Cost-Benefit Analysis of Tuna Value Chain in General Santos City, Mindanao, The Republic of Philippines

Summary Report

March 2019

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ABSTRACT

This study examines the impacts of tuna value chain in the local economy by estimating net economic value addition and tax contribution per kilogram of tuna supply. The tuna chain comprises of fishers, traders, brokers, cold storage enterprises, tuna canneries and fresh and frozen tuna processors. CBA models are built for each stakeholder by using Harberger-Jenkins methodology. The results show that tuna value chain has positive impact in the local economy in terms of economic growth and tax revenue generation. The study also examines the economic impact of adopting electronic catch documentation and traceability services (eCDTS) in the management of tuna resources and the possibility of promoting it under public-private partnership arrangement.

INTRODUCITON

The analysis is based on desk studies and a weeklong fieldwork in General Santos City in January 2019. Both primary and secondary data are used in the construction of CBA models. In total, there are seven CBA models, which contain footnotes and reference tables for data sources.

The tuna value chain in the General Santos City area comprise of fishers, traders, brokers, cold storage businesses, canneries and fresh and frozen tuna processors. Among the fishers are in municipality, small scale, medium scale and commercial categories. General Santos Fish Port Complex is also part of the value chain but only in way of providing services on user fees.

Information for the models are collected from randomly selected stakeholders in each of the above categories and the results estimated based on per unit of raw tuna fish supply is considered appropriate to represent the entire tuna value chain in Region-12 of South West Mindanao, which records fish harvest of 87776 MT in 2017.

Harberger-Jenkins methodology is applied in the construction of CBA framework, estimate of foreign exchange premium and computation of economic values. The foreign exchange premium for the Philippines is estimated at 7% and the economic opportunity cost of capital is adopted as 10%, which is recommended by the National Economic and Development authority of the Philippines.

On the average, each CBA model has 15 tables, organized as table of parameters, preparatory tables, financial cash flow statements, economic resource flow statement, sensitivity analysis and cash flow statements from different stakeholders' point for view. The models are organized in worksheets, named after each model. Wherever needed the models are linked to other worksheets, for example, Data-Analysis and Economic-CF, to refer to the data source. A preliminary CBA model is also constructed for economic evaluation of eCDTS intervention. The details of the results are described below.

1. MUNICIPALITY FISHERS

About 17% of the total supply comes from the municipality fishers. Fishers operating boat of less than 3 GRT fall in this category. Some of the fishers own their own boat; some hire the boat on trip basis; and some work as team members. These fishers work 11 months a year, make 3 to 4 fishing trips in a month, and collect on the average 100 kg of large size tuna per trip.

They engage the service of traders and brokers for selling the catch. It is a standard practice to give 15% to traders and 5% to brokers on gross value at the fish market. The net of all the expenditures is split between the captain of the boat, boat owner and the fishing team members based on a pre-agreed formula. Sometimes the captain is also owner of the boat.

The financing of fishing trip is either done by the traders, organized by the owner of the boat or through local moneylenders, who charge as high as 5% interest rate for every fishing trip. This translates to 36% on monthly basis if the frequency of trip is three for each month.

Table; One below depicts the return on per kg of raw fish supplied. The boat owner or captain receives net income of 5.5 PHP, the other fishers get 0.87 PHP, traders get 1.24 PHP and brokers get 0.32 PHP. The municipality fishers contribute annually 156 million PHP to the economy in present value, which is the highest among the participating stakeholders in the value chain.

