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Two Oil Spills - Interrelatedness of Socioeconomic  
Structure and Impact on Seafood Marketing Systems

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Little research has been done, to date, on the socioeconomic effects of oil spills. The socioeconomic investigations which were carried out in connection with the "Saint Peter" oil spill off the Colombian/Ecuadorian coast, and the "Urquiola" oil spill at La Coruña harbor in north-western Spain have provided an opportunity to document different effects on the seafood marketing systems in the two communities. The differences of the impact of the oil spills permitted an insight into the interrelatedness of socioeconomic factors both with respect to the effects produced and the degree of success of the corrective measures where such were implemented.

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Two Oil Spills - Interrelatedness of Socioeconomic Structure  
and Impact on Seafood Marketing Systems

BACKGROUND

In February 1976 the Liberian-registered M/V "Saint Peter", with a cargo of 243,442 barrels of crude oil, sunk outside the Ecuadorian/Colombian coast.

In May 1976 the foundering of the oil tanker "Urquiola" resulted in the release of 80,000 tons of crude oil at La Coruña harbor - the capital of one of three departments in the province of Galicia in north-western Spain.

The socioeconomic investigations (1) carried out in connection with these oil spills (2, 3) have pointed up differences in the impacts of the spills originating in differences in the socioeconomic structure, exemplified by the marketing systems, of the societies affected.

TUMACO-COLOMBIA AND ITS FISHERY MARKET (4)

Tumaco, a community with a population of about 50,000 inhabitants, is situated on the Gulf of Tumaco on the Pacific coast of Colombia. The greater part of the population lives on a narrow-necked, triangular peninsula with an area of about 1 1/2 km<sup>2</sup>. Existing public facilities, such as electricity, water, health care, and sewage, are hardly sufficient, considering the density of the population.

Industry in the Tumaco area is sufficient to provide employment for only about 500 - 1000 persons, the exact number depending on seasonal fluctuations. Aside from a lumber industry, the major employers are a fish cannery and a shrimp processing plant. The vast majority of the population obtains its livelihood by farming and by occupations related to fishery.



The Pacific Ocean in the neighborhood of Tumaco is normally a very fertile fishing ground, giving especially high yields of shrimp, tuna, and sardines, exploited by large-scale fishing operations; however, the fishermen of Tumaco are for the most part engaged in small-scale coastal fishing.

There are approximately 1000 full-time fishermen in the town of Tumaco. Most fishing is carried out near the shore with very rudimentary equipment. Of the 1000 full-time fishermen, 70% own some kind of equipment, while the remainder either rent equipment or are employed as laborers. The most common owned equipments are paddle canoes, fishing lines, casting nets, and trapping nets. 2% of the fishermen own larger canoes with outboard motors, and in addition to the above-mentioned equipment, may own a seine net.

Almost none of the full-time fishermen have any other means of support, and they have, on the average, 8 dependents. The average daily income lies in the area of 160 pesos per day (1 C.peso = US\$ 0.027, 1976).

Fishing generates, however, an opportunity for a far greater number of people than the full-time fishermen to obtain income. Among these are part-time fishermen and, to a much greater extent, those involved in the highly complex commercial procedures which are related to fishing and which comprise the greater part of the economic activity of the inhabitants of Tumaco.

The fishery market. Typical for the private distribution of the fish is that a portion of the catch from fishing vessels and/or canoes is first purchased at sea by the owners of, in the first place, motor canoes (I) and in the second, paddle canoes (who sometimes purchase directly from the fishermen, sometimes from the motor canoes) (I, II). These canoes and motor canoes then take the fish either to the local market place, where the fish is sold via fish vendors (III) to the consumers; or to a landing where intermediaries (III) buy up various quantities of fish for immediate resale to a variety of distributors (IV) - the owners of transportation facilities buying up larger quantities; lesser quantities

