirations for children

Parents' and caregivers' hopes for their children's educational achievement have become more modest in comparison with 2010, when 94% wanted their children to have some secondary education or complete college/vocational school. Today, in addition to those hoping to learn in madrasa, parents largely aspire for their children to complete high school (27.5%) or go to or complete college or vocational school (46.25%). The parents of 13 children (16.25%) want their children to complete elementary school, and three (3.75%) hope their children will have some high school.

Parents are less optimistic about the likelihood of their aspirations being met: whereas one in five believed that the child will definitely meet the desired goal, none do in 2012. Only 5% of parents (for four children) believe the goal will most likely be achieved, while 54% say it “may happen,” which is a 50/50 likelihood. Twenty-nine percent of parents say it is unlikely their 23 children will achieve the desired goal and 13% say it will not happen for their ten children. Nearly everyone identified cost as the barrier to educational achievement.

²¹ These conclusions were validated by families during the June 2012 debrief.

As in 2010, the transaction costs of health care are high: a lengthy boat trip costing about \$2 and mean healthcare and medicine cost of about \$7.35. The only standout difference between 2010 and 2012 for child health care is the difference in cost: whereas in 2010, parents reported very little cost to health care, but large costs for medicine, in 2012, the reverse is true. Medicine could still be expensive for those below the national poverty line, with \$1.50 for medicine, but the average health care cost is nearly 100 times what it was in 2010. Given the small number of children treated, these values reflect shocks to their families, but are not representative of the health care system. The family with one very expensive health incident said at the debrief session that it cost 1000p for the hospital and 200p for transport (mostly for fuel). Families seem to agree that fuel costs especially have driven expenses up.

3.4.3 Nutrition

In terms of *food security*, households reportedly eat two to three meals per day. Of the 21 families with children in 2012, 18 reportedly have three meals per day and three have two meals per day. These same families in 2010 reported a wider range including one family eating only one meal per day, three reporting two meals per day, 18 with three meals per day, and one reporting a normal day with four meals (the difference is not statistically significant).

Five households reported that their children missed meals in the last week at endline, compared with four in the baseline. The severity, however, was far greater in 2010 than 2012. While the children in 2012 missed only one meal in the last week, in many cases children missed 2, 3, and for one family, 14 meals in the last week in 2010.

Table 4: Children Missed Meals in Seaweed Farmers' Households

Reason given for missed meals	Endline (2012): 5 of 21 households			Baseline (2010): 4 of 23 households		
	Child's Age	Child's Gender	Number of Meals Missed in Last 7 Days	Child's Age	Child's Gender	Number of Meals Missed in Last 7 Days
Lack of money	11	Male	1	9	Female	3
	9	Male	1	6	Male	2
				5	Male	2
				2	Male	1
Lack of money	11	Female	1	9	Female	14
	9	Male	1			
	7	Female	1			
	5	Male	1			
	3	Female	1			
0 (infant)	Male	1				
Lack of money	13	Male	1	18	Female	1
	7	Female	1	6	Male	1
Lack of food	9	Male	1	11	Male	1
	8	Female	1			
	6	Male	1			
Lack of food	5	Female	1	7	Female	1
	18	Female	1			
Lack of food	12	Male	1			
	3	Male	1			

Table 5: Dietary Diversity Score Comparisons Across Time

Dietary Diversity Score	Number of Households with Children	
	2010	2012
2	0	1
3	3	1
4	4	3
5	5	4
6	1	3
7	2	2
8	4	4
10	1	0
11	1	1
13	0	1
14	0	1

With regard to **food diversity**, the average score was 7.11 out of a possible 14 using the FANTA Individual Dietary Diversity Scale (IDDS). This increase from the mean baseline score of 5.83 is highly significant.²² As you can see by the table, six of the 18 households with children score between 4 and 5, while another 6 score between 7 and 8.

In terms of **poverty and food diversity**, there is greater difference in the mean dietary diversity score compared with the baseline, where the mean scores by wealth were 5.9 for the wealthiest, 6.0 and 5.6 for

Child Dietary Diversity Score	Percent of Households
<i>Wealthiest Trintile (mean=8.1)</i>	
5	29%
6	29%
8	14%
13	14%
14	14%
<i>Middle Trintile (mean=5.3)</i>	
2	14%
4	29%
5	29%
6	14%
11	14%
<i>Poorest Trintile (mean=6.4)</i>	
3	14%
4	14%
7	28%
8	42%

the poorest households. The higher food diversity scores (between 11 and 14) at endline are found in the wealthier households and the more well-to-do households show more variation in dietary diversity, same as baseline.