Table: One

	MUNICIPALITY FISHERIES	
Share	17.00%	
DISTRIBUTIONAL IMPACTS		
(a) Annual Supply	14921.92	MT
(b) Net economic value addition to the economy	10.42	PHP/kg on annualized basis
(c) Return to Entrepreneur	5.50	PHP/kg on annualized basis
(d) Return to Fishers	0.87	PHP/kg on annualized basis
(e) Return to Traders	1.24	PHP/kg on annualized basis
(f) Return to Brokers	0.32	PHP/kg on annualized basis
ECONOMIC IMPACT (2017)		
Annual Net Value addition to the economy	156	Million PHP
Annual Fiscal Impact	NA	

II. SMALL SCALE FISHERS

About 5% of the total supply comes from small-scale fishers. Fishers owning boats between 3 to 20 GRT fall in this category. Normally, boat owner is not the captain of the boat. The captain hires the boat, teams up with a group of fishers, and ventures into the sea, sometimes outside the municipality water, whose boundary is within 15 kilometers from the shoreline.

The fishing team could be anywhere between 10 to 20 members, use auxiliary boats to go beyond the mother vessel searching for good catches, and tend to make 2 to 3 fishing trips in a year. They focus at catching larger tuna, which commands better prices in the export market.

Small-scale fishers supply directly to the end users, benefit from fuel tax rebate and share net of expenditures revenue among the boat owner, captain of the boat and fishers. Rarely, the captain of the boat is the owner.

Table: Two below depicts the estimate of return to each stakeholder. Based on per kilogram basis, the boat owner receives 4.02 PHP, the captain of the boat receives 6.76 PHP and the fishers receive 0.69 PHP. The overall contribution of small-scale fishers to the economy is 42 million PHP annually---all in present value.

Table: Two

Share							5.00%			
DISTRIBUTIONAL IMPACTS										
(a) Annual Supply							4388.8	MT		
(b) Net economic value addition to the economy							9.55	PHP/kg on annualized basis		
(c) Return to Boat Owner							4.02	PHP/kg on annualized basis		
(d) Return to Captain and Helper							6.76	PHP/kg on annualized basis		
(e) Return to Fishers							0.69	PHP/kg on annualized basis		
ECONOMIC IMPACT (2017)										
Annual Net Value addition to the economy							42	Million PHP		
Annual Fiscal Impact							NA			

Iii. MEDIUM SCALE FISHERS

About 15% of the total supply comes from medium-scale fishers. Fishers owning boats between 20 to 60 GRT fall in this category. Normally, medium scale fishers operate as an enterprise, which has its own captain and a helper to manage the fishing operation.

The enterprise puts together a team of fishers who are provided with logistical support, including the expenses for food. The fishing team could be anywhere between 20 to 30 members and make 3 to 4 trips in a year. They focus at catching smaller tuna but with larger volume.

Medium-scale fishers supply directly to the end users, benefit from fuel tax rebate and share net of expenditures revenue among the fishers and the enterprise on a pre-agreed formula.

Table: Three below depicts the estimate of return to each stakeholders. On per kilogram basis, the enterprise receives 0.43 PHP; the fishers receive 0.21 PHP; and the government gets net tax contribution of 1.76 PHP. The overall annual contribution of medium-scale fishers to the economy is 42 million PHP and to treasury is 23 million PHP--- all in present value. The internal rate of return to the enterprise is 12.09% in real terms, just above the required financial rate of return.

Table: Three

Share							15.00%			
DISTRIBUTIONAL IMPACTS										
(a) Annual Supply							13166.4	MT		
(b) Net economic value addition to the economy							2.19	PHP/kg on annualized basis		
(c) Net Tax Contribution							1.76	PHP/kg on annualized basis		
(c) Return to Investors				IRR=	12.09%		0.43	PHP/kg on annualized basis		
(d) Return to Fishers							0.21	PHP/kg on annualized basis		
ECONOMIC IMPACT (2017)										
Annual Net Value addition to the economy							29	Million PHP		
Annual Fiscal Impact							23	Million PHP		

IV. LARGE-SCALE FISHERS

About 63% of the total supply comes from large-scale fishing operation. Enterprises owning vessels over 60 GRT, supported by carrier vessels, fall in large-scale operation. In this model two 100 GRT fishing vessels are supported by three 80 GRT carrier vessels.

