The Marketing System of the Artisanal Fishery of the Cartagena Area, Colombia

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RESUMEN

El sistema asociado con el mercadeo de pescado marino en el área de Cartagena está bastante relacionado con los papelas tradicionales socio-económicos de los participantes de ese sistema. Los pescadores viven a un nivel de subsistencia. Como grupo están mal organizados y no llevan casi ningún control de los precios y poco control de las personas a quienes venden el pescado. Los mayoristas, por otra parte, poseen los medios de preservación y transporte del pescado; su nivel socio-económico es relativamenta alto dentro del pueblo pescador y son, frecuentemente, acreedores de los pescadores. Tienen el control principal de los precios y su movilidad les permite mantener el flujo de producto a los vendedores y a los consumidores.

Los suministros disponibles de pescado no necesariamente influyen en los precios, pues la pesquería, en general, es subdesarrollada con respecto a la demanda consumidora del pescado, y debido al poder de control de los precios que poseen los principales mayoristas del área. Entonces se presenta la tendencia de un sostenimiento artificial de precios, en vez de un sistema de precios basado en la relación entre suministro y demanda.

INTRODUCTION

A few previous studies have touched upon the basic market structure of the artisanal marine fishery in the Cartagena area. Ripley (1963) in an AID-Colombia study recommending fishermen's cooperatives and Cordini (1965) in a FAO survey of Colombia's fisheries both recorded the fishing system and noted the potential for development of the fishery beyond its then, subsistence level. Ciardelli (1967) noted inadequacies in the catch data collection system (upon which both Ripley and Cordini relied for their data on landings) and recommended ways in which to improve its reliability.

Despite the observations and recommendations resulting from these three works, plus at least two attempts to organize fishermen's cooperatives in the area, little has changed in the entire system since the earliest recommendations 15 years ago. However, none of these past investigations attempted to analyze the socioeconomic relationships that sustain the system - information that is tantamount to designing any successful program that expects to inject change to improve fisheries production and fishermen's standard of living within a system embedded in almost 400 years of tradition.

The purpose of this paper is to define the market structure of the artisanal fishery in Cartagena, and provide understanding of the roles of its participants and how they are maintained. Investigators who have tried to acquire quantitative data, as outsiders to the culture they were studying, must know that it is an extremely difficult task to gain the acceptance of culture members

in order to obtain reliable data. The process is lengthy, often frustrating, and our experience has been no different. We are just now beginning to realize returns of reliable quantitative data. For this reason, the majority of observations offered in this paper, while precise in representing the situation, are still qualitative in nature.

Geography and Demography of Area

Cartagena, as one of three principal shipping, industrial and tourist centers on the Colombian Atlantic, is thought to have a population of approximately 500,000 and is surrounded by nine coastal villages of up to 9000 inhabitants each. Five villages are accesible by land transportation, the rest are within 2 hours by motorized launch.

The fishing area considered is the stretch of coastline NE and SW of Cartagena, a distance of 51 km (32 mi.) from the village La Boquilla, south to the Islas del Rosario. This area includes Cartagena Bay, an area of 83 km^2 (32 mi^2). Depth of the fishing grounds is mainly less than 50 fathoms, including mangroves, estuaries, beaches, fringe and patch coral reefs as well as coral and mangrove islands.

SUMMARY OF FISHING METHODS AND GEAR

Vessels

Fishing is done from dug-out canoes between 3 and 7 m in length with a hold capacity of a few kilograms to a few tons. Canoes are propelled by paddles or sails, but recently some outboard motors are used. These are mostly of Japanese and American manufacture, commonly up to 40 Hp. The majority of the canoes are under 6 m in length without motors. Thus, the effective radius of canoe fishing, time of embarkation and selection of fishing grounds are limited to sites within a 20km radius of the village of origin, and the fishing periods limited by the energy resources of the fishermen and, of course, the weather.

Proprietorship of canoes will be discussed further in the relationships between fisherman and fish broker, since in many cases fishermen rent canoes and fishing gear.

Fishing Seasons

Fishing is done 5 to 6 days a week. Fishing may be done Sundays and holidays if there has been a previous spell of bad weather. Fishermen embark at dawn or nightfall and return some 5 to 7 hours later. Fishing trips away from the village may last 4 to 5 days, but this is only the case with fishermen who are accustomed to open sea navigating, and not for fishermen from bayside villages, who are generally fearful of open waters.

