

Symposium Proceedings

Value chain analysis of abalone trading in Lahuy group of island in Caramoan, Camarines Sur, Philippines

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Abstract

Abalone is one of the high value marine products that commands high price in the restaurant in urban areas, and part of attraction for food tourism in coastal tourist areas. In Camarines Sur the leading producer of abalone catch are located in the coastal area of the municipality of Caramoan, in the Lahuy group of islands. Secondary and primary data were collected regarding the activities for gleaning, pre-processing, and selling of abalone. Key Informant interview was conducted using interview guide questionnaire as well as Focus Group Discussion (FGD) in two major sites. Respondents of the study consist of concerned LGU-Caramoan officials, buyer-consolidator, buyer-exporter, and gleaners. Results show the continuing decline of harvest and an increasing time and effort to catch wild abalone. There's also noted information asymmetry wherein gleaners are not aware of the price and demand both in the national and international market. Value of abalone meat increases as well as cost, as it moves along the chain. With few restrictions of their extraction from the wild, as well as no uniformity of implementing quality control over the processing of abalone meat, there is an urgent need to craft guidelines on catch sizes, training for improvement of processing and preserving the abalone meat, and licensing/accrediting traders of abalone and other marine products. Establishing marine sanctuary is also highly recommended, not just for the recovery of population of abalone but also for other marine flora and fauna.

INTRODUCTION

Abalone, a valuable mono-valve mollusc species that captures the fancy of the gourmand enthusiast mostly in Asian cuisine. It is one of the high value marine product that commands high price in the restaurant in urban areas (Gonzales, B.J. 2015), as well as part of attraction for food tourism in coastal tourist areas where the mollusc is found and harvested. It even found its role for barter in the illicit economy of drugs and contraband between South Africa and China (Steinberg, J., 2005)

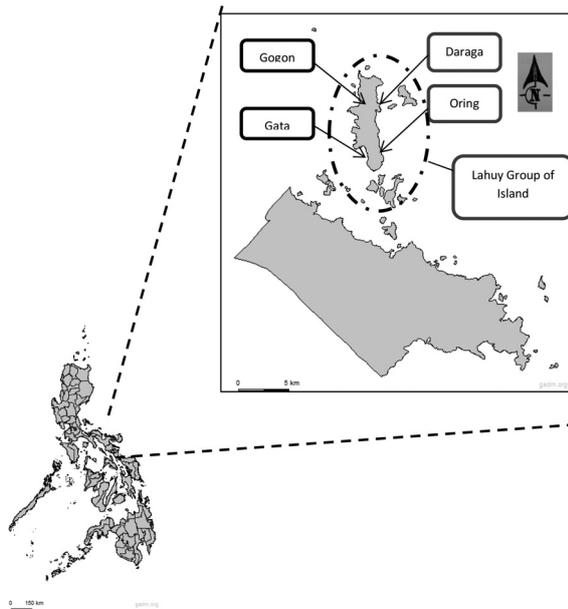
With increasing population and rapid economic growth in Asia, it is transforming the demand for global food industries, with China leading in the increase in the middle-class growth, hence increasing demand in seafood (Wang et al., 2019). This increasing demand, create a "pull" effect on the resources from the coastal areas as well as increase in post-harvest processing and activities, which in turn influence the

movement of seafoods across national boundaries (Hamilton-Hart and Stringer, 2015). Hence, it causes concern for protection and prudent use of these food resources since despite progress in technology for aquaculture, the current condition of fish stocks in the wild continuously decline (Pauly, D., & Zeller, D. 2017) and also intensify social struggle within the fisheries sector (Barvinck, et.al., 2018).

In the province of Camarines Sur, Philippines, the leading producer of abalone catch are located in the coastal area of the municipality of Caramoan, specifically in the Lahuy group of islands. The municipality of Caramoan is located in the eastern part of the Philippines, wherein it features peninsular land mass with mountainous ranges and with scattered island that faces the Philippine Sea and the Pacific Ocean where there is an abundant coral reefs, sea grass patches, and mangrove forest. In these marine environment, thousands marine species of both fauna and flora are found, among these species are the abalone, sea cucumber, sea weeds, giant clams, octopi, and

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other valuable marine resources. Among those islands in Caramoan, the Lahuy group of islands is one of the richest fishing grounds, where people living along the coastal communities derived their main source of livelihood. This island group - called the Lahuy group of islands, serve as the locale of the study and is shown in Figure 1, is consist of four (4) barangays namely; Gogon, Daraga, Oring, and Gata.



