Value chains for yellowfin tuna export: a case study for Mamburao and Sablayan, Occidental Mindoro

Submitted by

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To

WWF - Philippines

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Annabelle Cruz-Trinidad

A. Background and rationale

1. A three-year conservation program is being pursued by the WWF Philippines through the support of Danish International Development Agency (DANIDA) under the Coral Triangle Network Initiative. The goal of the program is to contribute to sustainable management of fisheries resources, in particular the tuna fishery of Sablayan and Mamburao in Occidental Mindoro. Value chain analysis shall serve as the framework for introducing sustainable management concepts by determining the sources of, and distribution of value along the supply chain and thereafter, assessing how some policy instruments can be introduced to ensure that those who are practicing more sustainable forms of resource use are provided incentives.

2. The program document mentions reef fish and tuna as focus commodities for the Coral Triangle. Transformational changes within both tuna and life reef fish fishery and trade are highly prioritized. The WWF knows that without a clear buy-in from local communities conservation and sustainable development goals can never be reached. But, we are also aware that local communities in many parts of this region are global actors delivering resources to markets often far away from the villages. The approach will be a collaborative approach involving all relevant stakeholders, while identifying main change agents among these, and at the same time supporting national and regional government initiatives for sustainable development.

3. Value chains include the *full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use.* It is essential in value chain analysis to identify the players who participate in the different phases from "gate to plate" and how these different players interact with one another. Governance is also a key to assessing the performance of the value chain given that a producer-dominated value chain should be managed in a different way than that of a buyer-dominated value chain. In fisheries, the value chain is more of a buyer-dominated one since the supply is not stable, prices are dictated upon by the buyer, and the price premium is imposed by transporters and traders vis-à-vis the producers or the suppliers.

4. **T**he value chain analysis for tuna will contribute to several conclusions regarding the sustainability of operations from "gate to plate" by:

   a. Identifying the different participants in the tuna value chain and assessing how their behaviour contributes to pricing efficiency, distribution of benefits, and sustainability;

   b. determining how much each of the participant in the fish supply chain is earning based on estimates of actual prices received vis-à-vis costs for assessing "reasonable return to labor and capital";

   c. extending the concept of costs to include environmental costs / economic costs;

   d. tracking the impact of price changes in final consumer markets on exvessel prices

   e. developing various market scenarios such increases in prices of products and production inputs (fuel, labor, etc) and determining its impact on net revenues for each stage of the value chain.

5. In order to assess the sustainability of tuna operations in Mamburao and Sablayan, the analysis will also be extended to include "economic costs" such as those imposed by each participant in the value chain but remains unvalued. An interesting case would be to value the "real" production costs of tuna. While in most industrial and agricultural sectors, the start of the value chain is in production, the case of fisheries is a bit different. While in the former, production arises from the inputs of capital, labor, and raw materials, in fisheries, production is abetted by the benevolence of nature. We will utilize two scenarios here: one is the

traditional view that fish before it is caught does not have any value. Thus, the value of tuna here would be tantamount to the extraction cost. The other view which we would like to propose is that tuna, even before it is caught, already has value and this value is based on the nurturing capacity of the coastal ecosystem to sustain its life. The economic analysis may also look at the carbon footprint for each stage of the value chain rendering those who utilize more energy less sustainable.

B. Literature Review

6. The "value chain" is defined by Kapinsky as "the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use" (Kaplinsky 1999). Value chain analysis for fish has been applied by Agrifoodconsulting in the Diagnostic Study for an Agricultural Program Design in Cambodia (www.agrifoodconsulting.com) albeit focusing on freshwater fisheries production. Trondsen (2007) points out some reasons why value chains are important for fisheries products among them being globalization or how producers and markets are ultimately connected in the global marketplace; sorting function or how some heterogenous commodities can be categorized into specialized markets; and a buffering function which allows for auctions and storage facilities to allow price stabilization. A clear depiction of the value chain is explained by Gudmundsson, Asche, and Nielsen (2006) in applications to four fisheries: cod from Iceland, nile perch from Tanzania, anchovies from Morocco, and herring from Denmark. By showing how value is imputed at every stage of the process from production to consumption, the authors show which particular step is generating or amassing the greatest value. In the case of white fish fillets the retail sector absorbs 61 percent of the value chain in Tanzania but only 37 percent in Iceland while for the small pelagics, the retail sector for Danish herring adds 38 percent of the value while for Moroccan anchovy the figure is 75 percent. Thus, if 61% of the value chain in Tanzania is absorbed by the retail sector, then the remaining 39% can either be sourced from the producer/harvesting sector, the processing sector, or the transport sector.

C. Methodology

7. This study scanned the literature for similar applications of the value chain analysis to fishery products. Basic information about the fishery sector in Sablayan and Mamburao were also generated from existing reports and first-hand information of WWF and LGU informants regarding the fishery. Socio-economic profiles were also reviewed to contextualize the performance and behaviour of the tuna fishery participants.

8. In order to generate information regarding tuna catch, prices, and cost, a questionnaire was developed (Annex A). The sample size for Sablayan was pegged at 86 while that of Mamburao was pegged at 84 based on the known numbers of handline fishers in both municipalities, i.e., 670 for Sablayan and 756 for Mamburao.

9. Information derived from the questionnaire allowed a more indepth analysis of different categories of handliners operating in Mamburao. Each of the eighty-four (84) respondents indicated an average monthly catch for tuna and this was assumed to be the known average volume produced per boat. The catch levels were then categorized further as follows:

- **a.** Category A: 20 to 50 kg
- **b.** Category B: 51 to 75 kg
- **c.** Category C: 76 to 100 kg
- **d.** Category D: 101 to 200 kg
- **e.** Category E: over 200 kg

10. Each response was then matched with the different cost components and sorted accordingly. This allowed an inference into the level of fishing effort viz the catching efficiency. The matching of cost items with

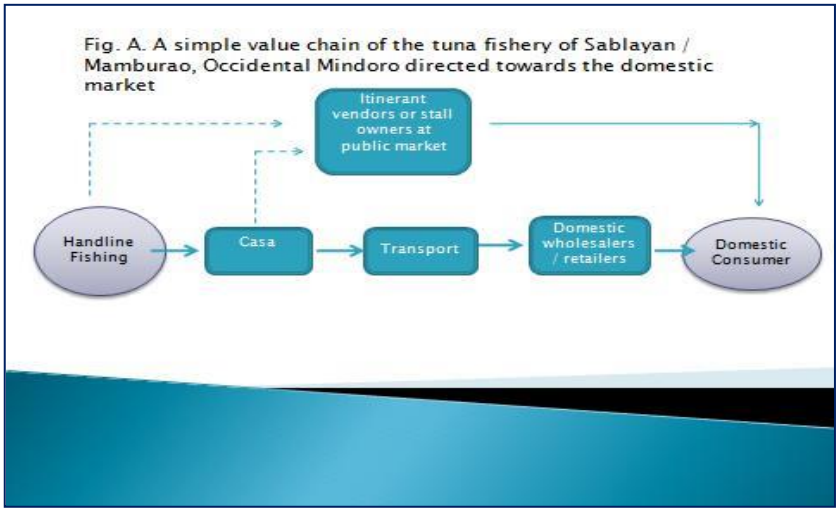
catch was done for Mamburao due to the level of data processing; unfortunately, the data set for Sablayan was incomplete.

11. A focus group discussion was also organized in Sablayan and Mamburao to probe and confirm the information culled from the rider questionnaire with participant list provided in Annex B. Lastly, a triangulation of data sources was done by reviewing the reports of the Fisheries Specialist and the Team Leader/Sociologist. Previously prepared reports on the Social Analysis of Sablayan (Cola and Manul undated) were also reviewed to understand the overall context for the tuna fishery performance.

D. The value chain for tuna in Sablayan and Mamburao, Occidental Mindoro: participants, behaviour, and networks

12. Two value chains for the tuna fishery in Sablayan and Mamburao are depicted in Figs. A and B. Figure A shows the value chain for the domestic market while Figure B shows the value chain for the export market. Although the focus of the analysis is the export market, the domestic sector is closely intertwined due to its being a receptacle for "rejected" tuna. Although recognizing the value chain for the domestic market, there is not enough information to do a comprehensive analysis for this segment; thus, the treatment will be on a descriptive and not analytical level. If future circumstances allow, the study can easily be expanded to include the domestic market for tuna.