These children have fewer sources of iron and vitamin A in 2012 compared with reporting in 2010 with no statistical significance. Whereas all of the children reportedly had at least one source of iron in 2010, now a third of the children have no source of iron. Of the 21 households, 38% have no source of vitamin A²³ in 2012 compared with 24% in 2010. Another 38% have one or two sources now compared with 77% in 2010. Another 24% have three or more sources compared with 10% in 2010. Overall, children appear to have a greater dietary diversity, but more of them have no source for iron and vitamin A compared to two years ago.

In trying to understand the nutritional changes described above, parents were asked to talk about food sources during the debrief meeting. Their discussion could not account for any positive change, as they say there are oysters and some other shellfish (no clams) available, but no meat. “Beef is dollar,” they say, which means very expensive. During the discussion, families reiterated that they cannot afford to go to the city or market, because fuel costs are high and they have nothing to sell. People used to come to Tunitus to sell produce like papaya or banana, as they do not grow on the islands, but they stopped

²² Wilcoxin signed rank test z=-5.653. Note that ideally questions would be asked of the primary caregiver for each individual child or in a sufficiently large sample, asked of the child with the most recent birthday, etc. Given the very small Tunitus sample, the questions were asked of “all children” in the household, so we cannot differentiate between the dietary diversity of boys and girls.

²³ Vitamin A is found in some vegetables, fruits and dairy.

coming, because no one was buying.

3.4.4 Time Use

The children of Tunitus seaweed farmers are engaged in child labor²⁴ according to their parents reporting of how they spend their time. Those engaged in child labor are highlighted in blue. The table shows child labor increasing among children ages 5-11 (both sexes), while decreasing among ages 12-14 (especially girls). The labor categories below are not mutually exclusive: economic activity includes seaweed as well as all other reported economic activity. Parents informed the research team that they would like their children to be working more on the seaweed farm, but to meet the 4Ps requirements, the children must be in school “full-time.” In addition, the price of seaweed is low and no one is buying.

Table 6: Parents Reporting of Children's Activities (hours/week)

Tunitus January 2012 Endline								
Age	Male				Female			
	Seaweed	Economic Activity	Household Chores	N	Seaweed	Economic Activity	Household Chores	N
5-11	7	3	0	16	11	5	7	17
12-14	13	15	10	8	6	7	14	3
15-17	14	11	0	6	8	4	0	4
Tunitus January 2010 Baseline								
5-11	0	0	0	21	1	1	0	19
12-14	19	20	0	7	20	20	0	3
15-17	22	37	0	5	6	6	0	8

Comparing the parents’ observations with the children’s reporting (ages 8-18), as presented in the PRA table below, we find similar differences as in 2010. Children themselves report²⁵ working on the seaweed farm, but report no other economic activity in 2012 during the participatory rapid appraisals. The time they spent on seaweed, however, has decreased since 2010, which may reflect the economic downturn in the seaweed market, and the need for the family to rely on other economic sources. Children report an overall decrease in time spent in religious activities (both worship and school). Time on the playground or at play is still a small percentage of their overall week.

²⁴ Per UN definition (<http://www.childinfo.org/labour.html>), age 5-11 years: engaged in any economic work or 28 hours of domestic work per week; age 12-14: at least 14 hours of economic work or 28 hours of domestic work/week; age 15-17: at least 43 hours of economic or domestic work/week.

²⁵ Girls are underrepresented in these groups, as they were more likely to decline to participate compared with boys in both 2010 and 2012. In 2010, refusal rates among girls from youngest to oldest were: 55%, 75%, 71% (boys: 11%, 0%, 50%) and in 2012: 70%, 0%, 33% (boys: 18%, 43%, 0%).

