The Value of Barbados' Fisheries: A Preliminary Assessment

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ABSTRACT

The value assigned to fisheries in the national economy is often based on the ex-vessel value of the fish landed. As the fish moves through various market pathways to the consumer, it increases in value with each transaction, and contributes to livelihoods. This additional value should be accounted for in assigning an economic value to fisheries and in determining the appropriate investment in management. A preliminary assessment of this additional value was carried out for the major fisheries of Barbados by: determining the pathways along which fish move from fisher to consumer, amounts moving on each path, and price increase at each step. Overall, additional value was about US$19 M, and was about 2.6 times the landed value of the fishery. This ranged from about 7.4 times the landed value for flyingfish to zero for sea urchins. The distribution of this additional value among reseller groups varied from being 68% for restaurants, 20% for processors/ exporters, 8% for fish fryers, 3% for vendors and <1% for supermarkets. These results underscore the need to value fishery products broadly, especially in a tourism economy where seafood is important mainstay of restaurants and fish fry operations.

KEY WORDS: Added-value, economics, valuation, fishery pathways

El Valor de las Pesquerías de Barbados: Una Evaluación Preliminar

El valor asignado a la pesquería en la economía nacional usualmente se basa en el valor ex -embarcación de la pesca desembarcada. En tanto la pesca se mueve a través de varias rutas de mercado hacia el consumidor, aumenta su valor en cada transacción, y contribuye a la subsistencia. Este valor agregado no debería tomarse en cuenta al asignarle un valor económico a las pesquerías y en determinar la inversión apropiada para su manejo. Una evaluación preliminar de este valor agregado se llevo a cabo para las mayores pesquerías en Barbados a través de: determinación de las rutas a través de las cuales se moviliza la pesca de pescador a consumidor, cantidades que se mueven por cada ruta, y el incremento del precio a cada paso. En total, el valor agregado fue alrededor de US$19M, y constituye aproximadamente 2.6 el valor al momento de ser desembarcado. Este varia desde 7.4 veces el valor desembarcado para el pez volador a cero para el erizo de mar. La distribution de el valor agregado varia entre los revendedores, siendo 68% para restaurantes, 20% para procesadores/ exportadores, 8% para ventas ambulantes de pescado frito, 3% para vendedores y <1% para supermercados. Estos resultados resaltan la necesidad de valorar ampliamente los productos marinos, especialmente dentro de una economía con base en turismo donde los mariscos son un importante soporte para restaurantes y ventas ambulantes de pescado frito.

PALABRAS CLAVES: Valor agregado, economía, valuación, rutas para mariscos

INTRODUCTION

Fishing and fish have been an important part of Barbadian commerce and culture from the earliest recorded times. The fishing industry has gone through many changes, particularly the offshore fleet. In the late 1950s, the fleet converted from sail to motor. The 'ice-boat' emerged in the 1980s and increased the fishing range of the fleet. The 1990s saw the appearance of longliners, which now number 30 or more. This offshore fleet, targeting flyingfish and large pelagics such as dolphinfish, tuna, billfishes, and kingfish (mainly wahoo), has been the mainstay of the industry. Fish complexes at Oistins, Bridgetown, Conset Bay, and Skeetes Bay have been built primarily to serve its needs. A processing industry has emerged to clean, cut, and package these products for local and export markets.

Though small, the inshore fisheries are no less a part of Barbados' fishing culture. Sea eggs, reef fishes (pot fish), snappers and brims, jacks, and sprats are key examples of the resources harvested from the island shelf and the deeper waters of its slope. Less important, but nonetheless contributing to the overall fishery picture for Barbados, are lobster, conch, and seamoss. These inshore resources are taken by a variety of fishing methods — diving, spearfishing, handlines, traps, cast nets, and seine nets among them. The inshore fleet comprises a large

number of small open vessels (moses). For a fuller description of the Barbados fishing industry see Willoughby 2000.

Fishing adds much to Barbadian life. It provides an important and readily available source of food of the highest quality. It also provides a means of livelihood for many people. Those who catch fish, sell fish, and process and distribute fish are estimated to number more than 6,000. Those who cook and serve fish, whether in exclusive restaurants, at fish fries, or the numerous rum shops across the island have not been counted. They all owe their living, either in whole or in part, to these resources. Numerous others make a living by supporting the industry. Some build, sell, and maintain the boats, their engines, and all the fishing and electronic equipment that they carry. Others sell and service the vehicles and equipment involved in transporting, processing, and exporting fish.