Source: gadm.org/maps/PH/camarines_sur/caramoan/html

Fig. 1. Map of Caramoan, Camarines Sur showing the locale of the study.

Among the four barangays, fisherfolks from Gata and Oring are the most active gleaners, since their close proximity in the coral reefs where abalone is found. The buyer-consolidators are also stationed in the said two barangays wherein they conduct their buying activity for abalone and other marine products.

MATERIALS AND METHODS

The study focused on the value chain of abalone in the Province of Camarines Sur, Philippines, specifically in the activity within the island barangays of Caramoan in the Lahuy group of islands. Value chain analysis (VCA) was used, as it generally outlined the full range of activities and processes that are required to bring a product from its conception to its end use (Kaplinisky and Morris, 2000). The VCA also described the characteristics of each chain as well as the relationship that connects each player as the product move through each player's chain – in terms of materials flow, information flow, and relationship of each member (Wang et.

al., 2019). Concerning the livelihood and participation of local fisherman and buyers in the connected trade of fishing industry wherein policy makers, managers, and consumers may unintentionally compromise the fishing activities due to dearth in information (Bevilacqua et. al., 2019), hence the VCA can aid as an initial means of investigating those concerns for preservation and judicious use of these marine resources (Hamilton-Hart and Stringer, 2015) and determine the social values in fisheries sector that is also as important as financial and ecological value (Fabinyi, et.al, 2018). This is paper also delve into the inherent structure and governance in the abalone trade of Caramoan, since value chain players unplanned and dynamic fashion (Bush et.al., 2018)

Both secondary data and primary data were utilized to gather comprehensive information regarding the activities for gleaning, pre-processing, and selling of abalone in Lahuy Group of islands in Caramoan. For gathering of primary data, Key Informant interview was conducted using interview guide questionnaire as well as Focus Group Discussion (FGD) in two major sites – Brgy. Oring and Brgy. Gata. Respondents of the study consist of concerned LGU-Caramoan officials, buyer-consolidator, buyer-exporter, and gleaners. The snowballing method was used for seeking the key informant – specifically for gleaners, with the starting point from the buyer/consolidator in local areas of the two barangays as they have the most active players in the chain.

Since the value chain for abalone trade extend from local, national, and up to international market, only the local chain was given focus. Regarding the chain that contains the players in the national and international market it was no longer covered as the semi-processed abalone product are mixed and processed together with other harvest from different areas in the Philippines, hence the resulting product is a homogenous , as no distinction of harvest from different places in the Philippines from abalone harvested in Caramoan.

RESULTS AND DISCUSSION

Experiential and Historical Account by Gleaners of Abalone in the Lahuy Group of Islands.

The focus group discussion yielded historical data regarding the fishing activities of fisherfolks in the island barangay of Sitio Pawikan of Brgy. Gata, Brgy. Oring, and Brgy Haponan. Since those island communities are relatively in close proximity with each other, they all have a lot of similar account regarding the gleaning for abalone, sandfish and other marine resources such as seaweeds.

The group stated that during 1970's, marine resources are very abundant and there are only few fishermen who engage in collecting sandfish and abalone. Initially the price of abalone

is 1 cent per piece, and the buyer is located at Brgy. Bikal, Caramoan, Camarines Sur, then after five (5) months, the price change to P8.00 per kilo – about 8 pieces of abalone of various sizes.

Then in late 1970's and most of the 1980's, fishermen from Visayas region started to come in and introduces illegal methods of fishing for abalone and other marine species. These methods include dynamite fishing, cyanide, and using pry bar to pry-out abalone from coral reefs. Also, during this time, other residents of coastal barangays started to join in, since the prices of abalone started to rise. As time progresses gleaners also noticed the decline in their catch of abalone as well as the increase in the number of hours and effort for catching abalone as shown in Figure 2.

The amount of catch fluctuates depending upon the season and phases of the moon – which influences the tide. Catch are good during the cooler month of the year - which usually during Amihan season, starting Mid-October up to Mid-January as well as during the first quarter phase of the moon.

The Gleaning Area in the Lahuy Group of Islands.