Fishing is done year round, although the best fishing is reported to be from September through May. However, the windy season, December to March, does not allow much open-sea canoe fishing and the 1977 closure of fishing in Cartagena Bay due to mercury contamination has greatly restricted alternative sites inside the Bay during this season of the year.

Fishing is done in conjunction with cultivation of crops so there is a fluctuation in number of fishermen active in the fishery by season and according to

the crops they cultivate. In the Cartagena Bay area are estimated to be 600 full-time fishermen, a portion of the total fishing population.

Gear

The most common types of gear employed are single hook handline, beach seine ("chinchorro"), cast net ("atarraya"), set gill net ("trasmallo"), dynamite fish traps ("nasas"), and harpoon gun, or diving.

Handline is by far the most common technique since it is the cheapest unit of gear to own and operate by one man. Beach seines require a smooth, sandy beach and between 8 to 15 men to make a set. Gill net and cast net are more versatile, for mangroves shores, bays, beaches or rocky shores and shallows, but are still expensive to own and maintain (Table 1 lists current prices of vessels and gear). Dynamite use is significant — though it is costly and open sale prohibited — in catching baitfish as well as commercial-size fish.

Traps commonly made of bamboo or nylon net with frame, are frequently used, but probably are an underdeveloped technique for finfish. Diving and harpoon fishing are least important for taking fin-fish, but are more common for catching lobster and crab.

Table 1. Current prices, fishing gear and supplies*

Item	US$
Ice	
wholesale, ton	15.78
retail 0.5 m^2 block	1.31
Fish hooks # 6, iron per 100	5.26
Line, nylon 3-ply multifilament, per kg	5.26
Line, nylon monofilament 10-20 lb test per meter	.08
Cast net, 6 m x 6.7 m, 8 cm stretch mesh, labor and materials	76.05+
Gill net, 3-ply multifilament 2- 4 inch stretch mesh per 100 m	263.15
Beach seine, 3-ply multifilament 80 fathoms (146.3 m) x 2m	1,578.95
Outboard motor 20 HP	973.68
40 HP	1,473.68
Gasoline per gallon	0.33
Outboard motor oil 30 per quart	1.18
Dugout canoe 5-7 m, untarred, unpainted	263.16-394.74

* Current prices and estimates, Cartagena 1978, $ Col 38 = 1 $US.

\+ Estimates based upon costs determined by Verreth J., Wahle, B. and Rud, J. 1977.

Table 2. Common commerical species, seasons of abundance and retail prices, Cartagena Public Market.*

Family	Common name	Seasons of abundance by month‡	Retail market price $ US/kg+
CARANGIDAE			
Caranx fusus	Blue runner	Oct. to Feb.	1.05
Caranx hippos	Crevalle jack	Oct. to Dec.; Mar. to Jun.	1.31
Caranx latus	Horse-eye jack	Oct. to June	1.05
Chloroscombrus chrysurus	Bumper	Nov.; Apr., to Jun.	1.05
CENTROPOMIDAE			
Centropomus undecimalis	Snock	Year round	1.31
ELOPIDAE			
Elops saurus	Ladyfish	Mar.,Jun.,Oct., Nov.	0.79
Megalops atlanticus	Tarpon	Oct. to Dec.	1.45
GERREIDAE			
Eugerres plumieri	Striped mojarra	Year round	1.05
Gerres cinereus	Yellowfin mojarra	Mar., Apr., Jun., Jul.	0.79
LUTJANIDAE			
Lutjanus analis	Mutton snapper	Oct. to Dec.	
Lutjanus apodus	School master	Oct. to Dec.	
Lutjanus jocu	Dog snapper	Apr., Jul.	1.84
Lutjanus synagris	Lane snapper	Oct., Feb., Mar., Jul.	
Ocyurus chrysurus	Yellowtail snapper	Oct., Nov., Apr., Jul.	
MUGILIDAE			
Mugil brasilensis	Pacific mullet		
Mugil curema	White mullet		
Mugil incilis	Tropical mullet	Oct., Nov., Mar.	0.66
Mugil liza	Liza		
Mugil trichodon	Fantail mullet		
POMADASYIDAE			
Haemulon plumieri	White grunt	Oct., Jul.	1.05
SCIAENIDAE			
Cynoscion jamaicensis	White sea bass	Mar., Apr.	
Larimus breviceps	Drum	Nov., Feb.	0.79
Menticirrhus littoralis	Gulf kingfish	Nov., Jul.	
Umbrina coroides	Sand drum	Nov., Apr., Jul.	
SCOMBRIDAE			
Scomberomorus maculatus	Spanish mackerel	Oct., Nov., Dec., Jul.	1.31
Scomberomorus regalis	Cero	Oct., Apr.	1.31
SPHYRAENIDAE			
Sphyraena barracuda	Great barracuda	Year round	1.05

* Taken from data collected October, 1977 to August, 1978, species representing 10% or more of total observations.