The fishing industry is important in other ways as well. It provides an important input to the tourism industry. Flyingfish, dolphinfish, kingfish, and tuna are perennial favourites with visitors. Recently, fish fries have emerged as a major feature and attract large numbers of locals and visitors. Fish exports are on the increase, providing foreign revenue. Last but not least, when we consider the value of the Barbadian fishing industry, we must take account of the colour and interest that the fishing industry adds to Barbadian life and culture. It fascinates locals and visitors alike and inspires our artists. And there is the Oistins Fish Festival.

Unfortunately, the true value of the Barbados fishing industry to the economy of Barbados has never been properly assessed. Only the ex-vessel value of the fish landings is reflected under fisheries in the GDP estimates of Barbados. Clearly, as fish pass from hand to hand along various pathways and finally to consumer there is considerable value that is added along the way. To obtain a true picture of the market value of the fishing industry, this added value must be included. In this report we make a preliminary attempt to assess the added value by:

i) Identifying the pathways along which fish and fish products flow.
ii) Estimating the value and value added of fish and fish products at each stage in each path.

We re-emphasise that fisheries may also have considerable value in several other ways that this study has not explored. These include:

i) The value of the support services to the fishing industry;
ii) The value of fishing and fish products in attracting visitors to the island;
iii) The value of fish as food in maintaining the health of Barbadians, and thus educing health costs; or
iv) The value of fisheries in the culture and identity of Barbadians.

Each of these can be assessed using appropriate methods, but valuing them must wait for later.

METHODS

The first step was to:

i) Construct for each fishery type a diagram showing the pathways that fish follow from the fisher to the consumer; then
ii) Starting with the total estimated landings in each fishery type, estimate the percentage that moves along each pathway. This was done separately for each type of fishery because in different types of fisheries, products may follow different pathways, or the same pathways in different proportions. The average annual landings for the five-year period 1999 to 2003 were used in this study.

Finally, the price that the fishery product was sold for at each step along the path was estimated. The sale of fish from the fisherman to the first buyer provides the landed or ex-vessel value of the fish. At each step after that, the difference between the purchase price of the fish and its selling price, provides the price increase or value added. By multiplying the total amount of fish by the value-added per kilogram, the total value added was calculated. Whenever fish was actually processed or changed form by cleaning, deboning, or preparation for cooking, a 20% loss figure was applied to account for unused parts.

The accuracy of the estimates of value is a matter of concern. Much of the information required was available from records at the Fisheries Division, or was obtained from interviews with Fisheries Division staff. The Fisheries Division routinely collects information on total amounts of fish landed and on selling prices at major landing sites. Their estimates of total landings by category are the starting point for this preliminary valuation. This information was supplemented by conducting rapid surveys and came from a variety of sources: fish boners/scalers, vendors/hawkers, fish processors, restaurants and hotels, supermarkets, and fish fry vendors. Surveys were carried out on the south and west coasts of the island, with three hotels and five restaurants surveyed on each coast. The sample population was derived from the hotels and restaurants catering to a broad base of clientele, i.e. local and foreign. Prices used are annual averages. These are known to vary seasonally, but it was beyond the scope of this project to attempt a seasonal breakdown. Information on amounts of fish taking various pathways was sometimes arrived at by deduction.

The estimate for sea urchins was derived from data provided by McConney *et al*. (2003). It was based on estimated numbers of full-time and part-time fishers and their average respective earnings per season as reported in a survey. Owing to problems with willingness of fishers to provide information on earnings and uncertainty regarding

numbers, and designation of part-time and full-time status, this estimate is considered to be one of the least reliable.

Two types of fishery are missing from this valuation study, because the products are seldom sold in the regular market places. These are conch and small inshore pelagics called 'sprats'. There are no substantial conch resources in Barbados, although conch can be found scattered throughout the island shelf wherever appropriate habitats occur. When divers encounter these they are taken and sold locally to known buyers or to restaurants. Sprats, likewise are sold locally to consumers on the beach or as bait. There are no data for these fisheries from which to develop estimates. Since most is sold directly from fisher to consumer, the value-added is likely to be minimal.