The gleaning area is approximately eleven (11) square kilometers of coral reefs during low tide, and this located at the southern portion of Lahuy Island, and around the Pawikan Island – a sitio of Brgy. Gata, The area around Pawikan Island, is also adjacent to the Fish Sanctuary of Brgy. Gata, wherein a strict implementation of No-Take Zone is vigilantly imposed.

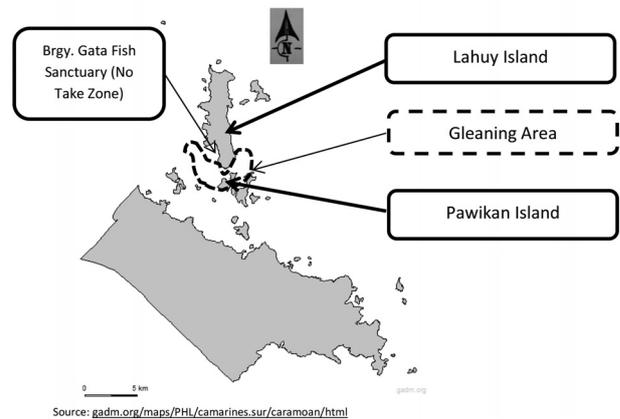


Fig. 3. Abalone Gleaning Area in Lahuy Group of Island.

Local value chain players and the source of revenue, cost, and income

Since there are no existing aquaculture for abalone, local fisherman resort to hunting/gathering activities of abalone. They usually employ locally made tools such as “kalwot”, handcrafted goggle, basket made of old nets with metal or any hard stick that serve as ribs, boat – hand paddled or motorized, and modified rechargeable flashlight. In Table 1 shows the equipment used and its associated cost, wherein only the flashlight and “kalwot” can be a significant investment of the gleaners since the rest can be source out from scrap or surplus materials such as old nets, wood, and other materials can be source out locally at a very small amount. Boats are multi-purpose equipment, since they use it

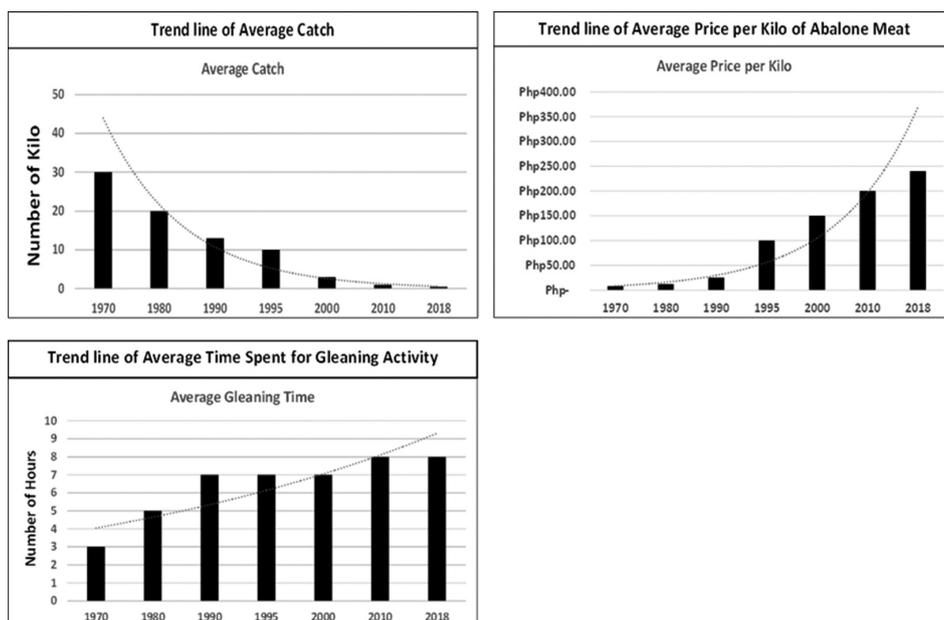


Fig. 2. Trend line of Price, Catch, and Time Spent for Gleaning Activity.

not just for gleaning activity, but also for transportation, other fishing activity, or used for seaweed farming. Most of the time, gleaners' band themselves to gather abalone and usually pooled an average contribution of P30.00 per head for gasoline.

Table 1. Gleaning equipment used and its associated cost.