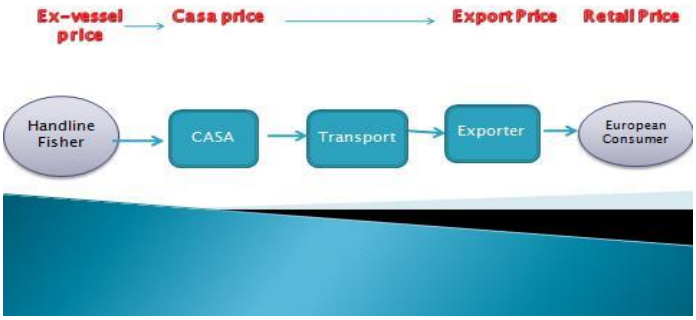
Fig. A. A simple value chain of the tuna fishery of Sablayan / Mamburao, Occidental Mindoro directed towards the domestic market



13. The first participants in the value chain are the fishers and this study takes particular interest in the handline fishery in Sablayan and Mamburao. A description of tuna fishing operations as well as fleet characteristics is provided in Babaran (undated) although this study utilized some of the information on number of vessels and catch rates for consistency. Babaran's census of handline boats yielded a total of 2,663 handliners including fishers from other municipalities of Mindoro (Rizal, Paluan, Calintaan, and Santa Cruz) as well as Batangas and Cavite. At least 43% of the handliners can be found in Sablayan and Mamburao. There is a sizeable number of non-motorized handiners operating in the Mindoro Strait but since the questionnaire included data from motorized fishing operations, the paddle boats were excluded from the analysis.

14. Babaran's study categorized the boats using engine horsepower which was then attached to particular yield levels (Table 1). Tuna catch data culled from the questionnaire yielded averages of 75 kg and 50 kg for Mamburao and Sablayan, respectively. This value does not seem to diverge much from the findings of Babaran (undated) which showed catch rates of boats with 5 to 10 hp as being in the 50 kg range per trip. This study agrees that fishing effort (such as engine horsepower or tonnage of boat) is more of a determining factor than the locality where fishing is done or from where the handliner operations are based; thus, for purposes of computing values, this study will use the catch rates computed by Babaran (item a, Table 1).

Fig. B. A simple value chain of the tuna fishery of Sablayan / Mamburao, Occidental Mindoro directed towards the export market



15. The number of fishers and number of trips per month were culled from the FGD and validated

by the Babaran study. The number of trips per month assumes a maximum value based on the number of days per trip. Smaller boats go on a one-day trip but those with 10 hp and larger can go for 3 days or about 7 trips per month.

Table 1. Summary of cost/revenue parameters for the handline fishery in Sablayan and Mamburao, Occ. Mindoro

Item reference	Cost / revenue parameters	SABLAYAN		Total, Sablayan	MAMBURAO		Total, Mamburao
		5 to 10 hp	10 to 16 hp and > 16 hp		5 to 10 hp	10 to 16 hp and > 16 hp	
A	average catch, kg/boat/trip	53	117		53	117	
B	number of fishers per boat	3	6		3	6	
C	number of trips per month	20	7		20	7	
D	number of boats, per category	159	178	337	81	300	381
E	total monthly production for all boats, this category, in kg (peak)	168540	145782		85860	245700	
F	total monthly production for all boats, this category, in kg (lean)	84270	72891		42930	122850	
G	catch/trip/fisher, kg	17.7	19.5		17.7	19.5	
H	number of casas			6			12
I	amount of boats handled per casa	27	30	56	7	25	32
J	amount of tuna handled per casa, kg	28090	24297	52387	7155	20475	27630
K	total yearly production, kg	1264050	1093365	2357415	643950	1842750	2486700

16. There are six (6) casas in Sablayan and twelve (12) in Mamburao and this study assumes that all fishers go to one casa or another and that leakages through itinerant vendors or retailers are not common. Supporting this assumption is the fact that the tuna handline fishery is geared towards the export market, thus, the necessity to grade the tuna (almost exclusively attached to a casa operations) is the norm. Given this, an estimated 56 and 32 boats are processed by the casas in Sablayan and Mamburao, respectively. Total annual production is estimated at about 4,800 metric tons of tuna which is roughly 70% of the total production of the Mindoro Strait as estimated by Babaran. This was based on a 10-month operating period consisting of 5 months at peak production and 5 months of lean production and the remaining two months being used for boat and engine repairs. This study assumes that lean months would yield half the production of a peak month or about 8 tons per month as opposed to 16 tons for a peak month.

17. Based on the FGD conducted in Sablayan, the months of December to March are when tuna production is at a peak, i.e., average catch rates per trip can range from 200 to 300 kilos. The boat owner interviewed provided some useful characteristics regarding the handline operations, as follows:

- **a.** Boat is 0.58 gross tons, fabricated in 2008 at a cost of P50,000;
- **b.** 40 hp engine bought as surplus at P10,000;
- **c.** Does three (3) trips per month of 5 days per trip or depends on whether ice is still available;
- **d.** Travels a distance of at least 20 km from shoreline and almost always targets a payao;
- **e.** The other determinant of travel time is amount of ice on board.

18. At a price of P100/kilo, this translates to P20,000 to P30,000 per trip. Each trip may last for 5 days; thus, a handline may make up to 4 trips in a month although the FGD results indicate that 3 trips per month is most likely.

19. From the producer, the tuna passes through two possible points: (i) the itinerant vendor or a retailer in the public market or (ii) the *casa*[1] where tuna is delivered for checking (Fig. A). This is also where a "professional" grader ascertains the quality of the fish. The fisher is more or less at liberty to decide where he should "sell" his fish depending on the price offer. From our interviews on site, the fisher may even elect to sell the fish to other casas, direct agents of exporters or other trading agents even if his trip was financed by another casa. The casas are cognizant of this behaviour, find it unethical, but in the end merely accepts the situation as a case of the fisher trying to find the best price.

20. The domestic consumers targeted are residents of Mamburao, Sablayan, and nearby municipalities. According to one interviewee, because of the small population in Sablayan, it is a challenge to even consume one tuna (ie. 40 kilos and up); thus, the price really dips low due to perishability factor. The other domestic consumers are market-goers in Batangas City or Cavite where the tuna "rejects" are usually delivered.

21. Because the target market for tuna is the export market, it is inevitable that the tuna is graded first and will only reach the public markets of Sablayan and Mamburao in case of reject or low grading. However we can not discount the possibility of some fishers (especially those located in remote areas) to simply sell the tuna the way they want. What most often happens is for the tuna to be brought directly to the casa upon which it is immediately graded and then iced and sent to the Batangas or Cavite market in cases of rejection, and to

[11] *Casa* in Spanish meaning house; in the tuna fishery of Sablayan/Mamburao, the casa referred to is actually the capitalist or financer of fishing operations. Alternatively, the "casa" refers to a shack or a work area usually adjacent to the domicile of the casa owner, where tuna is brought right after the harvested to be graded.

the Manila-based exporter, if graded highly. The value chain for the latter is very similar except that the last step prior to consumer involves more processing (packing, cleaning, etc).

22. Casas serve as the fish landing/buying stations; however, their roles as financiers of fishing operations is perhaps more significant in the value chain. There are 6 casas in Sablayan and 12 in Mamburao, eight (8) of which are fully operational. Either they finance the handline operations on their own or they act as agents of exporters (usually based in Manila). From the FGD, it was apparent that some casas actually finance handline operations from their own capital build-up. In Mamburao, one casa operator explained that she started in the fishing sector as an itinerant vendor and then progressing slowly into a retail stall owner and at present, she already maintains a casa and finances some fishing boats. Exposure of casa owners can be sizeable. One casa operator in Sablayan is financing fifty (50) boats with at least one boat piling up debts up to P100,000.

23. Normal business ethics would suggest that a boat which is financed by a particular casa would "sell" or "land" their catch with said casa. This is not always the case especially due to the entry of new agents who would usually jack up the prices. The threat of new entrants is real and is slowly being felt due to the decline in production from the GenSan tuna fishery.

24. Transport is provided by closed/refrigerated vans which are owned by exporters or wholesalers, mainly. Since tuna trading is becoming a vertically integrated sector, there are instances when traders and wholesalers invest in their own reefer vans, which transport their own catches and those of other casas. One of the informants who maintain wholesale and retail outlets in Manila own a van, some boats, and maintain a house in Mamburao. Sometimes, casas "share-a-ride" with these refrigerated vans. From Sablayan, travel covers about 2 to 3 hours and another 2 to 3 hours is spent on a RORO boat en route to the port of Batangas. Thus, the fish reaches the exporter or the domestic market within 12 hours. If the exporter buys the fish, transport cost is shouldered by the exporter as well.

25. To determine how much of the tuna catch actually gets to the domestic consumer, the amount of "rejects" or Grade C tuna must be estimated. In this study we assume a 70:30 ratio in favour of "rejects".

E. Cost and Revenue Analysis, Harvesting Sector

26. Revenues are based on price and catch estimates. Catch and price estimates were gleaned from the FGDs, the study of Babaran, individual interviews with informants, statistics from Bureau of Agricultural Statistics and National Statistical Coordination Board, and the results of the questionnaires. Babaran's study yielded an average of 53 kg/trip for boats with less than 5 hp and those between 5 to 10 hp and 117 kg/trip for those using boats of 11 hp and higher. These numbers are averages for both Mamburao and Sablayan, though. It must be noted that the duration of trips for the two size categories vary significantly with boats using smaller engines allowing for a one-day trip while bigger boats can go from 3 to 5 days per trip. What actually happens is that boats decide to extend or truncate the trip when catches are sufficient or when ice supply has run out.