As mentioned in the education section, children report spending more time in school. Parents confirmed during the community debrief that this is a result of the school being open four to five days per week instead of three. Due to the requirements of the social program calls the 4Ps, the school is open four to five days per week instead of three. In addition, families perceive an increase in security with a small detachment of five soldiers on this group of small islands in preparation for next year's elections.²⁶ Also due to the increased time in school, children report no time spent in the market or the city. During the debrief, families indicate that since they have no money to spare or anything to sell, sometimes due to poor fishing, there is no need to go to market or the city, and the transportation costs are prohibitive when there is nothing to sell.

Table 7: Children's Reporting of Where They Are (hours/week)

	2010		2012		2010		2012		2010		2012	
	8-11 year olds				12-15 year olds				16-18 year olds			
	<i>8 boys; 5 girls</i>		<i>9 boys; 3 girls</i>		<i>7 boys; 1 girl</i>		<i>4 boys; 4 girls</i>		<i>3 boys; 3 girls</i>		<i>1 boy; 4 girls</i>	
	Hours	%/week	Hours	%/week	Hours	%/week	Hours	%/week	Hours	%/week	Hours	%/week
House	64.5	38%	107.5	64%	63.5	38%	101	60%	80.75	48%	97	58%
Madrasa	16.5	10%	11.5	7%	27	16%	8	5%	28.75	17%	12	7%
Masjid	20.5	12%	15.5	9%	18	11%	22	13%	21	13%	20	12%
School	19.5	12%	25	15%	19.5	12%	25	15%	5	3%	30	18%
Seaweed Farm	9.5	6%	2	1%	9.5	6%	7	4%	20.25	12%	2	1%
City	15.5	9%			9.5	6%			6	4%		
Market	12.5	7%			12	7%			5	3%		
Play ground	9.5	6%	6.5	4%	9	5%	5	3%	1.25	1%	7	4%

²⁶ As the schools are on the mainland, the presence of the detachment should have no bearing on security for children traveling to and from school, as the kinds of safety issues raised are experienced on the mainland, not on the islands. The other security issues are those created by the weather: choppy water resulting in dangerous boating.

4. CONCLUSIONS

Based on the findings from the STRIVE Philippines monitoring and evaluation for the seaweed value chain, there were no discernible positive or negative effects due to the launching of seaweed nurseries for seaweed farmers and their families. The dropping and then flagging price of seaweed resulted in a reduction in seaweed as a major source of income. The other primary income generating activity is fishing. A handful of farmer families have other resources like remittances, income from vending, and work as a teacher at the madrasa. Another substantial source of income is a government-sponsored social program called the 4Ps, which provided between 20-88% of household income for the 14 (of 23) farmer households who participated. The farmers in Tunitus continue to farm seaweed with the expectation that the price will rise again.

Lead firms learned that nursery seedlings would be accepted by farmers as *utang* as they have in the past, which may make the nursery difficult to sustain without regular support from the firm – also mentioned as a driving factor in the ADB’s report on aquaculture and poverty reduction. The report concluded that seedling nurseries should be based in the community or producers’ organization whereby training and nursery techniques would be the responsibility of the Philippine Department of Agriculture – Bureau of Fisheries and Aquatic Resources (BFAR).²⁷

5. RECOMMENDATIONS AND LESSONS LEARNED

Two major lessons were learned from STRIVE Philippines work in the seaweed value chain: 1) facilitating value chains includes risks that may not be acceptable in some contexts or by some donors, so either the value chain should exhibit stability or multiple value chains or sectors should be chosen to mitigate the risk, and 2) fulfilling a strong learning agenda requires clarity between those involved and collaboration of all stakeholders.

5.1 RISK ANALYSIS

AFE’s proposal contained evidence of the breadth, depth and strength of seaweed as a business and income generator for seaweed farmers and would-be seaweed farmers in the Filipino coastal areas. The proposal further explicated the socio-economic conditions of this population. It proposed possible means by which

²⁷ ADB Report, p. 86, 98. AFE notes that one needs to be careful about using the term “producers’ organization” as the term means different things to different people. While a few cooperative type seaweed groups might exist in the Philippines, almost all seaweed is procured through a private sector network of suppliers and stockers. One could consider a stocker and the farmers they purchase from as a “group” but it is different than a cooperative type association.

income could flow by means of growing and/or strengthening the value chain. The price of seaweed had been stable²⁸ following “boom and bust” fluctuations. The risks associated with value chain facilitation in a strong market should be detailed in a thorough risk analysis using all possible sources of information, both formal and informal, and potentially reviewed by an objective third party.