+ Price in $US, using exchange rate $38 Col/$US

‡ Determined by frequency of appearance in market place (n=8)

Catch Composition and Species Sold

Composition of the catch varies, of course with types of gear and time of year. Cast nets that are most commonly deployed in estuaries, creek outlets or beaches, frequently yield species such as mullets (Mugilidae), mojarras (Gerreidae), catfish (Ariidae) and snook (Centropomidae). Beach seines yield similar catches from beaches near freshwater outlets and also capture pelagic species such as jacks, pompanos (Carangidae), barracuda (Sphyraenidae) and herrings (Clupeidae). Handlining is responsible for most catches of snappers (Lutjanidae) and grunts (Pomadasyidae). Catches from dynamite, traps, and gillnets are generalized in their composition.

There have been no studies on catch per unit effort for gear types in this fishery, and official data taken at embarkation sites is unreliable in providing total catch estimates. Rough estimates indicate a marine catch from the artisanal fishery at 1,500 tons per year in Cartagena.

Some 110 species have been recorded in the Cartagena market since October, 1977. Table 2 provides the list with seasons of abundance and market retail prices for some representative of principal families.

Other species are certainly captured more frequently than appear in the market, but their desirability as a marketable species is not as great, so they are kept for family consumption or bait. Examples are parrot fish (Scaridae), squirrelfish (Holocentridae) and herrings (Clupeidae).

Preservation and Processing of Catch

Marine fish is most commonly sold fresh by round weight or by unit at all levels of trading. Preservation is all but nonexistent. Few fishermen use ice, due to its cost (Table 1) or non-availability in the village. Loss of catch due to spoilage has been observed to be a problem, but its extent has not been measured.

Most fish brokers have an ice box for their boat, car, truck, or at the landing site and market place. In the public market at Cartagena, of 99 regular vendors, there are five ice boxes to hold fish from one day's trading to the next. Only two commercial processors in the area are known to have freezer plant facilities.

What little processing is done from fisherman to consumer, is usually done at time of purchase in the market place. Some vendors eviscerate and scale fish when it is sold.

Some marine fish is sold fried in the market place, usually species that do not preserve well compared to others. In contrast to marine fish, river fish is commonly sold and preferred salted, dried or fileted, in the Cartagena market.

Table 3 lists prices of marine species versus freshwater (river) species at various trade stages.

FLOW OF PRODUCT

Fish is usually purchased from fisherman by fish brokers at the landing site in the village, on the fishing grounds themselves, or at the embarkation site in the Cartagena market. Since few fishermen can afford ice to maintain the catch, they must sell it directly upon returning from the fishing grounds.

Table 3. Price progressions from fisherman to consumer

Scientific name	Common name	Broker Price to fishermen	Cartagena broker price to lesser intermediary	Cartagena retail price
River Species		Prices expressed in $US/kg*		
Prochilodus reticulatus	Bocachico	0.32+	-	1.83‡
Ageneiosus caucanus	Doncella	0.32+	-	-
Pseudoplatystoma fasciatum	Bagre Tigre	0.69+	-	2.68‡
Plagioscion surinamensis	Pacora	0.28+	-	1.49‡
Marine Species		source: La Boquilla ++		
Lutjanus sp./Ocyurus sp.	Snapper	1.05	1.57	1.66 a
Scomberomorus maculatus	Mackerel	1.05	1.57	1.57 a
Haemulon sp.	Grunt	0.52	0.66	0.92 a
Sphyraena barracuda	Barracuda	0.66	1.31	1.57 a

* exchange rate used $Col 38/1 $US
\+ source: Verreth et al. 1977, mean price.
‡ source: Valderrama, 1978, mean price.
++ n = 1
a Prices from December, 1977 to July, 1978, n = 6. Prices are estimated, since although prices are quoted by weight, fish is not actually weighed by vendors when sold

Fishermen may also sell directly to consumers or to minor intermediaries at the landing site or market.

Fish brokers transport fish by means of boat, car, or truck - maintaining it on ice - to the public market or to another city, such as Barranquilla or Medellín, which may be an endpoint or a distribution point for shipment to Bogotá.