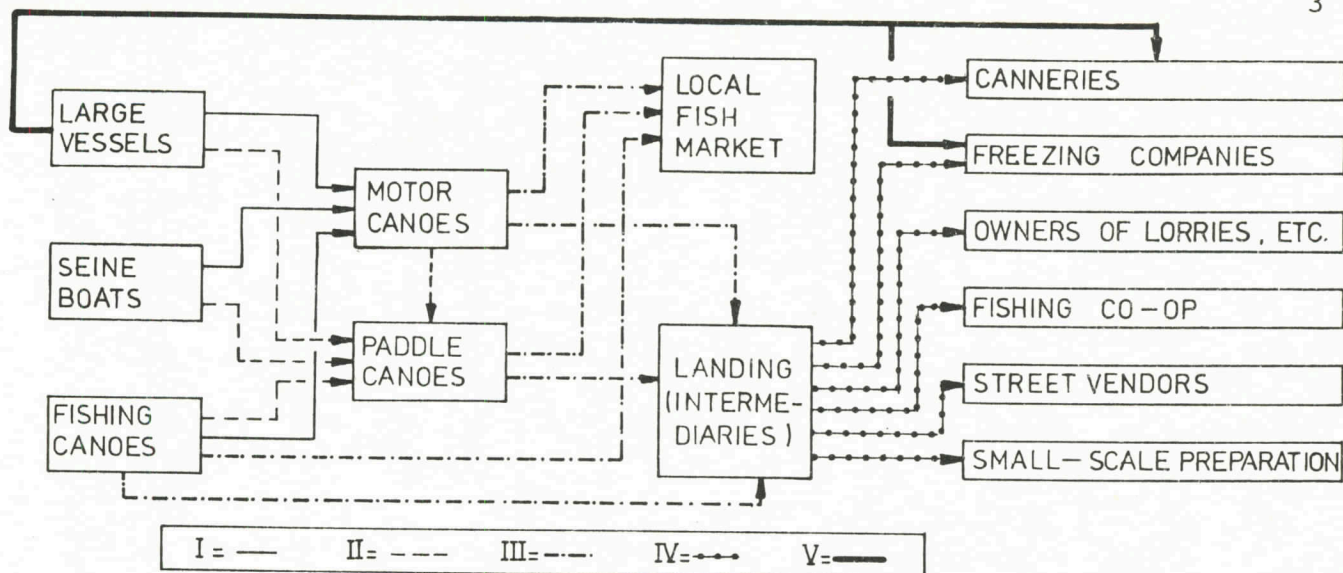


Fig. 1 - Flow chart showing the distribution of fish in Tumaco. (Roman numerals correspond to those in the text, and indicate a transaction.)

being purchased by those who distribute the fish to local shops, restaurants, freezing companies, etc; and small quantities being bought by street vendors and hawkers and by women who clean and prepare the fish for further resale.

This marketing system, with its numerous intermediaries, has apparently evolved in response to various circumstances, of which the most salient are:

- a) The lack of freezing facilities on the fishing boats and canoes would, considering the warmth of the climate, necessitate several journeys daily between the fishing grounds and the shore in order to keep the fish from spoiling. This would be especially impractical for those fishermen (and this constitutes the majority) who only own paddle canoes. This necessity is obviated by the existence of the forementioned "shuttle" traffic.
- b) For many of those fishermen who have no equipment of their own, this "shuttle" system provides a source of sometimes badly-needed extra income, since their share constitutes only about 2-3% of their catch at the end of the day in the case of large boats, and 25-50% for canoes.



- c) The whole marketing system has as its foundation the people's need to make a livelihood in a community where there are practically no employment opportunities.

This marketing system corresponds, in the terminology of Mintz, to "horizontal exchange", in which "the exchange of goods and services ends in the consumption by class equals"(5).

Tumaco export product market exhibits, however, different characteristics than those described above, and is not considered here.

The implications of this horizontal exchange what concerns the intermediary and his role are notable in Tumaco; "numerous intermediaries within the marketing system, who facilitate economic activity in the market places by performing bulking, storing, transport, processing and bulk-breaking services, and serving as credit sources as well"; moreover the marketing system affords a "ladder of upward economic mobility" for fishermen who have gathered some capital and can leave fishing for commercial enterprises.

