

Profit and Loss Analysis of *Eucheama* Seaweed Farming in Green Island, Palawan, Philippines¹

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Abstract

Introduction- One of the Philippines most productive producers- Green Island in Palawan is well known to produce only top quality seaweed. Data and Methodology- We visited Green Island to collect primary data on investment –revenue for 1-ha area belongs to different farmers. Information on marketing i.e. business relationships between middlemen - seaweed farmers were collated from interviews with seaweed traders in Puerto Princess. Results- Profit –Loss was calculated based on 3 harvests per year. At the end of round(R) 1, farm incurred loss deficit PhP 200. End of R2, farm reached Break Even and made Profit PhP15, 600. Pay Back Period is at least four good months and Internal Rate of Returns (ROI) was at 101%. Seaweed cultivation cannot be done during rough weather of Amihan - August to December. Availability of abundance cheap labor is a necessary precondition but not sufficient for explaining why the entire 600 households not into seaweed farming despite the fact that it has been there for more than three decades. Seaweed farming in Green Island have been growing slowly because poor fishermen are borrowing from the limited capital pool in the absent of fund injection from either government or outside aid.

Keywords: Quality seaweed, Green Island, Profit-Loss, Break Even, Profit, Pay Back Period, Internal Rate of Returns on Investment, Amihan, labor, capital

1. Introduction

In 2008, sixty nine percent of the Philippines fisheries production was the processed seaweed. With 20,000 hectares of highly productive farmed areas growing annually at 14%, seaweed farming benefits more than 200,000 coastal and island dwelling families and generated revenue totaling USD 3 billion per annum. By 2010, the Philippines were the world third largest producer of aquatic plants including seaweeds having produced 10.03% or 1.74 million metric tons of the world total production of 17.34 million m.t (FAO). Against this background, we zoomed into the Province of Palawan- top producer among three provinces in Region 4 (the other two are Quezon and Batangas). In the recent years, Region 4 is the Philippines most productive after Region 9 (Zamboanga) and the Autonomous Region for Muslim Mindanao (Sitangkai and Tawi-Tawi) in terms of consistency in quantity and quality.

Before the Marine Colloids Philippines introduced seaweed farming to Green Islanders in 1978, the “Palawenyos” in the area were artisanal fishermen. The fishing grounds of Green Island Bay up to Dumaran Island, north and Charybdis -Constancia shoals and Honda Bay, south were reported rich with marine resources. Coral reefs were pristine and teeming with marine life. However, in the 1970s, the idyllic condition begins to deteriorate due to population pressure on the island’s fragile ecosystem, the tiny island were bursting at the seams. Over the year, “the displaced” Muslim Taosugs and Badjao ethnic who fled their civil war ravaged homeland have moved into Green island. Since then, they have adjusted and assimilated with other migrants arriving later from far and wide of the Philippines islands. The marine resources mostly held as common property were threatened by the very competitive settlers who were not part of the pre-existing common property regime. Some origin Palawenyos lost their ancestors’ domain, consequently the customary

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tenure over reefs and fishing ground collapsed resulting in devastating tragedy of a common. Weak enforcement from Local Government Unit created a situation of open access, resulting in coral reefs being destroyed by the rampant use of explosive and Cyanide for fishing. To make it worst, from 1980s-1990s, trawlers and other commercial fishing vessels were encroaching and plundering the traditional fishing zones.

During six good months in 2013, Green Island was producing 240 m.t dried seaweed equivalent to more than half of annual production of the entire Palawan. Despite longer seaweed farming history, not all households in Green Island cultivating seaweed. Our research question is this: exactly, how high is the economic returns or profit for an investment in a 1-ha seaweed farm in Green Island?

This paper is organized as follows; Palawan position in the overall national production and the brief history of farming is summarized in first section. Section 2 highlights the gap in literature i.e. the need to calculate economic returns on seaweed farming in Green Island. Section 3 briefly described sampling sites where we collected the primary data. Section 4 elaborates learning by doing among the islanders had contributed to the emergence of Green Island as top producer for Palawan. The core of our work is in section 5. The gist is that, the availability of abundance cheap labor is a necessary precondition but not sufficient for seaweed farming rapid expansion. The profit-Loss Analysis shows that the total cost of starting a 1-ha farm is beyond the means of hardcore poor islanders. That is why the entire 600 households are not into seaweed farming despite the fact that it has been there for three decades. The concise section 6 pointed out what aspects of seaweed farming urgently need research attention. The last section draws some lessons from Green Island experience. Seaweed farming in Green Island, Palawan have been growing slowly because poor fishermen are borrowing from their own capital pool in the absent of any fund injections from government or outside aid.