Name of Equipment	Materials Used	Source	Cost
Modified Flashlight	Rechargeable LED Flashlight	Local hardware	P 400.00
	Battery (2 pcs)	Local hardware	P30.00/pc
Kalwot (Pick)	Stainless Rod	Scrap Metal hardware	P20/feet
Handcrafted google	Scrap wood, scrap glass, sealant	Locally source	Small value; Immaterial amount
Handcrafted flippers	Scrap PVC pipe	Surplus from house construction	Small value; Immaterial amount
Floating Basket	Scrap net, bamboo stick, scrap metal rod	Scrap materials salvage from old fishing nets.	Small value; Immaterial amount

The gleaners usually practice opportunistic gleaning activity, wherein they not only hunt abalone, but they will also catch any marine product that that have economical values such as sea cucumber.

The fishermen also conduct the initial processing to preserve the abalone by removing it from the shell, then blanching it using seawater, and occasionally salting it to prolong its shelf life – but this method is discouraged by traders/exporter in Naga City. The local buyer/consolidator, usually engage in buying several marine products, that that include abalone, sea cucumber, seaweeds, fish, cuttlefish, and other marine products. They usually serve as quality controller and price setters in the area, and they have groups of fishermen who regularly supply them of their catch. These buyer/consolidator, regularly deliver their product to buyers in Naga City and in Camaligan Fish Port but can also sell their product to local consumer and tourist, since local consumer buy abalone during their special occasions or as gift (pasalubong). Foreign tourist with appetite for exotic marine food product can also directly purchase from the local fish dealers

The buyer/exporter of marine product are located in Naga City and in Camaligan Fish Port. From Naga City, the Oceancell Trading International Corporation (Philippines), purchased mostly from the stock delivered by buyer/consolidator stationed at Brgy. Oring, wherein he delivered an average of one hundred-fifty (150) kilos per week at an average price of P420.00/kl. Size category is usually not

implemented - except for the very small size, as they prefer to purchase the abalone on a “rumble” basis. The sorting and grading are performed in their warehouse at Cavite, Philippines. There are also abalone suppliers from Siruma, and Camarines Norte, but the bulk of their purchase are from Caramoan area. Delivery to their Cavite warehouse is usually on a daily basis, as long as there is available stock delivered by the traders, since they need to immediately process the abalone meat to avoid spoilage, and it is only in their Cavite warehouse that they have blast freezing equipment.

Another large-scale buyer of abalone is located in Camaligan Fish Port, Philippines, the Seachamp International Export Corporation (Philippines). This buyer also purchases various marine products and open 24 hours for the whole week and with almost daily delivery to their warehouse in FTI, Taguig City, Philippines. Most of their stocks of abalone are delivered by buyer/consolidator from Pawikan Island with an average delivery of 150 kilos every three days. They also get additional supply of abalone from Samar Area and Gubat, Sorsogon, an average of 15-20 kilos every week. Sizing is not implemented by Seachamp, as buying of abalone meat is on a “rumble” basis. The sizing and grading are done in their FTI, Taguig Warehouse.

Revenue, cost, and income by gleaners and traders

Concerning the income generated by gleaners, there are only few expense item needed such as battery, of which they consume at least two (2) batteries per gleaning activity that average six (6) to eight (8) gleaning hours, and another is the contribution for gasoline with an average of P30.00 per gleaning activity. Table 2, shows the simplified weekly income of gleaners for an average of four (4) days gleaning activity.

Table 2. Simplified Weekly Gleaner's Income Statement.

Revenue and Cost Item	Amount		Percentage
Revenue (Average of 2kls/day for 4 days/week) @P240/kl		P 1,920.00	100%
Less: Cost associated with gleaning activity			
Contribution for gasoline cost (P30/day) x 4 days	(120.00)		(6%)
Flashlight Battery (P30/pc x2) x 4 days	(240.00)		(13%)
Miscellaneous (P50.00) x 4 days	(200.00)	(P560.00)	(10%)
Estimated Net Income		P 1,360.00	71%

Value chain analysis of abalone trading

With the minimal cost of 29% based on the revenue, gleaners are able to earn an income of 71% based on the revenue. Hence, gleaners are motivated to be involved in the gleaning activity as they can earn income with a minimal cost.

Regarding the traders, their revenue, cost, and income is shown in Table 3, wherein traders recovers only 31% from their revenue as their net income since they incurred 57% cost of sales that goes to paying the gleaners of their catch.

Table 3. Simplified Weekly Trader's Income Statement.