27. From the questionnaire results, a straight average for all size categories yielded 76 kg/trip and 51 kg/trip, for Mamburao and Sablayan, respectively, which is well within the range observed by Babaran (Table 2). The range from Mamburao is 20 kg/trip to a high of 400 kg/trip while for Sablayan, the range is 25 kg/trip to 70 kg/trip. The Sablayan handline fishery generates lower catch levels compared to Mamburao yet they are more dependent on tuna than on any other species as shown by their dependency levels. Data summarized by Cola et al (undated) showed that trip frequency is almost double in Sablayan than in Mamburao.

Table 2. Catch comparisons between Mamburao and Sablayan tuna handliners per catch category and estimates of dependency on tuna fishing

	Average tuna catch k/trip		% of Tuna in Catch	
Catch Category	**Mamburao**	**Sablayan**	**Mamburao**	**Sablayan**
Category A: 20 to 50 kg/trip	44.6	44.4	0.32	0.59
Category B: 51 to 75 kg/trip	61.9	56.8	0.32	0.64
Category C: 76 to 100 kg/trip	90.1	none	0.21	none
Category D: 101 to 200 kg/trip	133.6	none	0.41	none
Category E: above 200 kg /trip	283.3	none	0.43	none
Average	75.6	50.6	0.34	0.62

28. Prices received by handliners are determined by casa operators who normally have the fish graded. Prices may vary among casa operators who, in turn, offer prices based on exporter demands. Sometimes, operators offer prices without grading; the prices are normally lower than what a Grade A (highest price) would fetch but this is a risk taken by the casa operator which is most favourable to the fisherman. For this study, the prices corresponding to the different grades are as follows: (i) for grade A, P120/kilo; (ii) for grade B, P110/kilo; and (iii) for grade C, P100/kilo. Fishers interviewed during the meeting in Sablayan indicated that during periods of surplus, prices can go down to P50 to P70 per kilo. The grades used for Sablayan are as follows: Grade A = P110/kilo while Grade C = P80/kilo. According to the study by Cola et al (undated) there is at least a P10 differential between prices in Mamburao and Sablayan with prices received by Mamburao at an average of P100/kilo while that of Sablayan at P90/kilo.

29. From Table 3, it can be gleaned that revenues can range from P3600 to P5300 per trip based on an assumed catch rate of 44.6 kg/trip depending on the prices received which, in turn, depends on the "grading". Meanwhile a catch of close of 100 kg can yield more than P10,000 per trip if tuna receives a "grade A" and P 7,210 if tuna is graded "C".

Table 3. Computation of gross revenues for handline fishing given various catch and price assumptions, in Pesos

Price in P/kg	Catch rates in kg per trip				
	44.61	61.94	90.14	133.56	283.33
Price = 120	5353.04	7432.31	10816.36	16027.50	34000.00
Price = 100	4460.87	6193.59	9013.64	13356.25	28333.33
Price = 80	3568.70	4954.87	7210.91	10685.00	22666.67

30. Cost components were gleaned from the questionnaire (Table 4). These include fuel products, ice, food and drinks, and baits and hooks. Other operational costs include repairs especially of boats, engines, generators, petromax, etc. The questionnaire also sought information on fixed costs such as taxes and licenses and insurance and marketing costs such as auxiliary invoices, landing fees, and commissions, but yielded none or very scanty information. Since each of the cost components corresponded to a catch level,

the sample was sorted to reflect a progression of catch rate from the lowest to highest levels. This is to make some inference on the costs and the cost components relative to catch levels and also to infer on the level of fishing effort.

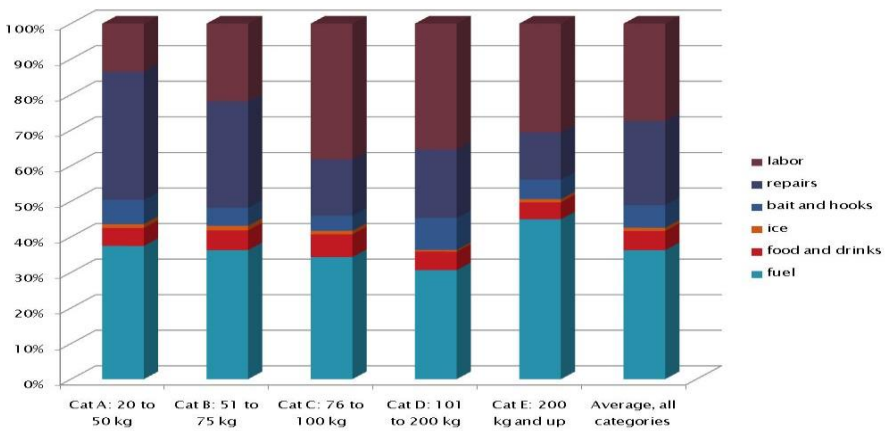
Table 4. Cost estimation for different classes of handliners based on catching potential, disaggregated according to major components, in P/trip

Cost parameters	Category A: 20 to 50 kg	Category B: 51 to 75 kg	Category C: 76 to 100 kg	Category D: 101 to 200	Category E: 200 and up
Gasoline/diesel	552.79	718.22	933.62	1666.07	2981.67
Food and Drinks	215.44	253.50	368.71	545.38	1561.83
Kerosene	218.19	211.57	137.78	252.80	685.78
Ice	133.00	181.66	267.80	418.16	556.58
Gasul	28.58	41.41	41.72	35.98	99.39
Bait	72.10	71.23	81.50	262.15	319.46
Kawil	96.60	85.06	96.06	318.69	319.46
Nylon	9.86	8.00	0.00	143.93	0.00
Load	0.00	0.00	1.94	0.00	0.00
Boat repair	511.85	548.83	352.22	750.02	758.38
Engine repair	333.02	322.80	230.64	476.47	456.51
Repair of gear	105.61	105.95	82.60	320.03	331.50
Generator repair	10.14	10.17	6.68	12.87	13.33
Electrical repair	0.00	0.00	0.00	0.00	0.00
Petromax repair	211.78	212.47	139.59	365.45	508.18
TOTAL COSTS	2498.95	2770.87	2740.87	5568.00	8592.09

31. Almost all cost items indicate increases corresponding to increasing catch categories supporting the findings of Babaran that vessels that operate 1 to 10 hp engines catch less than those which operate vessels that use 10 hp engines. Increasing fuel use indicates a larger engine while increasing food consumption and ice indicate a larger manpower complement and a larger hold capacity for fish and ice. Generally, economies of scale exist in the handline fishery –bigger boats translate to higher holding capacity, longer time at sea, ability to store more ice – and finally, ability to catch more fish. Observing gas consumption alone will show that category E consumption is about 4 times more than Category A but the fish catch is 6 times more.

32. On average, fuel comprises the largest component of cost, i.e., about 36% followed by labor 27% and repairs, 24% (Fig. C) What might seem surprising is the fact that the lowest catch category, and presumably the boats which have the smaller engine, actually consume more gasoline. This may be explained by the daily trips and the relatively smaller hold capacity that make travelling to and from the fishing ground more inefficient and costly.

Fig.C. Cost components of handline fishing, per catch category



33. The estimation of gross revenues is straightforward and will depend on the prices of tuna. Assuming that all catch is graded “C”, the gross revenue for a handline unit in Mamburao would be about P7,500 per trip as opposed to P4,000 per trip for a

similar unit in Sablayan. Monthly gross revenues would depend on the number of trips made which may range from 1 day or about 20 trips per month to about 4 days or about 7 trips per month.Net revenues are computed from estimates of gross revenues minus operating costs (Table 5). If all landed tuna is given a Grade C, profits are still made for Mamburao handliners at P3,127 per trip. This is not true for Sablayan where losses are incurred for grade C tuna. To earn profits, tuna has to be graded as “A” or “B” in Sablayan. The effect of changing the percentage contribution of Grades “A” and “B” tuna to total catch will also change the profit margins even while maintaining the same catch levels.

34. Figure D compares margins earned by handline operators for different catch categories. While margins are significant across the board, i.e, at least 40% and up, they become lower by at least 10% subject to a downgrading to “C”. Although in general, margins are still earned despite the possible lower grade.