In addition, the characteristics of the market as "typified by competition which is nearly perfect" (6), i.e. a price system which is based largely on the operation of supply and demand rather than on externally imposed standards, applies here as well.

#### SHELLFISH GATHERING SECTOR IN GALICIA, SPAIN (7)

The estuaries of Galicia with their rich banks of shellfish (blue mussels, oysters, clams, etc.) provide a permanent source of subsistence and income for all the inhabitants of the terrestrial-maritime zones of the province.

More than 60,000 persons hold a professional shellfish gatherer's license. Of these about 1,000 are engaged exclusively in the gathering of shellfish, while the remainder are for the most part farmers or fishermen.

The equipment used for the harvesting of the shellfish is primitive and traditional. Spades, hoes, and oyster-tongs are used in those areas which emerge above water at low tide, while shellfish rakes ("rastros") are used in the natural banks which always are under water.

The shellfish gatherers can thus be divided into two groups according to the equipment used: those on foot, to the majority farmers, who work the banks uncovered at low tide, and those on boats, to the majority fishermen, who work the underwater banks.

Due to an increase in the economic importance of shellfish, efforts were made by the authorities to control the development of the sector. This led to a number of regulations, of which the most important were:

- a) The inclusion of all shellfish gatherers into the fishermen's association.
- b) The requirement that the gatherers be licensed.
- c) The instatement of a prohibited season for shellfish gathering from 1 March to 30 September and regulations as to permissible size and species, as well as to types of equipment.
- d) The granting of title over the banks to persons or entities who can assume the responsibility for the rational exploitation of the shellfish resources.

The shellfish market. The fishermen's association is the sole agent for the sale of all shellfish. Sales are transacted through a downward auction system at the central fish exchange of each port. The principal buyers are the canning industry, which purchases over 90% of the production; small- and large-scale intermediaries for fresh products; and owners of cultivation parks.

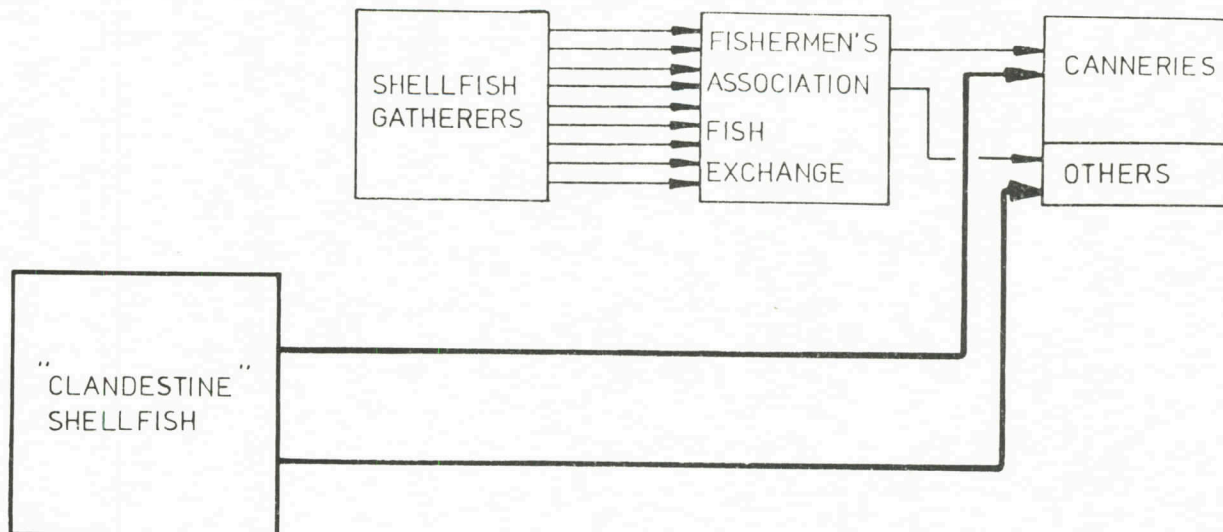


Fig. 2 - Flow chart showing the distribution of shellfish, Galicia, Spain.