The fishing vessels are always in the sea and the carrier vessels make 3 to 4 trips in a month. The captains and helpers in the ship are regular employee of the enterprise.

Teams of 40 fishers work round the year on each ship on net of expenditures income sharing mechanism. Such large-scale fishing enterprises supply the catch directly to the end users and benefit from fuel tax rebate.

Table: Four below depicts the estimate of return to each stakeholders. On per kilogram basis, the enterprise receives 0.12 PHP; the fishers receive 0.29 PHP; and the government gets net tax contribution of 0.12 PHP.

The overall annual contribution of large-scale fishers to the economy is 25.8 million PHP in net present value and 6.5 million PHP in net tax revenue. The internal rate of return to the enterprise is 18.11% in real terms, which is higher than that of medium-scale fishing enterprises.

Table: Four

Share							63%			
DISTRIBUTIONAL IMPACTS										
(a) Annual Supply							55298.88	MT		
(b) Net economic value addition to the economy							0.47	PHP/kg on annualized basis		
(c) Net Tax Contribution							0.12	PHP/kg on annualized basis		
(c) Return to Investors				IRR=	18.11%		0.10	PHP/kg on annualized basis		
(d) Return to Fishers							0.29	PHP/kg on annualized basis		
ECONOMIC IMPACT (2017)										
Annual Net Value addition to the economy							25.8	Million PHP		
Annual Fiscal Impact							6.5	Million PHP		

V. COLD STORAGE BUSINESSES

Typically, tuna canning companies maintain 1 to 3 months of raw fish inventories to avoid factory close down because of the interruptions in tuna supply. The General Santos City area has 50000 cold storage capacity, which enjoy 100% capacity utilization at present.

Table: Five below depicts the CBA results of a 10000 MT annual capacity cold storage enterprise. On per kilogram basis, this enterprise contributes annually 0.05 PHP in net economic value and 0.05 PHP on tax revenue.

Such cold storage facilities have similar cost structures and income profiles; therefore, the results are applied to the entire cold storage businesses serving the tuna value chain to estimate the aggregated impact.

In total, the cold storage businesses serving the tuna value chain adds 2.73 million PHP in net economic value and makes 2.30 million PHP in tax contribution. On the average, the cold storage business is generating internal rate of return of around 10%, which is close to the social opportunity cost of capital.

Table: Five

DISTRIBUTIONAL IMPACTS								
(a) Cold Storage Capacity					50000	MT		
(b) Net economic value addition					0.05	PHP/kg on annualized basis		
(c) Net Tax Contribution					0.05	PHP/kg on annualized basis		
(c) Return to Investors			IRR=	10.21%	0.001	PHP/kg on annualized basis		
ECONOMIC IMPACT (2017)								
Annual Net Value addition to the economy					2.73	Million PHP		
Annual Fiscal Impact					2.30	Million PHP		

VII. CANNED TUNA PROCESSORS

There are six canneries in the General Santos city area with per day operating capacity of 720 MT. All these canneries are working at less than the half of the installed capacity because of the shortages of raw tuna supply.

The results shown in Table: Six are generated by using cost structure of an 80 MT per day capacity cannery operating at 45% capacity utilization. At this level of operation, the financial internal rate of return for the plant is 7.84%, which is less than the social opportunity cost of capital.

Nevertheless, on per kilogram basis, the plant is economically viable generating 0.12 PHP in net present value and making net tax contribution of 0.09 PHP. These results if extended to the entire tuna canning industry the total economic value addition each year is 11.93 million PHP and tax contribution is 21.12 million PHP---all in present value.