Table 5. Computation of gross and net revenues for Mamburao and Sablayan Handliners, catch rates per trip in kg, revenues in Pesos/trip

Gross Revenues based on average catch rates per trip	Mamburao	Sablayan
Catch/ trip	75.6	50.6
Grade A	9,073.6	5,566.37
Grade B	8,317.4	5,060.34
Grade C	7,561.3	4,048.27
Operational Costs, average all catch categories	4,434.2	4,434.2
Net Revenues		
Grade A	4,639.4	1,132.2
Grade B	3,883.3	626.1
Grade C	3,127.2	(385.9)

F. Cost and Revenue Analysis, Casa Sector

35. The casa functions as landing site for tuna handliners. Casas are modest shacks usually attached to houses or officers of casa owners. Basic apparatus found in casas include weighing scales, water

receptacles, and ice chests. When the study team

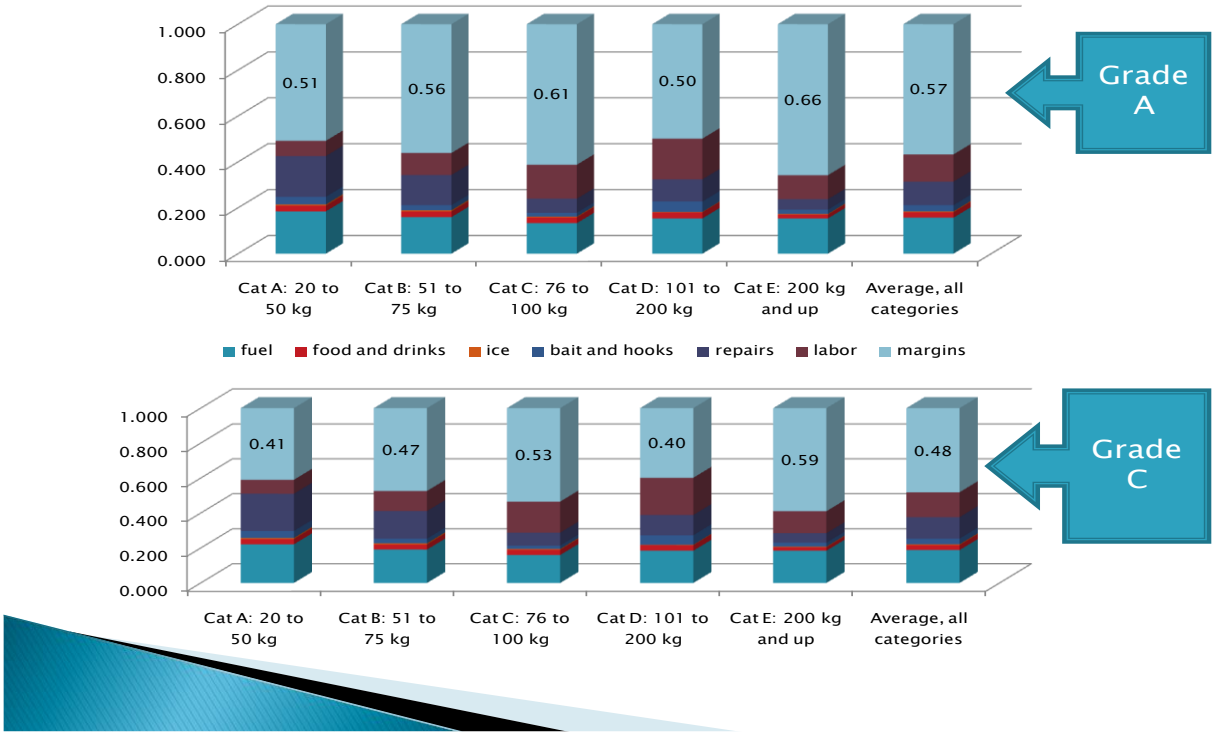


Figure D. Comparison between cost components and profit margins for different catch categories using two grading scenarios

visited Mamburao, a few yellowfin tunas were fortunately landed. It took less than 30 minutes to weigh and grade the tuna. The grading was done by an "external expert" who represents the exporter. A simple implement is used to poke the side of the tuna which then comes out as a sliver of flesh that is graded. The grader's word is much awaited by the casa owner and the fisher; however, nobody can really say whether his/her word actually conforms to the real tuna grade. The risks can actually swing both ways. There is a possibility that the tuna accorded a grade "C" is actually a higher grade (B or A) but this can also happen in the reverse owing to the imperfect methods for grading tuna and the inability to assess how the tuna was handled.

36. After grading and a little bit of cleaning, the tuna is prepared for transport. If the exporter buys the tuna, he/she makes arrangement for the tuna to be brought to their collecting area from where refrigerated vans will take the tuna to the export offices in Manila. Otherwise, or in cases of "reject", the casa operator will arrange for the tuna to be brought to Batangas, Cavite, or Manila for the domestic market. In such cases, the tuna "shares a ride" with tuna from other casas as well as other fish. Transport cost is about P6 to 7 pesos per kilo and this is paid for by the casa owner and this includes fish that is sold to the exporter.

37. Casas in Mamburao were observed to have from 2 to 5 hired hands, with the average being 2 laborers per casa. Payments are varied as well as the number of days hired although average wage payments amount to about P5000 per month (Table 6). Information from Sablayan shows that casas do things quite differently. Two casas have labourers ranging from 6 to 13 while 2 casas rely on their own labor, i.e., managerial labor is equal to hired labor. Value adding of labor does not end with casa-based activities such as weighing, icing, and preparation for transport. In most cases, labourers accompany the fish to the exporter handling area or to the fish markets in Batangas or Manila. For example, a casa labourer may earn P200 per van when he accompanies the fish. This is split with the owner of the van (if the owner is not the exporter also) after paying gasoline and RORO fees. Another casa in Sablayan does not pay wages *per se* but allows labourers to accompany the fish and charge P200 per van. Yet another model allows labourers to top off the cost of the fish by P5 to P10/kilo as wages. They may opt to sell the fish to Mamburao.

Table 6. Estimate of wage costs among the various casa operators, Mamburao				
Name of Casa	**No. of Laborers**	**Wages in Pesos / day**	**No. of working days / month**	**Total Salaries paid per casa/ per month**
1. Abelle fish Buyer	2	240.00	21 days	P 5,000.00
2. Kapt. Ricky Fish Buyer	5	160.00	24 days	P 3,840.00
3. Chita Fish Buyer	2	250.00	20 days	P 5,000.00
4. Nhor Fish Buyer	2	240.00	20 days	P 4,800.00
5. Mathy Fish Buyer	2	150.00	16 days	P 2,400.00
6. Baby Bico Fish Buyer	5	200.00	21 days	P 4,200.00
7. Amie Fish Buyer	4	270.00	22 days	P 5,940.00
8. Doring Fish Buyer	4	300.00	20 days	P 6,000.00
9. Nokoy Fish Buyer	2	100.00	14 days	P 1,400.00
10. Feby Fish Buyer	2	150.00	18 days	P 2,700.00

38. Perhaps one of the pivotal roles of the casa owner is from the financial perspective. Casa owners are de facto financiers of handline fishing operations. Oftentimes, casas fund handline operations but there are times when they also request some financial assistance from the exporters. As previously stated, some casas evolved from handline operations or from market retail operations. After some capital build up, these small capitalists become casa operators. The amount of funds released by the casa can be derived from the operational costs required for fuel, kerosene, food and ice. In this study we assumed that every month the exposure of the casa operator is about P100,000 for a fleet of 10 boats.

39. The cost summary for a casa operator based in Sablayan viz. Mamburao is compared in Table 7. The cost components are essentially the same; however, the cost estimates per kilo of tuna processed vary due to the amount of tuna handled, mainly, and due to the farther distance of Sablayan from the main markets. The main cost components are labor (hired hands plus the labor inputs of the owner or "managerial labor"), cost of monthly rentals and utilities such as water and electricity, depreciation cost for equipment and land, and transport cost. Also included as part of cost is the opportunity cost of capital assuming that each casa operator finances a total of P100,000 per month for operating costs of handliners. Lastly, another cost component for the casa operator is the cost of fish purchased which is the amount paid to fishers after deducting all debts and/or operating expenditures financed by the casa. Total costs for an average casa operator is about P3.4 million per month for Mamburao and close to P5.9 million for Sablayan which in both cases includes the cost of purchasing tuna from the handliners. The purchase cost is P100 and P90 in the case of Mamburao and Sablayan, respectively.