Brokers may sell wholesale to minor intermediaries, including vendors, in the public market but some do sell retail to consumers, also. Both brokers and minor intermediaries may sell to stores, hotels and restaurants. Minor intermediaries may also sell door to door through residential areas.

Figure 1 shows schematically, the flow of product through the market.

ROLES AND RELATIONSHIPS OF THE PARTICIPANTS IN THE MARKET SYSTEM

The socioeconomic role and relationship of fishermen and intermediaries

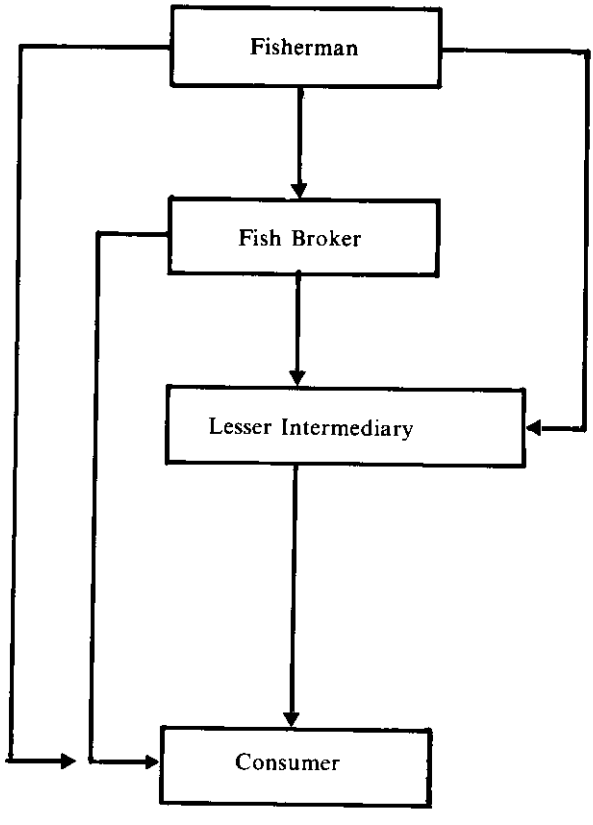

Figure 1. **Fisherman:** (1) Feeds family, (2) Shares with owner of fishing gear, (3) Shares with creditors for loan payment, (4) Sells to public, (5) Sells to lesser intermediary, (6) Sells to fish broker; **Fish broker:** (1) Buys from fisherman, (2) Sells to public, retail, (3) Sells to lesser intermediaries, wholesale, (4) Sells to restaurants, grocery stores; **Lesser intermediary:** (1) Buys from fisherman, (2) Buys from fish broker, (3) Sells to public retail, (4) Sells to restaurants, stores, residences.

are the most important factors in perpetuating the marketing system. A profile of the participants is presented, with a discussion of how those roles are maintained.

Fishermen

Fishermen are at the bottom of the socioeconomic scale. They all but lack formal education and rarely is it presented to them or their children. Technical knowledge of fishing, navigation, and the sea, outside their limited realm or experience is also very naive. Ineffeciency steeped in superstition and tradition govern fishing philosophies and techniques. Conformity and social

acceptance is important to the individual as well as to group identity, therefore there is neither present the social atmosphere for inventiveness or experimentation, nor is there rapid acceptance of innovation when it does arise.

Fishermen recognize that improving their efficiency and range could improve catch and subsequently their livelihood and they are enthusiastic for a plan. However, they are still expectant of the paternalistic initiative of government agencies to embark on a plan for them. Besides this, financial aid to fishermen is considered a risk that credit agencies such as banks or government loan programs do not wish to take. In short, fishermen and their fraternal organizations have little faith in the promises of government agencies because of their poor past completion record and crediting agencies in turn, have no faith in fishermen as borrowers since they are stereo-typically judged to be lazy and not goal oriented.

Fishing may be a part time or full time venture. This refers to the time spent fishing relative to other earning enterprises such as agriculture, bricklaying, carpentry, and commerce. Few are actually full-time fishermen all year. Existing states of technology of gear and the vessel range in the artisanal fishery limits the scope of potential fishing especially during the windy season of the year. Therefore a fisherman could probably not depend solely upon fishing, using his primitive gear, even if he wanted to.

Some part-time fishermen enter the fishery only at certain seasons when opportunity is great or their other income enterprises are at a lull.