Table: Six

DISTRIBUTIONAL IMPACTS								
(a) Canned Tuna Processing Capacity					225000	MT		
(b) Capacity utilization					45%			
(c) Net economic value addition					0.12	PHP/kg on annualized basis		
(d) Net Tax Contribution					0.09	PHP/kg on annualized basis		
(e) Return to the Investors			IRR=	7.84%	-0.020	PHP/kg on annualized basis		
ECONOMIC IMPACT (2017)								
Annual Net Value addition to the economy					11.93	Million PHP		
Annual Fiscal Impact					21.12	Million PHP		

VIII. FRESH AND FROZEN TUNA PROCESSORS

There are fifteen fresh and frozen tuna processors in the General Santos city area. Results in Table: Seven are generated by using cost structure of an 18 MT per day processor operating at 78% capacity utilization. At this level of operation, the financial internal rate of return for the plant is 9.76%, which is also less than the social discount rate.

Nevertheless, the plant is viable economically. It adds for each kilogram of processed tuna 1.96 PHP in net economic value and contributes 1.05 PHP in tax revenue.

These results if extended to the entire fresh and frozen tuna processing industry in General Santos City area the total annual contribution is 7.65 million PHP in net economic value and 3.90 million PHP in tax revenue---all in present value.

Table: Seven

(a) Fresh and Frozen Tuna Processing Capacity				5000	MT
(b) Capacity utilization				78%	
(c) Net economic value addition				1.96	PHP/kg on annualized basis
(d) Net Tax Contribution				1.05	PHP/kg on annualized basis
(e) Return to the investors	IRR=	9.76%		-0.012	PHP/kg on annualized basis
ECONOMIC IMPACT (2017)					
Annual Net Value addition to the economy				7.65	Million PHP
Annual Tax Contribution				3.90	Million PHP

IX. ECONOMIC VIABILITY OF eCDTS

The Oceans and Fisheries Partnership (USAID Oceans) implements the electronic catch documentation and traceability services (eCDTS) project in collaboration with Bureau of Fisheries and Aquatic Resources (BFAR). The existing documentation procedures implemented by BFAR involves twelve key steps for recording the tuna harvest, which is not economically efficient from the viewpoints of different stakeholders. The eCDTS when implemented would save time in the documentation procedure and provide clearer insight where the fish are coming from.

The economic benefits of implementing eCDTS would come from time saving in the documentation procedure, opportunity cost of the delayed consignment and effective monitoring of fisheries resources. In this analysis, only the economic value of timesaving in documentation procedure is incorporated, which amounts to reduction by 40% of the time required at present. The framework of estimation is given in WS; Economic-Evaluation: eCDTS.

The salary range of people involve in documentation related activities is assumed at 15000 PHP a month. At that salary, the opportunity cost per hour is 600 PHP. Using this value for time saved in handling the consignment per vessel per trip, the economic value of time amounts to 1500 PHP for BFAR and 1400 PHP for private companies on per vessel per unloading basis.

The eCDTS technology requires upfront investment of 10000 PHP on equipment and monthly access fee of 900 PHP to pay for the use of transponders. These costs when compared with economic value of time saved yield the benefit cost ratio of 2.81 for the private companies and 3.01 for BFAR.

This clearly hints at the possibility of engaging the end user companies for implementation of eCDTS in tuna value chain. A preliminary assessment suggests that eCDTS would be attractive to all categories of fishers if the frequency of port landing for delivery of tuna exceeds 5 times in a year.

CONCLUSION AND RECOMMENDATION

The tuna value chain in the General Santos City area of Philippines is important for the local economy. In present value, the value chain generates 274 million PHP in net economic benefit and contributes 57 million in tax revenue annually. In addition, it creates employment opportunities and fetches more than 350 million USD in hard currency.

Over fishing can deplete the precious tuna resources which have had been the mainstay of livelihood for the local population. Introduction of eCDTS has the potential to contribute towards better management of tuna resources and promote economic efficiency in operation of the tuna value chain.

A rigorous cost-benefit analysis of eCDTS is recommended for exploring a public-private partnership arrangement for wider application of eCDTS, which is being implement at present as a pilot scheme. The canning and fresh and frozen tuna processing companies are clearly the possible partners for public-private partnership arrangement.

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