Table 7. Cost components for casa operator and estimation of monthly gross and net revenues, comparison between Mamburao and Sablayan casas

Cost parameters and assumptions	Mamburao	Estimated Cost/Kilo of Tuna	Sablayan	Estimated Cost/Kilo of Tuna

Amount of tuna handled per month	27630		52387	
Assumed Grade A	8289		15716	
Assumed Grade C	19341		36671	
Total Revenue, Grade A	1492020	180.00	2357415	150
Total Revenue, Grade C	2320920	120.00	3667090	100
Labor for packing, icing, washing	P5000 per month for 21 days for 2 laborers	0.36	same	0.19
utilities	1500 per month for water and electricity and rental	0.05	same	0.03
ice	P280/block at P2.8 per kilo	2.80		2.80
cost of capital	cost of capital invested multiplied by 12% social rate of discount as opp cost	0.03	same	0.02
labor of owner	P20000 per month	1.09	same	0.57
commission for retailer	7% of total tuna handled	8.40		8.40
depreciation for property and equipment	1 million depreciated over 10 years	0.30		0.16
Licenses and permits	P5/kilo per month	3.00		3.00
transport costs	P6/kilo	6.00		8
Purchase price of tuna		100.00		90.00
TOTAL COSTS PER CASA, in P/kilo		122.03		113.17
TOTAL COSTS PER CASA, P/month		3371793		5928488
TOTAL REVENUE		3812940		6024505
NET REVENUE		441,147.33		96,016.93

40. Revenues are computed based on the prices offered by the exporter, i.e., Grade A= P180 and Grade = P120, for Mamburao. If a casa operates at a 20 plus ton level for the month, it will stand to gain about P440,000 in net revenues. In Sablayan, a casa operator handling 50 tons plus will be able to earn net revenues of P96,000 per month (Table 8A). Net revenues are computed based on the price assumption (scales differ between the two sites) and the distribution of catch as grade A and Grade C. In this study, we

assume a 70:30 ratio in favour of grade C, although our observation is that the ratio is presently at 80:20. This may be representative of casa operations during peak season, ie., from December to March.

41. In Table 8B, production was assumed at half the volume of that in Table 8A albeit increasing the purchase price. The drop in production (representing scarcity) and the attendant increase in price did not compensate for the quality of fish as evidenced by the standard 70:30 grading in favour of grade "C". In Table 8C, while the production level was maintained at about 13 tons per month and the price retained as well, the mere shifting of the ratio to 50:50 for grade "A" and "C" resulted to profits.

42. If production were halved without any change in prices to be offered by exporters, the net revenues would also be cut in half. The casa may opt to increase its margins by offering lower prices to the fishers but in times of scarcity, this move may not be feasible. The exporter could not also adjust prices significantly as it only follows the trend from the exporting country. Note that tuna pricing is based on demand pull rather than supply push.

43. Casa margins are greatly influenced by the prices offered by exporters. From Figure F, we can see that as the exporter buying price is lowered from P180 to P120, the casa owner sacrifices margins (upper diagram) and maintains payments to fishers or does the reverse, i.e., lower the buying price and maintain margins. Sometimes lowering the buying price for tuna is not an option especially when the casa finances the operations; likewise, the long term relationship of a casa with a fisher must be maintained. It is likely that the casa absorbs these costs.

Table 8A. Comparison of net revenue for casa operators in Mamburao and Sablayan based on high production scenarios

Cost parameters and assumptions	Mamburao	Estimated Cost/Kilo of Tuna	Sablayan	Estimated Cost/Kilo of Tuna
Amount of tuna handled per month (in kg)	27630		52387	
Assumed Grade A (in kg)	8289		15716.1	
Assumed Grade C (in kg)	19341		36670.9	
Gross Sales from Grade A Tuna, in pesos	1492020	180	2357415	150
Gross Sales from Grade C Tuna, in pesos	2320920	120	3667090	100
Selling price of fish , in P/kg		100		90
Value adding costs of casa, in P/kilo		122		113
Value adding margin, in P/kg,		22?		13?
TOTAL COSTS PER CASA, P/month (in pesos)		3371793		5928488
TOTAL REVENUE PER CASA ,		3812940		6024505

P/Month				
NET REVENUE PER CASA, P/month		441147		96017

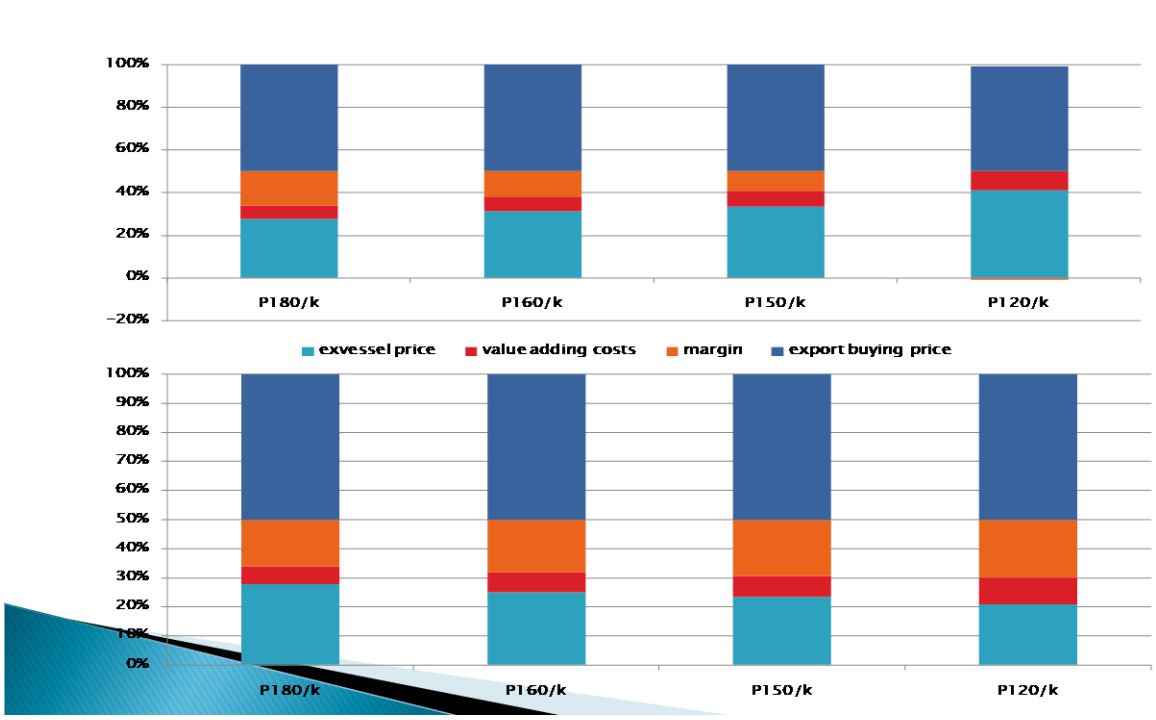
Table 8B. Comparison of net revenue for casa operators in Mamburao and Sablayan based on low production scenario

Cost parameters and assumptions	Mamburao	Estimated Cost/Kilo of Tuna	Sablayan	Estimated Cost/Kilo of Tuna
Amount of tuna handled per month (in kg)	13815		26193.5	
Assumed Grade A (in kg)	4144.5		7858.05	
Assumed Grade C (in kg)	9670.5		18335.45	
Gross Sales from Grade A Tuna, in pesos	746010	180	1178707.5	150
Gross Sales from Grade C Tuna, in pesos	1160460	120	1833545	100
Selling price of fish , in P/kg		120		110
Value adding costs of casa, in P/kilo		144		134
Value adding margin, in P/kg,		24		24
TOTAL COSTS PER CASA, P/month (in pesos)		1987530		3513447
TOTAL REVENUE PER CASA , P/Month		1906470		3012253
NET REVENUE PER CASA, P/month		**-81060**		**-501195**

Table 8C. Comparison of net revenue for casa operators in Mamburao and Sablayan based on low production but higher quality scenario

Cost parameters and assumptions	Mamburao	Estimated Cost/Kilo of Tuna	Sablayan	Estimated Cost/Kilo of Tuna
Amount of tuna handled per month (in kg)	13815		26193.5	
Assumed Grade A (in kg)	9670.5		18335.45	
Assumed Grade C (in kg)	4144.5		7858.05	
Gross Sales from Grade A Tuna, in pesos	1740690	180	2750317.5	150
Gross Sales from Grade C Tuna, in pesos	497340	120	785805	100
Selling price of fish , in P/kg		120		110
Value adding costs of casa, in P/kilo		144		134
Value adding margin, in P/kg,				
TOTAL COSTS PER CASA, P/month (in pesos)		1987530		3513447
TOTAL REVENUE PER CASA , P/Month		2238030		3536123
NET REVENUE PER CASA, P/month		250500		22675

Figure E. Effect of price changes offered by tuna exporter to casa owner margins (upper panel) and prices offered to handliners (lower panel)



G. Cost and Revenue Analysis, Export Sector

44. The exporter is the last segment of the chain before reaching the consumers in Europe, either through purchases made by a coop that owns retail stores or through a chain of supermarkets. Like the casa, the exporter also has to pay for labor, rentals and utilities, depreciation of equipment, raw materials, licenses and permits, and freight costs. Like the casa, the exporter also reflects the cost at which it buys fish from the casa and all the attendant costs needed to bring the fish from the landing site and /or casa to the processing area.

45. Information shared in this section came from one exporter only, R and D. There are eight (8) other tuna exporters in Manila who are accredited to export to the European Union (EU) but it is only R and D who has agreed to be party to WWF's Sustainability Program. Thus, it is incumbent upon this study to include R and D in the analysis; however, where opportunities exist to expand the study, it would be better to gain insights also from the other exporters.