Recommendation 1: *Value chain project proposals should include a thorough risk analysis in addition to the value chain analysis. Risks should be detailed and transparent and include multiple levels: risks arising from the market, environment, etc., as well as to firms, competitors, suppliers, producers and their families. Consideration should be given for engaging with multiple sectors or value chains so as to mitigate the risk of "putting all ones eggs in one basket."*

5.2 FULFILLING A LEARNING AGENDA

STRIVE was envisaged as an implementation project with a strong learning component. The learning objectives were not always synchronized across stakeholders. Early in the project, the research team felt stymied by the directive permitting implementers to plan and implement as they would normally and researchers to “keep up” with them. Due to this directive, implementers had no incentive to work with researchers to find the best means of examining the impact (examine the counterfactual) of their activities. In addition, the sponsor’s interests and preferences were sometimes unclear, which added to the challenge of fulfilling a strong learning mandate. Finally, due to a budgeting issue, the implementer was responsible for contracting for data gathering, which may have unnecessarily complicated relationships and incentive structures. Combined, these issues resulted in fewer choices in research methods, especially in the Philippines.

Recommendation 2: *The learning agenda should be supported by all stakeholders whereby donors, project implementers and researchers collaborate to fulfill the learning agenda. Such cooperation should be mandated in written agreements (contracts, grants, cooperative agreements, etc.).*

²⁸ ADB Report, p20.

6. REFERENCES

ADB (2007). Philippines: Strategy for Sustainable Aquaculture Development for Poverty Reduction Project.

Arnold, Shannon (2008). Seaweed, Power, and Markets: A Political Ecology of the Caluya Islands, Philippines, Master Thesis, York University, Toronto, Ontario, Canada.

Bixler, Harris J, and Hans Porse (2011). A Decade of Change in the Seaweed Hydrocolloids Industry. *Journal of Applied Phychology*, 23:321-335.

Hill, Nicholas Anthony Owen (2011). Livelihood Diversification for Conservation: Interactions between Seaweed Farming and Fishing in Danajon Bank, Central Philippines. Doctoral Thesis, Imperial College London, University of London and Institute of Zoology, Zoological Society of London.

ANNEX I: HYPOTHESES & RESEARCH METHODOLOGIES

The following table presents a set of testable hypotheses to address the main research questions as they relate to AFE's intervention in the Philippines. The chart also lists indicators, sources of information, and research tools that will be used to study each hypothesis.

Hypotheses	Indicators	Sources of information
Hypothesis A: AFE's intervention expands production in the Philippines.		
<i>Sub-hypothesis A1.</i> AFE's intervention increases the production of producers	Changes in production <ul style="list-style-type: none"> – Change in the volume of lead firm purchases (seaweed) – Change in the value of lead firm purchases (seaweed) – Change in the value of lead firm purchases (woven prod) – Change in the value of lead firm raw material purchases (woven prod) 	Reports from lead firms (monitoring/AFE) Key informant interviews with suppliers (monitoring/AFE)
<i>Sub-hypotheses A2.</i> AFE's intervention increases the number of producers	Change in number of producers (no change in number could indicate maintenance of existing producers, or movement in & and out of value chain) <ul style="list-style-type: none"> – Change in the number of seaweed farmers – Change in the number of weavers 	Reports from lead firms (monitoring/AFE) Key informant interviews with suppliers (monitoring/AFE) Focus Group Discussions/key informant interviews with HHs (Case study/DCG)
<i>Sub-hypothesis A3.</i> AFE's intervention increases the sustainability of existing and new producers	Change in sustainability of producers (sustainability of the lead firm will help to ensure sustainable market access for producers) <ul style="list-style-type: none"> – Change in the volume of lead firm sales (seaweed) – Change in the value of lead firm sales (seaweed) – Change in the value of lead firm sales (woven prod) 	Reports from lead firms (monitoring/AFE) Key informant interviews with suppliers (monitoring/AFE)