Revenue and Cost Item	Amount	Percent taje
Revenue (Average of 200kls/week) @P420/kl	P 84,000.00	100%
Less: Cost associated with trading activity		
Cost of sale (200kls/week @ P240/kl)	(P48,000.00)	(57%)
Fare (60 boxes @ P100/box)	(6,000.00)	(7%)
Ice (75 pcs @ P5.00/pc)	(375.00)	(0.40%)
Fare (P200/pax)	(200.00)	(0.20%)
Gasoline (2 gallon @ P240/gal.)	(480.00)	(1%)
Tricycle fare (60 boxes @P30.00/box)	(1,800.00)	(2%)
Miscellaneous Expenses	(700.00)	(P57,555.00) (1%)
Estimated Net Income	P26,445.00	31%

The rest of costs incurred are for transportation cost and for preserving the abalone meat using ice since they have to be rinse of the salt that they use as preservative. Comparing the net income of the two players, traders earned higher amount, but on a percentage basis, gleaners are able to recover a higher percentage from the revenue.

Change in Value of Abalone from Gleaner to Buyer/Exporter

Relating to the change in value of the harvested abalone moving along the chain, gleaners can sell it at an average price of P240.00 per kilo to buyer/consolidator in their area, each kilo contains approximately 16 pieces at an average of 65 grams each as shown in Table 4. This same average amount will be the Cost of Sale for the buyer/consolidator when they sell the blanched abalone to buyer/exporter.

Table 4. Change in Revenue, Costs, and Profit of Abalone Meat.

Particulars	Gleaners	Buyer/ Consolidator	Increase (Decrease) in Value	Increase (Decrease) in Percentage
Revenue	Kl P240.00/kl	P 420.00/kl	P 180.00/kl	75%
	pc P 15.00/pc	P 26.25/pc	P 11.25/pc	75%
Cost /	Kl P 70.00/kl	P 287.78/kl	P 217.78/kl	311%
	pc. P 4.38/pc	P 17.99/pc	P 13.10/pc	311%
Profit/	Kl P170.00/kl	P 47.48/kl	(P 122.52/kl)	(72%)
	pc P 10.63/pc	P 2.97/pc	(P 7.66/pc)	(72%)

Note: 1 kilo of abalone meat is equivalent to 16 pieces with an average of 65grams per piece.

The buyer/consolidator can sell the abalone for about P420.00. With average gleaning cost of P70.00 and P287.78 for operational cost for trading abalone, the gleaners and buyer/consolidator can earn profit of P170.00/kilo and P47.48/kl, respectively. From gleaners to buyer/consolidator, there is an increase of 75% in value, although there is also a corresponding increase in cost of 311% mainly due to transportation cost and the cost of purchasing the abalone meat from gleaners, hence there is a 72% drop in profit per kilo and per piece when abalone meat move from gleaners to buyers.

Regarding the risk of spoilage, gleaners have lower risk of spoilage since they sell their catch almost immediately, whereas, traders have to accumulate first the abalone meat and usually they have to store it for three (3) to six (6) days before transporting it to be sold to buyers in Naga City or Camaligan Fish Port, which exposes them to higher risk of losing money.



Fig. 4. The Relationship of the Number. of Days and Risk of Spoilage.

The value chain map of abalone gleaning and trading industry in Camarines Sur

The current local value chain (VC) players of abalone are local fishermen in Lahuy group of islands as well as from neighbouring coastal barangays of Caramoan, with occasional transient fishermen from Quezon Province and Catanduanes,

Sorsogon, and Eastern Samar. Also, part of the local VC are buyer/consolidator that serve as collection point of harvested abalone. There is also occasional consumer that composed of tourist (both local and foreign), but local market of abalone for local consumption is non-existent since they are not part of regular cuisine in Caramoan as well as in Partido area.

This is also due to the high demand in national and international market.as shown in Figure 5.

Governance in the value chain

Product flow as well as price determination are cornerstone in the abalone meat value chain wherein there is pronounced fluctuations of supplies of abalone due to seasonal factor. Regarding price setting, the buyer/consolidators usually peg their price on the price set by large buyer/exporters in Naga City and Camaligan Fish Port. Gleaners of abalone are not also aware of the price in the national and international market, they are not also aware of the quality required for abalone in international market, except for those demanded by Buyer/Consolidator in their area.

The value chain for abalone trading in Lahuy Group of Island also indicate an hourglass-shape market structure shown in Figure 6 since there are numerous players in the gleaning activity, with few traders and large-scale buyers in the middle, and numerous consumers at the end of the value chain. These give the buyer/consolidator and buyer/exporter ability to influence the price setting and quality determination.