46. Labour costs include managerial labor (marketing, accounting, and operations) and hired labor. It is the latter who performs all activities the minute the fish arrives at the processing plant. The tuna is cleaned, loined and iced again in order to maintain the freshness after making the trip from Mindoro. It is then vacuum packed and placed in giant ice chests where the temperature is maintained at 0 degrees. After 24 hours or 48 hours which is more common, the tuna is ready for its final packing which may include applying cloth gauze to absorb extra blood, re packing, and then stacking in styro containers. Each box is labelled according to specifications provided by the buyer which indicates where the fish was caught, its weight, and other conditions. After packing, the tuna is ready to be shipped and within 20 minutes, the tuna is loaded onto the aircraft. There are at least 10 laborers hired to do these tasks: (i) 5 of them doing the final stages which is sealing, icing, and packing and (ii) another 5 or so who are assigned to the "dirty area" where the fish arrives

and is slaughtered. Wage rates are based on how much tuna each worker was able to process at the rate of P500/ton.

47. Managerial labor includes two senior staff of the firm who are in charge of operations (fish buying), marketing and negotiations with buyers, logistics, etc. There is one accountant to support operations. Total managerial labor is assumed to be P120,000 for the senior staff and accountant which is patterned after current pay scales.

48. Domestic transport cost is also shouldered by the Exporter after having committed to purchasing the product. The rate used for transporting tuna from Mamburao is P8/kilo. In addition to this, the exporter also pays for the freight cost at US$4.50 per kilo of tuna or roughly P193.5 at the current exchange rate of US$1:P43.

49. Raw materials used for exporting tuna include Styrofoam boxes, ice gels, plastic wrappers used for vacuum sealing, labels, and corrugated boxes. Given the costs of these materials, this study used an average cost of P300 per box of 24.5 kilos. Prior to exporting, the processing necessitates a lot of ice and storage. The exporter has invested in various equipments and apparatus to get the approval of the buyer. These include ice making machines, vacuum sealer, AC units, at least 2 large ice chests for chilling, and several freezers. Total costs of equipment for the processing plant, land acquisition, and acquisition of 4 refrigerated vans total P7 million and this value was then adjusted using a lifetime of 5 years. Cost of utilities (water and electricity) was estimated at P50,000 per month. Lastly, the costs of tuna purchased is also imputed and here we assume a price of P180/kilo. Thus, the cost estimates are at P4.7 million given the cost components enumerated above plus the purchase cost of tuna (Table 9).

50. Revenue computation uses the export price of tuna at US$17/kilo as applied to a conversion rate of 50% relative to the amount of tuna purchased from the casa (due to processing, loining, and removal of skin), i.e, to meet export demand of 10,00 kilos, the exporter needs to assemble double this amount from the casas and fishers alike This results in a net loss of P1 M. However, if the conversion rate is increased, say up to 15,000 kilos – the net revenue would be about P2.6 million. An alternative would be to depress buying prices. If the buying price went down to P100/kilo, a net revenue of P618,000 would be generated.

Table 9. Cost components for exporter and estimation of monthly gross and net revenues

Cost components for exporter	Assumptions	P/kilo
wages, (packing, sorting, semi processing)	10 hired hands at P500 per ton at 20 tons	5
managerial labor	120,000 for two managers and accountant	8
local transport	P8/kilo	8
Freight	US$ 4.50	193.5
raw materials	boxes, plastic, gel, gauze, ice	12.2
marketing costs	none	
rental and utilities	P50,000 per month	2.5
depcreciation on equipment	7 million	5.83
purchase price of tuna from casa		180
Total cost, P/kilo		234.6
total monthly costs		4,691,564.63

H. Value distribution

51. The value to reckon with is the value of tuna as it reaches the consumer which in this study is more or less US$17/kilo or about P731. From this final figure, the value contributions of the 3 sectors are analyzed. First, the handline fisher contributes value by expending his/her labor as well as other operational expenses such as fuel, food, bait, and maintaining boat and gear which amounts to about P53 per kilo. Since there is no "buying price" for tuna, the difference between the selling price and the value adding amount constitutes the profit. At a selling price of P80/kilo, a margin of P27 /kilo is made. Thus, a higher buying price for the casa means higher profits for the fisher.

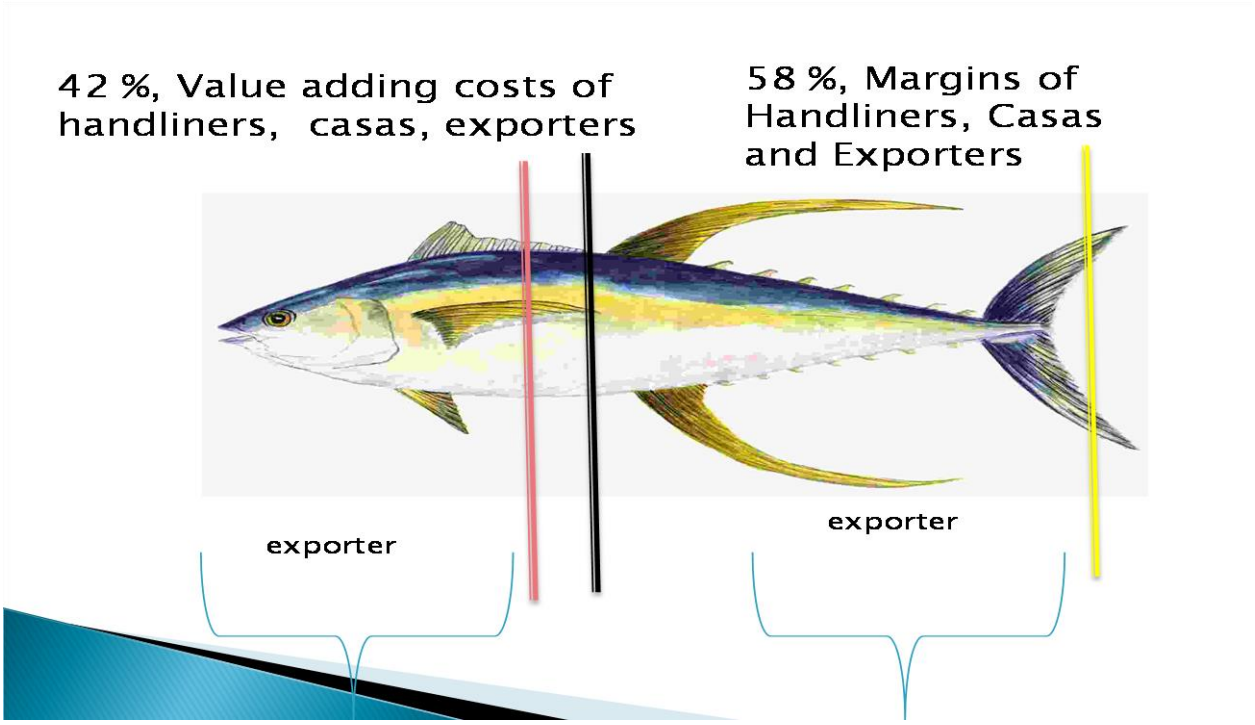
52. The value adding amount for the casa is P22 per kilo but it purchases tuna at P80/kilo (selling price of the fisher). Thus, the margins of casa owners depend on the prices at which the exporter is willing to buy. In order to earn a margin, the price must be greater than the value adding price plus the buying price or about P102/kilo. A buying price of P120/kilo will earn modest profits but lower than P100 will translate to losses. Compared to the fisher and the casa owner, the exporter earns the highest margins and that is mainly due to the higher cap on selling price which is dictated by the consumer.

Table 10. summary of value adding in the tuna export sector

Segment of Value Chain	*price*	*value adding*	*value adding + buying price*	*selling price*	*Margins*
handliners	*0*	*53*	*53*	*80*	*27*
casa	*80*	*22.00*	*102*	*120*	*18*
exporter	*120*	*234.58*	*355*	*731*	*376*

53. The total value of tuna is distributed to the three sectors as follows: i) handliners, 11%; ii) casa, 6%; and iii) exporter, 83% (Fig F). The percentage values consist of margins and value adding. For the latter, the exporters contribute 32% to the total value of tuna through the processing and transport. The fishers contribute 7% value adding due to the labor contribution while the casa contributes only 3% value adding.