RESULTS AND DISCUSSION

The results of the survey are displayed in the form of path diagrams and value added tables for each species or group. In the path diagrams, the percentages of fish moving from each seller to the various buyers are shown. A thicker line is used to indicate path steps in which the 20% loss factor was applied. The value added table for each species or group shows the actual quantities and prices of fish as it passes from one form to another and one path component to another.

Flyingfish and large pelagics had the most complex pathways, often involving export (Table 1, Figure 1). Coastal resources that were most often sold directly to consumers had the simplest pathways (Figure 2).

Table 1. Example of calculation of added value for flyingfish (US$).

Form	Seller	Buyer	Percent	Amount (kg)	Price (US$)	Price difference	Value/ Value added
Whole fish	Fisher	Vendors/hawkers	25%	378,669	$1.27		479,016
		Processors	45%	670,870	$1.01		677,579
		Fish Fry	9%	134,174	$1.45		193,881
		Consumer	21%	307,109	$1.45		443,773
	Total Landings (kgs)			**1,490,822**			**1,794,249**
Deboned	Vendors/ hawkers	Restaurants	46%	174,188	$3.15	$1.89	328,344
		Consumer	54%	163,585	$1.77	$0.51	82,610
	Processors	Consumer	1%	5,367	$5.30	$4.29	22,997
		Restaurants	86%	461,558	$4.85	$3.84	1,772,385
		Supermarkets	8%	42,936	$4.55	$3.54	151,992
		Fish Fry	1%	5,367	$4.65	$3.64	19,536
		Export Market	4%	25,158	$4.78	$3.77	94,844
	Supermarket	Consumer	55%	23,615	$5.30	$0.75	17,593
Cooked	Restaurants	Consumer	100%	600,909	$21.93	$17.08	10,260,514
	Fish Fry	Consumer	100%	159,332	$11.18	$6.40	1,019,722
	Supermarket	Consumer	45%	19,321	$9.49	$4.94	95,349
Value added by deboned and cooked flyingfish							**13,865,887**
Overall value of flyingfish fishery outputs							**15,660,136**

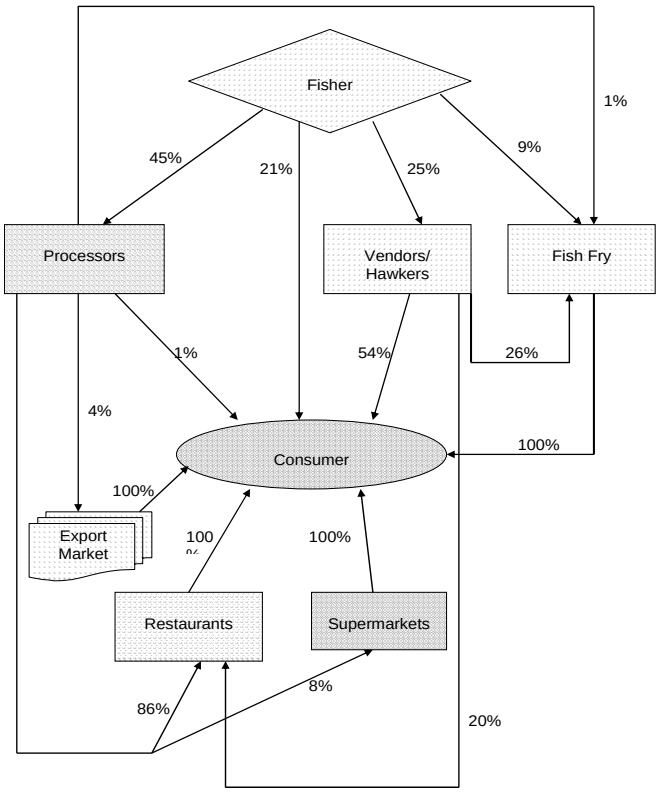

Figure 1. Path diagram for flyingfish.