Regarding the involvement of local government and law enforcements, previously there is lax enforcement of environmental laws and regulations as evidenced by illegal fishing methods employed during the 1970's, 1980's, 1990's, and early 2000. However, seeing the effects of illegal fishing

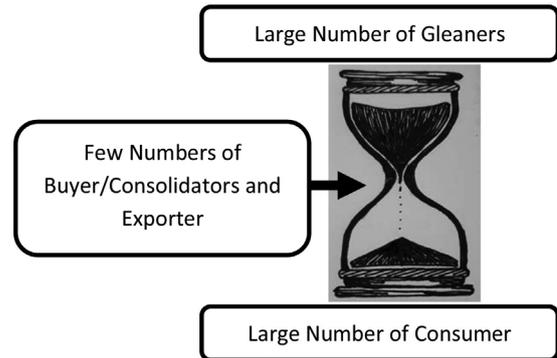


Fig. 6. Hour Glass Business Model for Abalone Trading.

activities, local government of Caramoan started to enforce fishery law. This can be evidenced by establishment of fish sanctuaries and conducting patrol of along the coastal areas of Caramoan. People in the community are also willing to establish more fish sanctuary, as long as the government will support their effort by establishing “Bantay-Dagat” force that are equipped with necessary tools and equipment to combat illegal fishing activities.

Threats and opportunities in trading of abalone

Threats in the abalone fishing/trading are mostly man-made such as overfishing and use of illegal fishing methods initially introduced by fishermen from Visayan region. Overfishing is also considered as factor in declining catch of abalone as an effect of increase in population in the area. Climate change also played a role, as rising temperature affects the distribution of the abalone. Another threat that may be considered is the apprehensive behaviour of some members of the community regarding establishing fish sanctuary, as

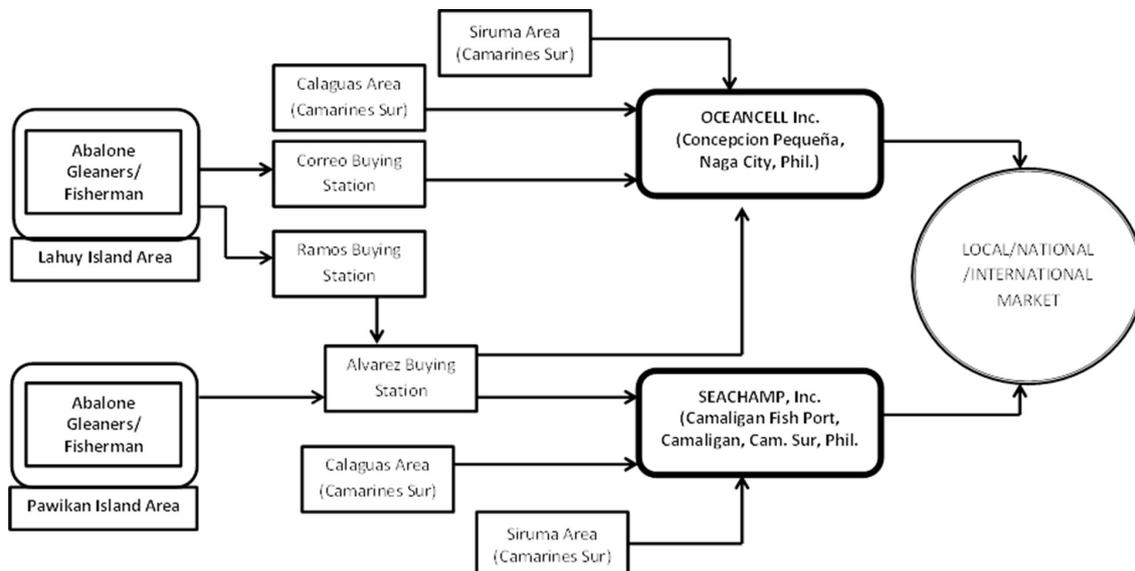


Fig. 5. Value Chain Map for Abalone Trading in Caramoan, Camarines Sur.

they viewed it in a negative perspective that can limit their ability to increase their catch.