Family participation in the fishing operation includes male adults and youths in fishing; women, girls, and some younger boys in sales.

Income derived from fishing is almost impossible to determine. Few fishermen are aware of their income in general, much less their income from fishing alone. Costs are rarely considered — fuel, ice, opportunity cost of time, depreciation of gear or amortization — relative to or the sale of catch.

Ownership of canoe and gear is variable. Gear and/or canoe may be owned and shared by the fisherman and his family or, as in many cases, it may be rented for the price of a portion of the catch or for the obligation to sell the catch to the gear owner.

In cases of shared labor, as is the case in participants in beach seine sets, payment in catch is according to each man's status in the hierarchy with respect to ownership of canoe, gear, and leadership of the group.

Fish Broker (Fishtrader; Mayorista)

Fishbrokers occupy the most powerful role in the market system. The broker is well-established socioeconomically in the fishing community, and though not necessarily resident of the village, his family is well known to the village inhabitants.

He is not necessarily a full-time broker, but may be known to fishermen from some other type of enterprise, for which he is trusted in his relationship with the fishing village.

The broker owns a means of preservation of fish, consisting at least, of an ice-box. He also owns one or more conveyance for transporting fish, i.e. canoe with motor, launch, freight boat, car or truck, and is therefore highly mobile within his territory. Because of this mobility, he maintains his sales

and is not affected by poor fishing in one area as he has the capability to look elsewhere for supplies of fish.

Due to the status held by the broker in the community, and his established financial situation, he is also a creditor of fishermen. Loans may be personal or related to fishing gear. It is through these terms, therefore, that the broker maintains his relationship with fishermen to retain their allegiance to sell their catch to him, or cancel their loan obligations by payment in fish. This of course, perpetuates the fish broker's role amongst fishermen - maintaining his public relations and his financial hold over them.

Fish brokers may supply fishermen with fuel and ice, discounting these costs from the catch when it is sold. Some fishermen also have said that the fish broker will supply dynamite for bait fishing. This is likely, since dynamite is expensive and the cost would be prohibitive to most fishermen. Considering its widespread use and the fact that it is legally prohibited, the supplier must be relatively mobile and someone readily accessible to fishermen.

Fish brokers are also frequently owners of canoes and fishing gear which are rented to fishermen for a portion of the catch and/or the obligation to sell the catch to the broker. Normally the canoe and gear owner outfits 2 fishermen, supplying bait, gear, ice, and food for the crew in exchange for a share of the catch, say 30%. In addition, the fishermen are then obligated to sell say another 60% of the catch for the broker's price, leaving fishermen with a share worth 10% of the catch.

In terms, then, of the possible relationships with fishermen, fish brokers vittually control fish prices. Fishermen are bound to sell their catch to the broker through their loan debts to him; their lack of means to transport or preserve the catch makes them dependent to sell it upon landing and the broker is conveniently stationed at the landing site purchasing at the price he offers.

The broker, in turn, sells the product wholesale by weight, (not by unit) to lesser intermediaries and/or to the public, also for the price he offers. This situation exists, first because consumer demand for fish is fairly constant and probably under-supplied and secondly, because lesser intermediaries lack the mobility of the fish broker and are dependent upon him to supply fish to the market where they purchase from him.

The fish broker we may conclude is in a rather secure, self-perpetuating position of power in the market system. This also explains his antagonism to the suggestion of government price controls, inspection, or fishermen's cooperatives which he sees as threatening his position.

There appears to be little competition between fish brokers for supplies of fish since in most of the area, fishermen are paid the same price by brokers. If anything, there appears to be collusion amongst brokers, because of the uniformity of fish prices. There may be more competition on the sales level to lesser intermediaries, but this has not been studied sufficiently to indicate the extent to which it occurs.

Lesser Intermediaries

Lesser intermediaries seem to be of two principal classes. The first consists of those who have access to some means of transport giving them access to supplies of fish at the village landing site and mobility to transport that pro-

duct to the market for resale to the second type of intermediary or to sell retail to consumers - the public, stores, and restaurants. They have fewer means and less status within the fishing village than the fish broker, usually not more than a canoe with outboard motor, and are likely to engage a taxi since they do not own a car or truck, to transport fish to market.

These intermediaries are highly opportunistic, their numbers and presence vary greatly in the market place according to the success of the fishing season. They are, therefore, not dependent on the fishery for their enterprise as intermediaries, but engage in other business activities as well.