The demand for shellfish by the canneries has increased continuously since the 1950's. A sharp decrease at that time in the sardine catches and an increase in the price of oil for packing sardines forced a diversification of production, thereby revitalizing the entire shellfish sector.

The rapid expansion of the canning industry into the shellfish sector soon enabled the canneries to obtain control over the market. A number of structural deficiencies and peculiarities in the sector aided in this development:

- a) In order to enable official control of the shellfish sector, a centralized market was instituted to replace the earlier system whereby each producer (gatherer) could sell freely to any buyer. The new system, whereby the shellfish is offered wholesale through the agency of the fishermen's association at a downward auction, has removed all possibility of intervening in the formation of prices from the hands of the producer.
- b) The wholesale sales system reduced the number of buyers, partly through the elimination of the economically weaker



buyers, and partly because of the need for only one representative of an industry to be present at each transaction.

It was thus that a few buyers came to dominate a greater part of the market, allowing them to come to an agreement on prices among themselves. The buyer's position is moreover strengthened by means of massive authorized importation of shellfish at a low price.

Additional factors pertaining to the gathering phase of production combine to further undermine the position of the gatherers. The end of the sardine season and the end of the agricultural harvesting season free great numbers of people for the opening of the shellfish season. The need for extra income, the lack of storage facilities, the lack of transportation to seek other markets, and the competition during the early days of the season, all force the gatherers to sell immediately and to practically any price. The widespread occurrence of clandestine shellfishing activities further intensifies the compulsion to gather and sell the product as quickly as possible.

Activities of a clandestine nature permeate the entire shellfishing sector. Their basic motivation lies in an attempt to maintain the level of income in the face of forces which tend to depress it. Their overall result is a damping effect on prices.

The clandestine activities pertain to both the illegal extraction and the illegal sale of shellfish. Illegal extraction comprises: the gathering of shellfish during the prohibited season; gathering of immature specimens; extraction using prohibited equipment; and extraction by unlicensed persons. The amount and value of shellfish extracted by illegal means is not known. Officially it is acknowledged that it amounts to over 50% of the total production in Galicia, and even this is probably an underestimate.

In summary, the following factors combine to determine the formation of shellfish prices:

- a) The centralized sale through a downward auction, excluding the producer from the sales process and concentrating the sale to a few large buyers.
- b) The importation of large quantities of cheap products.
- c) The regular prohibition season and the sudden appearance on the market of massive quantities of shellfish at a fixed date.
- d) The great volume made available to the market at low prices through clandestine means.

In the terminology of Mintz, this marketing system corresponds to "vertical exchange", in which "the exchange of goods and services ends in their consumption by members of a class different from that of their producers". The goods being world market products which are "marketed through specially designed means and special intermediaries" correspond to Mintz' characterization of "upwards vertical exchange" (8). Typical for the export market is also the "control yielded by the state power... through control of licenses and permits, through decisions as to the number of intermediaries, and by other means", through which "the state channels the movement of certain products outside the internal marketing system to serve its own ends and those of the classes which control it" (9). Accordingly the potential and effective conflicts imbedded in this marketing system rank high, as is the case here as well.

#### EFFECTS OF THE OIL SPILLS ON PRODUCTION AND MARKETING

Tumaco. a) Almost all of the fishermen reported that it was practically impossible to sell fish for a period of at least three weeks after the spill. The reluctance on the part of the public to buy fish continued, however, even after this critical period, and lasted altogether about two months. In the month of February, the price of fish sank to about half of its former value. b) For fear of ruining the nets, the majority of the fishermen who continued working during this period used lines, if available, and fished only for personal consumption.