2. Literature Review

Studies on economics of seaweed farming in the Philippine indicated that the investment in seaweed farming are highly profitable. Padilla and Lampe (1989:8) stated the ROI for farms in Philippine in 1988 was 78% per annum, which according to the authors "way above the opportunity cost of capital". No calculations were included. They were assuming away the opportunity cost at 15% (or seaweed priced at PhP4 per/kg) and concluded that seaweed production in the Philippines was still resilient. Another studies by Alih EM (1990) and Salayao et al (1991) reached similar conclusions for Tawi-Tawi islands and for Northeast Sorsogon respectively. Among the latest are Hurtado AQ (2013) and Hurtado AQ, et al (2014), both provided an overview on production, comparing costing as well as the productivity level of different farming techniques, diseases and effect of typhoons to the seaweed production. Only two of the previous studies highlighted the overall production of Palawan province. In a concise note, Mundo et al (2002) said that 20 municipalities in Palawan produced 138,950 m.t. seaweed in year 2000. They also mentioned that seaweed farming in Green Island was a seasonal activity. Pido et al (undated slides) noted that in year 2005, seaweed farming revenue increase the income of the communities in six barangays of Puerto Princessa.

3. Data and Research Methodology

In April 2013, we interviewed 10 seaweed traders (five days) in Puerto Princess- the capital city of Palawan province. We collated information on marketing and business relationship between middlemen and seaweed farmers. After that, we travelled to Roxas, north of Palawan and then took 4 hours pump boat ride to Green Island. This tiny island is inhabited by 2,000 Visayan speaking individuals in 600 households. Four hundred households are seasonally involved in cultivating seaweed on 100 hectares shallow reef top. We spent few days in Green Island and collected primary data on investment –revenue for 1-ha area belongs to different farmers. In addition, we participated in and observed the farm belongs to head of the village. The head of village- who owned the biggest farm invested his income from seaweed into rearing live reef fish in cages. At the time of our visit, his cages has more 300 tails of different sizes and Grouper species. Market size (around 1.5kg) Red Sunoh are sold to the Chinese middlemen based in Roxas at price PhP3, 800 per/kg while the Pink Sunoh were priced at PhP2, 800 per/kg.

4. Species, Culture Technique and Marketing Aspects

When seaweed farming was introduced to Green Island, the islanders were desperate for a viable alternate livelihoods. Sometimes in 1979, some fishermen started to cultivate *Tambalang* collected from the wild (*Euchema Kappaphycus Alvarezii spp*), while some bought seedlings from traders. Fishermen were learning by doing, improvising technique through years of trials and errors. They discovered that the fixed monoline off-bottom and on bottom methods are most

efficient way of farming. Farmers received no subsidies from Department of Agriculture-Bureau of Fisheries and Aquatic Resources. In 2012, the DA-BFAR was reported to distribute 32 metric tons seedlings to 320 poor households in Palawan but none of the farmers we interviewed in Green Island received from it. In 1995, Palawan was producing 10,000 m.t but it increased exponentially ever since and in 2001, Palawan was contributing 20.36% of Philippines production until it reached 335,764 m.t in 2004.

In April 2013, 400 households in Green Island produced on average of 10 m.t dried seaweed per week. The cultivated areas are located at the shallow waters -Northern East side of Green Island on top of totally damaged coral reefs and in the areas where sea grasses is dying and fish is depleted. Cultivation is not possible all year round due to rough weather of Northeast Monsoon or *Amihan* in August to December. The Ex-farm gate and wholesale price of seaweed are higher during *Amihan* when there is a temporary decrease in supply. The monthly price fluctuates, the lowest was in 1996-97 – at PhP14 per kilo. The highest price ever recorded was PhP110 per/kg in 2008, and later drop to PhP50 (exchange rate 1USD=40 PhP) per kilogram in 2013. At time of our field visit, dried seaweed was sold ex-farm gate at PhP32-40 per/kg. The supply chain consists of seaweed farmers, middlemen and collection centres. The Middlemen usually ex-seaweed farmer (accumulated enough capital) buys from his trusted farmers and transports it to Puerto Princessa or directly to Zamboanga city. The relationship between a seaweed farmers and middlemen is a borrowers to lenders. All collection centres are located near the port. As the subsidiary companies for Semi-refiners, the collection centres primarily function is to get enough volume of high quality dried seaweed (stockpiling, sorting and cleaning).