Main hypothesis B: AFE's intervention increases producer productivity in the Philippines.		
<i>Sub-hypothesis B1.</i> AFE's intervention increases commercial access to raw materials.	Change in raw materials sold <ul style="list-style-type: none"> – Change in quantity seedlings sold/distributed (seaweed) 	Reports from lead firms (monitoring/AFE) and/or derived figures (from sales)
<i>Sub-hypothesis B2.</i> AFE's intervention increases use of improved technologies	Change in technologies used by producers	Reports from lead firms (monitoring/AFE) Validations through Focus Group Discussions (FGDs) with intermediaries (monitoring/AFE) Training feedback loops (monitoring/AFE) On-farm observation (monitoring/AFE) FGDs/key informant interviews (KIs) with HHs (Case study/DCG)
Main hypothesis C: AFE's intervention increases sales.		
<i>Sub-hypothesis C1.</i> AFE's intervention increases lead firm/intermediary's knowledge and skills.	Change in lead firm/intermediaries' methods and/or business	Key informant interviews (monitoring/AFE)
<i>Sub-hypothesis C2.</i> AFE's intervention increases lead firm/intermediaries' sales	Change in volume & value sold by lead firm/ intermediaries <ul style="list-style-type: none"> – Change in the volume of lead firm sales (seaweed) – Change in the value of lead firm sales (seaweed) – Change in the value of lead firm sales (woven prod) 	Reports from lead firm/ intermediaries (monitoring/AFE)

Main hypothesis D: AFE's intervention improves well-being of participating producer households.		
<i>Sub-hypothesis D1.</i> AFE's intervention increases income from targeted value chain.	Change in volume of production sold by producers	Focus Group Discussions/ key informant interviews/ questionnaire (Case study/DCG)
<i>Sub-hypothesis D2.</i> AFE's intervention increases the likelihood of targeted value chain as a primary source of income	Change in ranking of targeted value chain among sources of income	Focus Group Discussions/key informant interviews/ questionnaire with HHs (Case study/DCG)
<i>Sub-hypothesis D3.</i> AFE's intervention decreases poverty.	Change in poverty likelihood	Evaluation questionnaire (DCG/IRIS)
<i>Sub-hypothesis D4.</i> AFE's intervention increases physical enterprise-based assets.	Change in producer enterprise-based assets	Focus Group Discussions/ key informant interviews/ questionnaire with HHs (Case study/DCG)
Main hypothesis E: AFE's intervention improves well-being of children in participating households.		
<i>Sub-hypothesis E1.</i> AFE's intervention increases the diversity of food consumed by children.	Change in food consumed	Focus Group Discussions/ key informant interviews/ questionnaire with HHs (Case study/DCG)
<i>Sub-hypothesis E2.</i> AFE's intervention decreases incidence of hunger in children.	Change in children's hunger score	as above
<i>Sub-hypothesis E3.</i> AFE's intervention increases school attendance.	Change in school attendance	as above
<i>Sub-hypothesis E4.</i> AFE's intervention increases the likelihood that children will reach a desired level of education.	Change in index of level of education aspired to and the perceived likelihood of achieving the goal.	as above
<i>Sub-hypothesis E5.</i> AFE's intervention increases completion of school.	Change in index of type of school, grade completed, cost, distance, mode and travel time	as above
<i>Sub-hypothesis E6.</i> AFE's intervention increases use of health care/quicker use of health care.	Change in where child is taken, how soon upon onset of symptoms and transactions costs	as above
<i>Sub-hypothesis E7.</i> AFE's intervention decreases use of child labor.	Change in time children spend in production.	Focus Group Discussions/key informant interviews/ questionnaire and Participatory Rapid Appraisals (PRAs) with children & youth (Case study/DCG)

ANNEX 2: DESCRIPTIVE TABLES OF PANELED TUMITUS SEAWEED FARMERS

Endline 2012

Age	Gender		Total
	Male	Female	
0 to 7	14	16	30
8 to 11	11	9	20
12 to 15	11	4	15
16 to 18	3	8	11
19 to 30	11	13	24
31 to 45	13	10	23
46 to 60	7	4	11
Over 61	1	2	3
Total	71	66	137

Baseline 2010

Age	Gender		Total
	Male	Female	
0 to 7	19	16	35
8 to 11	9	10	19
12 to 15	9	4	13
16 to 18	5	9	14
19 to 30	9	14	23
31 to 45	14	10	24
46 to 60	6	2	8
Over 61	1	2	3
Total	72	67	139

Is Farmer a member of an organization?	2010 N=23	2012 N=23
No	8 (35%)	18 (78%)
Yes	15 (65%)	5 (22%)