The prices they pay to the fishermen are more negotiable than those of the fish broker. Their relationship to the fishermen is not obligatory or consistent, thus explaining the ephemeral nature of their role in the market.

The second type of lesser intermediary is the vendor. Vendors are mostly women from Cartagena, and the villages of Tierra Bomba and La Boquilla. They themselves may be families of fishermen, but there exists a hierarchy amongst them according to their economic means. Some bring their fish from La Boquilla and supplement sales with purchase from fish brokers or other lesser intermediaries. Others purchase exclusively, the more desirable (salable) species from brokers. In any case, one's position in the hierarchy is readily evident by the composition of the catch she sells. Those which can offer only small mojarras, catfish, and mullets are of lesser status in the hierarchy and more likely to be of the family of fishermen.

Those who offer snappers, grunts, and jacks, purchased from the brokers are more likely to have income sources other than fishing. This hierarchy is self perpetuating, since smaller, less desirable species, bring a lower price and overall, lower income to the vendor. They will never be able to afford more expensive, salable species.

However, vendors all share certain characteristics which categorize them as a whole. None has a means of transporting fish from the village to the market place (they must take a bus, canoe, or taxi). None has an ice box to maintain the fish from one day to the next, thus implying that fish not sold the same day is lost income for that day. In addition, although they purchase fish from brokers by weight, none sells by weight but rather by unit. In such circumstances it is difficult to measure the profit of a vendor relative to costs.

The number of vendor intermediaries is fairly constant in the Cartagena public market - an average of 60. They are much more static than the first type of lesser intermediary, which indicates they are more dependent upon fish sales for their income. When fishing is poor, the market vendors are directly vulnerable, since only a few will be apportioned the supplies of fish that the brokers bring to the market.

PRICES

Table 4 shows price comparisons of marine fish and other protein foods found in the Cartagena public market. Protein yield from fish compares unfavorably with cheese, eggs, pork, poultry, and beef considering it is sold round weight, including waste. Still, consumer demand is fairly constant for fresh fish and is generally unaffected by price increase, although it is contended that consumption of fish would greatly increase if fish prices were lowered. Data

Table 4. Retail price comparisons of marine fish and non-fish animal protein substitutes - Cartagena Public Market

	Pesos	$US*/kg
Marine fish (snapper, whole)	65	1.71
Chicken (whole)	65-80	1.71-2.10
Beef	80	2.10
Pork	75	1.97
Eggs (dozen)	35	0.92
Cheese	70	1.84
River fish (bocachico in season, whole)	40	1.05

* exchange rate $ 38 Col / $ 1 US

show little variation in price according to season and supply of preferable marine species. Retail prices of river species fluctuate greatly throughout the year according to season of abundance. This is thought to be because existing prices of fish are neither a reflection of supply nor demand but are a reflection of the control which fish brokers have over the entire market. The fish broker determines the price to the fisherman and the price to vendors, and since there is no observed change in price from vendor to consumer, we assume that this margin is held by the price from broker to vendor, and broker to fisherman.

SUMMARY

The overall supply of fish, to the market, is static because the level of technology of the artisanal fishery is not changing. In fact, the entire market structure is a static, rather than a dynamic economic unit because of the perpetuation and reinforcement of the traditions, the socioeconomic position of fishermen, and the roles of fish brokers and lesser intermediaries. In its existing state therefore, the artisanal fishery will remain so - a subsistence level venture for fishermen - rather than a profit-making enterprise, with only the fish brokers in a self-determining situation.

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REFERENCES

Ciardelli F., Alejandro
1968. The marine fisheries of Colombia and their statistics. Ann. Proc. GCFI 20: 133-144

Cordini, J. Manuel.
1965. Informe al Gobierno de Colombia sobre encuesta acerca de las pesquerías. UN-FAO Informe No. 2041 75 pp.

Ripley, W. Ellis.
1963. Report to US-AID/Colombia on the fishery of Cartagena, Colombia and its development. Washington, D.C. 30 pp.

Valderrama B., Mauricio
1978. Informe preliminar de mercadeo, Estación Bajo Magdalena. Centro Investigaciones Pesqueras. 10 pp.

Vergara G., Nizar E.
1970. Marketing and consumption of fish products in Bogotá. UN-FAO/INDERENA. Studies and Investigations No. 4. 105 pp.

Verreth, J., B., Wahle and J. Rud
1977. La socio-economía de la pesca del Río Magdalena y su sistema de plano inundable. 21 pp.