5. Profit Loss Analysis – Results and Its Limits

The *Fixed Cost* is estimated to be PhP 15,400 or equivalent to cash outflows of PhP600 for paddling or flat-bottom boat 2ftx 4ftx16 ft (hwl) + PhP6, 000 pump boat (to bring wet seaweed to shore if farmers does not have drying platform) +PhP5, 000 (100 kg stock 1-ha) + PhP1, 000 for stakes+ PhP1, 000 for nylon+ PhP1, 800 for tools (canvas spread for drying, tarpaulin, baskets, sledge hammer, digger bars etc). The *Operation or Variable Cost* is estimated to be PhP 19,400 or equal to a total of PhP10, 000 for labour (1-ha require 4 persons or 0 if family members are drawn upon for labour) + PhP5, 000 for food (cost of food for 4 persons at PhP4.00 per person per day) + PhP 1,400 (30 liters diesel per-month X PhP48 per liter, farmers uses paddle or rafting to save fuel) + PhP3, 000 for others (raffia, stakes, maintenance, depreciation and contingencies). The *Revenue* is calculated based on 3 harvests per year (or six months January to August). According to those with at least 12 years farming experience, on average propagules grows 10% or least double (slow growing strains or infected with Ice-Ice disease) within 45 days. At the End of round(R) 1, farm incurred loss or deficit PhP 200 which is derived from Revenue PhP 35,000 (saving = 300kg wet for next round seedlings) minus Total Cost PhP34, 800. At the End of R2, farm reached Break Even and made Profit PhP15, 600 derived from PhP35, 000 minus only Variable Cost of PhP19, 400. The 1-ha farm profit margin at R3 is 100 percent. The Pay Back Period is at least four good months and Internal Rate of Returns on Investment (ROI) was at 101%.

Table 1: Cost and Return Analysis for a selected 1-ha farm in Green Island

A. Initial (fixed) Investment	Cost (PhP)	Life (depreciation rate?)
1.Flat bottom boat	600	5 years
2.Pump boat	6000	5 years
3.Seedlings (100 kg)	5000	4 planting cycles
4.Stakes	1,000	5 years
5.Nylon ropes	1,000	3 years
6.Tools to construct and maintenance work	1,800	5 years
Sub-total A	15,400	
B. Variable (operation) costs		
7. Labor	10,000	
8.Food	5,000	
9. Fuel	1,400	
10. others	3,000	
Sub-total B	19,400	
Total farming cost	34,800	
C. Cash inflows		
D. Profit (C-B) without depreciation		
E. Payback period (A/D x ---months) and Rate of Return (D/A)	5 months	

Cost data are based on 2013 price at PhP50 per kilo (exchange rate 1USD=40 PhP Seedlings (propagules) for subsequent planting are sourced from round 1 or farmer buys after new strain after round 4.

Source: Interviews with seaweed farmers (experience at least 12 years) in Green Island, Palawan

The Profit-Loss calculation must be interpreted with two caveats; (i) the probability and effects of diseases outbreaks such as Ice-Ice, theft or sabotage are not calculated but by no meaning negligible. (ii) Most farming related work are done by family members, farm owner does not pay wage but provide food instead. They take turns to work on each other farm according to the "*Bayanihan*" norm.

6. Suggestions for Future Research

Future research should estimate multiplier effects on income and employment and to calculate the Total Factor Productivity of seaweed farming specifically in Green Island and Palawan in general.

7. Concluding Remarks

The Internal Rate of Returns for seaweed farming in Green Island is very high. Imagine how much this island can produce if the entire households can start farming and if farming can be done throughout the year like the areas in the south of Palawan. Life in this crowded tiny island is extremely difficult for those households who cannot afford seaweed farming. The coral reefs around this fragile island is already dead and has no fish. The rest of its ecosystem is on the verge of collapse. Most of these households are too poor to start a farm. Their creditworthiness is zero, therefore has no access to formal credit institutions. They are in a dire need for any forms of subsidizations either from government or external aid. The physical labor of the islanders who decided not to work out side can be used as input in the labor intensive seaweed production if capital is made available.

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