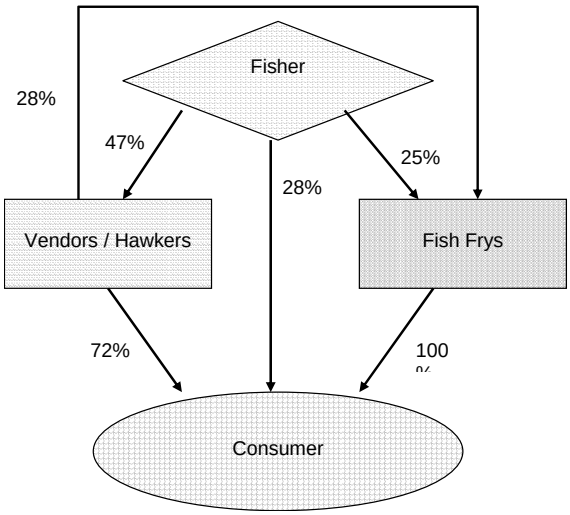

Figure 2. Path diagram for reef fish.

This study shows that the total value of the fish landed in Barbados is considerably greater than its ex-vessel value (Table 2). The value added component ranges from 0% in the case of the 'all others' category to 88% of the total value in the case of flyingfish. It is higher for offshore fisheries, the catch of which is processed, exported and is the main attraction at fish fries and restaurants, than it is for inshore fisheries, the catch of which is most often sold directly to consumers.

When the value-added is broken out according to who sells the fish and to whom, it shows that the majority of the additional value is derived from sale of cooked fish to consumers in restaurants and at fish fries (Table 3). Vendors and processors (however) generate appreciable amounts of addition al values as they transport, clean and market fish.

This was a preliminary study with limited time and funds. Hence, several data gaps were identified. These will need further research.

i) Fish-fry vendors did not provide access to records of their purchasing and re-sale practices therefore the estimates are based on verbal information.
ii) There are no records of landings for lobster, sea urchins and conch. These resources are considered high valued by various players in the "value-added chain".
iii) There is no information on other establishments such as rum shops and small restaurants that are know to frequently sell fish. The large number of these warrants further investigation, as due to their large numbers, they probably add significant overall value.
iv) No information was obtained on the contribution from food processors making fish products.
v) Prices were averaged since there were a range of prices available for each category of seller.
vi) The locations of the survey should be extended, to receive a more representative contribution from the fishery resources.
vii) Consumers are varied and there is the need for a better understanding of their characteristics.

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Table 2. The value added for different fisheries (US$).

Fish Type	Ex-vessel value	Value added (% of total)		Overall value
Flyingfish	1,794,249	13,324,338	(88)	15,118,587
Dolphinfish	2,502,692	3,001,173	(55)	5,503,865
Tuna	701,425	1,217,695	(63)	1,919,119
Billfishes	307,805	327,302	(52)	635,107
Swordfish	96,522	61,518	(390	158,040
Kingfish	133,459	92,141	(410	225,600
Subtotal - offshore	5,536,151	18,024,168	**(77)**	23,560,319
Snappers	82,150	122,964	(60)	205,115
Shark and barracuda	44,721	42,317	(49)	87,037
Lobster	3,934	3,888	(50)	7,821
Jacks	29,626	16,898	(36)	46,524
Bonito	4,885	4,684	(49)	9,570
Reef fishes	44,657	28,028	(39)	72,685
Sea eggs	1,387,500	0	(0)	1,387,500
All others	201,048	28,890	(13)	229,938
Subtotal - coastal	1,798,520	247,669	**(12)**	2,046,189
Total	7,334,672	18,271,837	(71)	25,606,508

Table 3. The value added by different sellers according to category of buyer.

Seller	Buyer	Value added	(%)
Vendor	Consumer	232,200	1.3
	Fish fry	94,747	0.5
	Restaurant	262,675	1.4
Subtotal		589,621	3.2
Processor	Consumer	191,933	1.1
	Export	791,868	4.3
	Fish fry	91,458	0.5
	Restaurant	2,319,276	12.7
	Supermarket	245,168	1.3
Subtotal		3,639,703	19.9
Restaurant	Consumer	12,409,891	67.9
Fish fry	Consumer	1,559,407	8.5
Subtotal		13,969,297	76.5
Supermarket	Consumer	73,215	0.4