Concerning the pre-processing of abalone meat, gleaners and traders resort to blanching and using salt as alternative to ice. With this, abalone meat has to be rinse overnight before it can be delivered to buyers in Naga City or Camaligan Fish Port, as they don't accept salted abalone meat. Another concern regarding the abalone meat from Caramoan is the presence of whitish or greenish substance that the buyers in Camaligan Fish Port observed wherein it causes spoilage of abalone meat.

Opportunities for abalone trading may include aquaculture for abalone – which may include hatchery, raising wild sourced abalone to attain marketable size, introducing new cuisine of abalone to be offered to tourist visiting Caramoan, and making souvenir items made from abalone shells. To give relief to the wild stock of abalone and sandfish, improvement in seaweeds farming can provide alternative livelihood to those involved in gleaning activities of abalone and sandfish. Establishing fish sanctuary that can serve as snorkelling and dive spot for tourist can also be considered to make the sanctuary prospect economically functional as people from the community can earn income from providing service to tourists. This can possibly be done by arranging tour packages that involve coordinated diving/snorkelling tour that can also be linked with offering of local cuisine prepared from local marine products such as abalone, seaweeds, sandfish, and other locally catch fish. This can possibly strike balance between the fisher folk's economic needs and marine resource conservation.

DISCUSSION

Based on the information gathered from key informants and other concerned persons, and observations of the abalone trading in the Caramoan, it can be concluded that trading for abalone is still a viable source of livelihood despite decreasing catch and difficulties encountered during gleaning activities due to considerable reduction in the size of gleaning area, as previously they can catch abalone along the coral reef area of Oring, and Pawikan Island. Despite of this, the rehabilitation of the abalone stock does not necessitate the establishment of hatchery, as there are still viable breeding population of the abalone evidenced by the volume of catch in the area.

The gleaning for abalone usually involve minimal cost, thus increasing their net income per kilo, and making abalone gleaning attractive for fishermen as a profitable activity. Also, with minimal legal restrictions in gleaning for abalone, supply of these marine resource relatively flows throughout the year, except during unfavourable weather condition and rising water temperature during summer. On the side of buyer/consolidator

and buyer/exporters, trading for abalone, and other marine products are capital intensive since fishermen prefer cash basis transactions, hence it can be related to the fact that there are few fish traders in the Lahuy group of islands - two (2) in Brgy Oring and also two (2) in Sitio Pawikan, Brgy Gata and few marine product exporters. It is also imperative for buyer/consolidator that they maximize the economy of scale by purchasing from several gleaners in the area and accumulating the product before delivering the marine products to buyers in Naga City and Camaligan Fish Port, hence increasing the risk of spoilage. Included also in the consideration by the buyer/consolidator is the distance and transportation mode in Caramoan that that add cost to their operation cost in abalone trading.

The VC map for abalone trading exhibited an hour-glass business model wherein it heavily influenced the pricing and quality of the abalone meat product as the buyer/consolidator and buyer/exporter act as gatekeepers of the flow of abalone meat from the wild up to the consumer as well as the information flow concerning price, quantity demanded, and required quality of abalone meat in the market. Therefore, to increase the success of intervention to improve the marine environment and the population of abalone stock, close cooperation of these groups of players is necessary. This may involve size and catch limit, catch monitoring, size monitoring, and price monitoring. Since they are also close with the fishermen and gleaners, they can be the best partners for social marketing to influence their behaviour concerning conservation of the marine environment in the area as well as improving the well-being of the community.

It is concluded that the major cause of the decline in the catch of abalone in the gleaning area – specifically along the Brgy Oring's reef area, are due to overharvesting of abalone, and use of illegal methods and to the reluctance to established marine sanctuary by the community as they viewed it as limitation to their fishing activity. Also, the practice of preservation of abalone meat requires innovations, as they usually practice salting, which can affect the quality of meat.

To address these concerns, holistic approach of conservation which includes balancing the economic needs of the affected community as well as active participation of local government and the community for establishing proper trading activities of abalone, which may include size limits, catch limits, as well as developing abalone-based menu to cater for food tourism in Caramoan, and by issuing accreditation and licenses to engage in buying and consolidating abalone meat and other marine products. For storage and preservation of abalone meat, reliable power source is necessary to be established to avoid resorting to salting during storage. To make the establishment of sanctuary attractive to the local community, alternative use of the area which is also a viable

alternative source of income must be introduced – this can be done by establishing the area as snorkelling or diving site for local and foreign tourist which employs the locals as guides and boat operators.

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