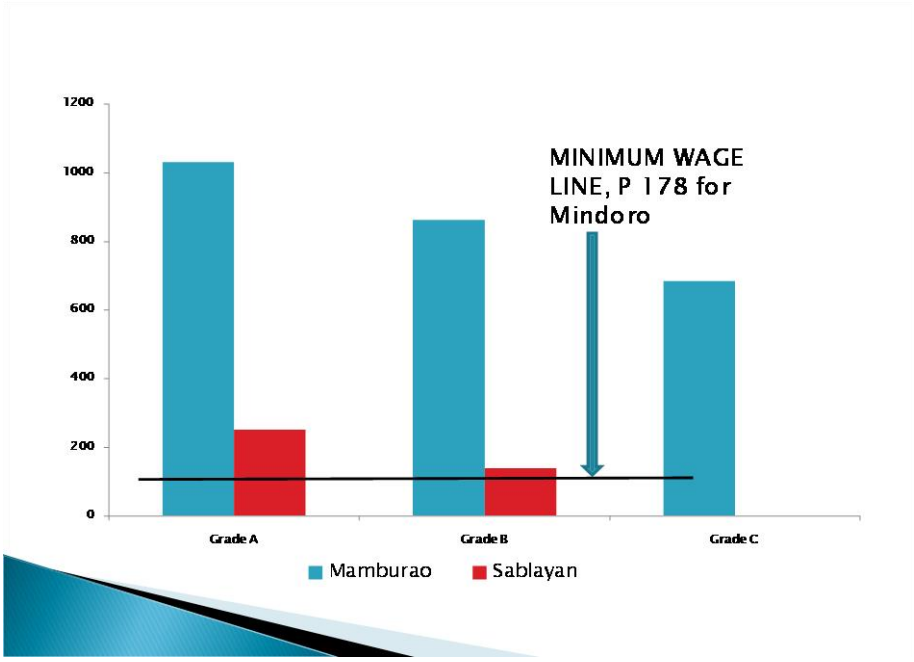
Fig. F. Distribution of value adding and margins made on tuna fishing, trading, and exporting.



I. Returns to Labor and Capital

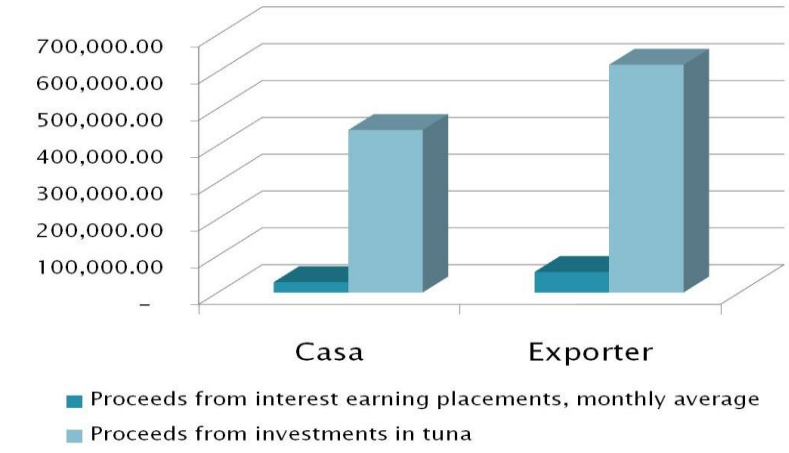
54. This study also uses the value chain analysis and the segregation of the different market segments as providing inputs of labor and capital to the production and marketing of tuna from harvesting through transport to final consumption. It can be said that if the factors of production such as labor and capital do not earn fair returns, then the activity may not be economically feasible or that some other sectors are gaining to the detriment of the market participants. In the harvesting sector, for example, the main input to the production process is labor and fuel. Thus, fair returns may be compared to the alternative use of labor. Although in most cases, especially in rural fishing economies, the alternative use of labor is low or close to zero, we shall assume that the opportunity cost is equal to the minimum wage. Looking at the net returns of the different catch categories (Fig. G) and labor share, the share of each unit of labor is higher than the minimum wage which implies that returns to labor are fair. The share of each unit was computed based on the information provided by the fishers during the FGDs which in local parlance is called “tersyiahan” or a derivative of the term 1/3. After deducting all costs, the net revenue is divided into 3 portions wherein 1/3 is assigned to the captain. The remaining 2/3 is again divided into 3 which is then divided among the captain and the 2 crewmembers. The same procedure was used to compare the returns to labor for Sablayan and Mamburao given the three types of grading and for the most part, the minimum wage is breached --- all the time for Mamburao and for grades A and B, for Sablayan. This generally augurs well for labor inputs.

Fig. G. Comparison of benefits accrued to labor viz. Minimum wage rate in Occ Mindoro



55. The same can be said for the owners of capital: the casa owner and the exporter. As the previous analyses will show, the casa owner invests in purchase of tuna and oftentimes provides financing for operational costs of handlining. The exporter also uses capital to purchase tuna from the casa or the fisher, transports the commodity to the holding area and eventually to the processing plant, processes and packs it in a form acceptable to consumer, and sends it by airfreight. These activities cost the casa owner at least 3 milllion a month assuming total amount of tuna handled is 20 tons and up while the exporter invests in at least 6 million for attendant costs. Yields from investing the same money in interest-bearing instruments ranges for P28,000 per month for the casa owner to P55,000 for the exporter but Fig H shows that net revenues from tuna are more than ten-fold. There are risks associated with tuna, however, and sometimes losses for extended months are also experienced.

Fig.H. Comparison of benefits accruing to owners of capital arising from investments in tuna trading vs. Investment in other interesting – earning assets.



J. Conclusions

56. Insights from the value chain analysis may be used for some policy interventions relevant to sustainability. This study considers sustainable tuna fishing operations as fishing using non-passive gears, non-IUU, and within limits recommended by stock assessment or best available evidence of sustainable yields.

57. Sustainably managing the fishery occurs at two levels: first at the macro level where the collective effort of all handliners is managed or controlled and second, at the individual fisherman level, where effort is also controlled. Profitable operations usually attract new entrants to the fishery; this is what theory dictates and this is what usually occurs especially in generally unmanaged fisheries. Lack of management controls in the handline fisheries of Mamburao and Sablayan may be gleaned from the absence of a licensing and registration system for boats and fishers, an information management system fully integrated with BFAR or BAS at the regional level, accurate catch statistics, and a market information system that broadcasts prices, for one. The cost analysis shows there is little information on licensing and registration and almost no costs incurred (whether this is accurate or not). Furthermore, there are no macro level statistics on fish catch that is available at the provincial or regional level which are deemed essential for management.

58. The second tier of management occurs at the individual fisher level. Generally, the handline fishery for tuna is profitable for all participants of the market chain. **Even if tuna is graded "C" or rejected for export, there is considerable demand from the domestic market that ensures profitability for tuna fishing.** The profits made even for lower quality tuna serve as disincentive for sustainable management. There might be some wisdom in imposing some sanctions against those who land tuna whose quality has deteriorated due to mishandling. The corollary to this is positive reinforcement, i.e., provision of incentives to those who perennially get high grades for their fish.

59. There are some hidden but essential participants in the value chain including the local government and institutions that support a uniform policy of conformity to sustainability parameters. The role of LGUs is highlighted in the provision of a policy framework that encourages sustainable practices to thrive at all levels of the value chain. Enforcement, environmental protection, and legislation that support these initiatives must be set in place. A foolproof registration and licensing system is a first step towards sustainability because management can only occur when the constituencies are clarified. LGUs may also provide a system of incentives/disincentives to encourage better handling practices. Information asymmetry and provision of adequate and up-to-date market information on prices and demand is also an essential role of LGUs. Meanwhile, the formation of institutions such as industry groups is encouraged in order to promote self-policing and to encourage cooperation.

60. Particular insights from the value chain analysis are summarized in the succeeding sections.

61. **Improving on value**. Each segment of the market chain can enhance the value of the product by performing some activities that may enhance pricing. For example, proper handling of tuna even at sea would ensure a higher chance of getting the Grade A rating. Perhaps investing in more ice and knowing the best practices in chilling tuna would be of help. At the casa level, improving the sanitary conditions and perhaps including semi processing activities would be another way of value adding.

62. **"Board and lodging".** For the handliner, tuna is free. This concept has been debunked many times over but implementing it is still very difficult. In order to veer away from the concept that tuna is free, fishers and all other market participants must be educated to accept the nurturing function of the ecosystems which allow for tuna to grow. Thus, the nurturing function has to be assigned to a particular management entity and this function carries with it some costs. One way of going about this is through a system of licenses or taxation for which the proceeds are devoted entirely to marine protection. It must be noted from this study that payments for licenses are either nil, non-existent, or not properly accounted for. Even the very basics of registering all fishing boats need to be complied with.

63. As the thinking on sustainability, accountability, and traceability continue to evolve, one of the management tools that may be considered is the imposition of a license fee for tuna fishing boats. Fees and licenses are not new tools; however, ***the basis for estimating the amount of license can be equated with the costs required for managing the municipal waters or MPA areas that are designed to ensure recruitment, protection of juvenile species, and maintenance of a healthy ecology.*** While it can be argued that tuna is a highly migratory species and that the nurture of tuna is not reliant on the waters of Mindoro alone, MPAs ensure that the species lower in the food web and associated habitats are maintained. Costs of maintaining MPAs may then be used as a proxy for the "board and lodging" of tuna. In the Apo Reef in Sablayan, the cost is estimated at P31 per hectare based on an annual cost of P1.2 million per year for gasoline, labor, and other operating costs[2]. Butardo-Toribio, Alino, and Guiang (2009) examined the cost of establishing and maintaining six (6) MPAs in Cebu and Zamboanga del Sur and yielded an annual cost ranging from P62,000 per year for Bibilik MPA to P600,000 per year for the MISSTA MPA (Militar, Sto. Nino, Sugod, and Tagulo) all of which are in Zamboanga del Sur. It must be noted, though, that the sizes of MPAs in this study range from 20 hectares (Bibilik MPA) to 180 hectares for Pilar Municipal Marine Park in Pilar, Cebu. Thus, the annual MPA costs per hectare was computed at a minimum of P360 pesos per hectare.

64. This amount can be shared between the Local government as a "steward" of the resource and by the fishers who are directly benefitted from protection and conservation activities. LGUs are compelled to allocate a portion of the annual budget for MPAs as steward for future generations of fishers, of fish consumers, and of the other citizens who must retain the option of using the resource whenever they want. Fishers and governments alike have been promoting the theory of "free access" to resources with all fishers having a claim or ownership therein; this is partly the reason why licenses are hardly imposed at amounts that reflect the real value of the resource, i.e., "just paying for paper and ink" is what is normally argued. The thinking which must be advanced now is that fishers are but one group of resource users and there remains to be a vast citizenry of resource users who may, at present, seem disinterested but who have real claims on the resource. A simple 50-50 sharing (P600,000 pesos or half of P1.2 million per year) between the LGU and fishers group yields a license of P750 per year, on average, based on about 700 fishers recorded for Sablayan and Mamburao.

65. Another alternative would be dividing the fisher's share by the estimated production and the fee imposed could be a landing fee so that it is not fixed but based on actual production.

66. **Price transmission.** The exporter is directly linked to the buyer, thus he/she can adjust pricing and purchasing behaviour relative to the prices negotiated for. He can maintain a comfortable margin by dictating the buying price of tuna from the casa. The casa remains to be the most volatile part of the chain where pricing is concerned. The casa merely passes on the price signal to the fisher but the fisher has options to whom to sell the fish and will almost always look for a higher price. A reliable fisheries marketing information system can address the problem of information asymmetry by broadcasting prices at the export and domestic market at all times. Included in the market information system would be specifications of consumers on the quality and type of processing required. This would further help to integrate the different market participants and not isolate one segment from another.

67. **Information asymmetry.** The grading process manifests a case of information asymmetry because there is no way to verify whether the grade given to tuna is accurate. Because of lack of information, this process may be subject to unfair practices.

68. **Risks.** A comparison of supply chain risks across the three major players in the yellowfin tuna value chain was based on a listing of risks (World Bank 2008) and evaluated against the three players (Table 11). Risks associated with the weather (including climate change) are most felt by the fisher due to day to day exposure to the elements. Weather risks are lower for the casa and the exporter expect in extreme weather conditions or disasters such as floods, earthquakes, fires and the like. Logistics and infrastructure risk is

[2] Source of costing is WWF Office in Sablayan.

highest for the exporter but lowest for the fisher due to the requirements (business permits, certifications, traceability, sustainability certification, etc) and physical transfers which are fundamental to exporting. Sanitary/phytosanitary risks are highest with the exporter level and this is mainly due to the large quantity of fish handled and the risk of spoilage while in transit. Risk of rejection to the exporter can be translated to its operating cost which is about P500,000 or about US$12,000 per shipment based on four (4) shipments per week. The fisher also faces some sanitary risks between the time the fish is caught and offloading to the casa due to handling practices.

69. The risk of labor disputes and other forms of unrest is lowest in the capture sector and highest in the exporter sector where labor is more likely to be organized, aware of their rghts and entitlements, and more demanding of fair practices. In the fishing sector, it is more of a way of life and a social undertaking and moreover, labor is easily replaceable by friend or next of kin.

70. Pricing risk is low for exporter because they are insulated from short term shocks brought about by changing demand for tuna. The fisher and the casa operator merely follows the price to be dictated by the exporter. One more category of risk was introduced to depict realities in the tuna sector (actually this applies to the capture fishing sector as a whole). This is the risk to life which is highest for the fisher due to exposure to the elements.

Table 11. Risk Analysis as Applied to Tuna Value Chain

Type of risks associated with participants in tuna sector	Handliners	Casa	Exporter
Weather including climate change	H	L	L
Price	H	M	L
Logistics	L	M	H
Infrastructure	L	M	H
Sanitary / Phytosanitary	M, handling from boat to casa can result to rejection	L	H, product rejection in exporting country is high
Labor	L	L	H
Environment (defined as impacts of environment on tuna rather than the other way around)	H	L	L
Policy	H	H	H
Life and property	H	L	L

Source : Adapted from Jaffee, Siegel and Andrews (2008).

K. Limitations of Study

71. If opportunities for further refinement of this value chain analysis present itself, it is recommended that a more thorough analysis of the domestic wholesale and retail sector is done including characteristics of participants and price movements. This sector also constitutes some level of demand that may drive prices. Another consideration is the relatively lower quality of tuna that is acceptable to the domestic market which may actually discourage fishers from striving to attain a grade A rating.

72. Likewise, the study was only limited to one exporter who has agreed to participate in the Fish Sustainability Pilot. In order to rein in the other exporters and encourage them to subscribe to the same standards and protocols for the project, it is also important to understand their behaviour and their business practices.

73. More reliable data on tuna catch rates must be gathered. The level of catch and seasonality are factors that greatly influence market behaviour; what has been generated by the questionnaire must be verified and contextualized using a macro level data collection such as that collected by BAS or BFAR for the MIMAROPA region.

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Annex A

Questionnaire on Pricing and Costing of Fishing Operations

Note: This is a rider to the Household survey and will focus on the estimation of costs (both financial and economic) and earnings of tuna fishers. Some information may overlap with Raoul's or RIc's; if such is the case, I leave it up to whoever will consolidate the questionnaire to delete as needed. I will be able to recognize my data needs in any case.

A. Personal Information
    a. Name
    b. Age
    c. Number of years fishing
    d. Boat owner (Yes or NO)

B. Fishing Operations
    a. Common fishing area: _____
    b. What type of gear is used? _____
    c. Is this gear used the whole year round? If yes, proceed to item e.
    d. What kinds of gears do you use other than that stated in item b. _____
    e. Please determine what types of gears are used on a monthly basis

	Jan	Feb	March	etc					
Gear 1									
Gear 2									

C. Quantity produced/traded
    a. Monthly average production, per species, per type of fishing group (handline/hook and line, in kg) _____
    b. Monthly average volume assembled/purchased, per species, per casa, in kg) _____
    c. Monthly average volume traded, per species, wholesaler and retailer, in kg) _____
    d. Monthly average volume exported, per species, per source, in kg) _____

D. Costs of Fishing
    a. What are the major expenses incurred per trip and how do these cost?
    b. Gasoline or Diesel _____

c. Food _____
d. Cigarettes _____
e. Kerosene _____
f. Bait _____
g. Etc _____
h. Etc

E. What are the other costs incurred in fishing
   a. Boat repairs? How much? How often
   b. Net repairs? How much ? How often
   c. Engine Repairs? How much? How often
   d. Taxes and licenses: how much and how often paid
   e. Commission to marketing agent or casa, if any
   f. Insurance?
   g. Landing fees or port fees
   h. Auxiliary invoice

F. Cost of labor
   a. What is the sharing arrangement?
   b. If you are a boat crew, how much are you paid per trip? _____
   c. If you are not fishing, what would you do for a living? _____
   d. How much would you be paid?

G. Pricing information
   a. Months in which highest price received (ex vessel price)
      i. How much
      ii. What species
   b. Months in which lowest price received(ex vessel price)
      i. How much
      ii. What species
   c. How is the ex vessel price determined? (just check)
      i. Offer is made by casa or buyer without negotiation ____
      ii. Fisher offers a price and negotiates with the buyer ____
      iii. Others

d. In your opinion, has price varied much over the last year on a month on month basis ? Why or why not?
e. How about over the last three years?
f. What do you think are factors that influence pricing?
    i. Does the price received cover much of the cost?

Annex B

Participants to the Focus Group Discussions

Sablayan, September 8, 2010

1. Vic Samson, Tuna Buyer and Grader
2. Neng Dalangin, Casa Owner
3. Imelda Ladao , Fish Buyer and Market Retailer
4. Mario Magayon, Diver, Fisher, Warden, and Boat owner
5. Lito, WWF
6. JR Briones, Fish Buyer, Grader
7. Jestoni Lachicha, Casa worker affiliated with Ludy Bico

Mamburao, September 9, 2010

1. Carmencita Yalung, casa operator and handline owner
2. Roberto Cueto, operates 3 handliners
3. Lorna Barrera and spouse, basing operator and casa owner
4. Abelle Pantoja, Casa Operator / Tuna Queen
5. 2 fishers of Abelle's casa
6. Municipal Agriculture Officer
7. Dr. Ging, Executive Assistant, Office of the Mayor
8. Arnold, Mamburao News