The most noticeable effect of the oil spill on the community of Tumaco was that manifested in the fish market. It appears that it was not in the first place any physical hinder or fish mortality which directly prevented fishing in any larger scale, but rather the market decrease in sale of fish due to anticipated health risks connected with oil contamination. The effect was most pronounced for fresh (non-processed) products, and therefore predominantly affected the individual fisherman selling to the Tumaco market, as well as depriving the numerous persons involved in the local distribution and sale of fish of any means of livelihood. The effects of the oil spill were, thus, equally felt by the producers (fishermen) and the intermediary buyers. Lack of market possibilities and drop in prices caused many fishermen to halt fishing for a period of about three weeks.

Administrative measures. None.

La Coruña. The "Urquiola" oil spill led to severe pollution of the shellfish banks, causing a massive shellfish kill and contamination of both the natural banks and the cultivation parks and barges. As a consequence, the entire 1976-77 season was lost, depriving all of the gatherers of their source of income. The canneries, by contrast, suffered no noticeable adverse effects from the oil spill.

The primary factors which led to the immunity of the shellfish buyers in La Coruña could be attributed to the domination of processed products and the advanced, industrial character of all but the gathering phase of the shellfish sector. These two factors, by their very nature, provided the buyers with the means (built-up stocks, interregional and international import) to avert the negative effects of the oil spill.

The loss of income incurred by the gatherer through the loss of the whole shellfishing season and the relative immunity of the buyers re-emphasized the vulnerability of the (subsistence) gatherer vis-à-vis the (industrial) buyer.

The widespread occurrence of clandestine shellfish gathering and



sale made it impossible to assess both the number of gatherers affected by the oil spill and the damage in terms of loss of real production and loss of real income. The personal declaration of the gatherers as to their income from shellfish as brought to light by an unassociated investigative group ("Trasmallo") showed in one case to be 67% higher than the estimates given by the fishermen's association and 57% higher than the estimates made by the Trade Union Organization. In another locality the differences ranged from 38% to 52% over the official estimates (10). The authorities, while offering compensation for loss of income, found themselves incapable of determining the extent of the damage, and ended up paying only a fraction of the real loss.

Administrative measures. The shellfish gatherers were offered lump sums covering varying percentages of their losses, depending on which damage estimate is considered. The actual sum paid to members of various associations varied at the time of the study (May 1977) from no compensation to max. 75,000 ptas.

Aside from loss of income, the oil spill brought to light and intensified numerous conflicts originating in structural weaknesses and problems of the sector. A sharpening of conflicts between associations resulted from the large disparity in the amount of compensation paid to the members of different associations. The undervaluation of production losses made by the fishermen's associations created additional stress between members and their representatives - the leadership of the associations. The low amount of compensation paid has further aggravated the conflicts between the gatherers and the authorities, who are considered responsible for a number of the gatherers' grievances. All of these conflicts were still raging one year after the oil spill (11).

## CONCLUSIONS

The interrelatedness of socioeconomic structure and effects produced by the oil spills was illustrated here by the effects on the market.

The marketing system studied in connection with the oil spill in Tumaco, Colombia, was characterized by a large number of producers (fishermen) and a large number of intermediary buyers carrying out a large number of small-scale, free transactions, as is common for a subsistence-type economy. This "horizontal" fresh products market showed vulnerability to the oil spill at all stages, affecting equally the producers and the intermediary buyers.

The marketing system in La Coruña, which has evolved through the integration of the sector and through governmental regulation, was characterized by a large number of producers who are required to sell through a single, centralized agency to a small number of large-scale buyers. As a consequence of this "vertical" market structure and the fact that the buyers were chiefly canneries and less susceptible than dealers of fresh products to adverse effects of oil spills, the producers (gatherers) bore the brunt of the damage. A set of social and economic factors have combined to make the gatherers the weakest group in the shellfishing sector. It was due to the same set of factors that the gatherers suffered the severest damage from the oil spill, and that, furthermore, the adoption of inadequate compensatory measures was made possible.

The theoretical framework to which these studies were related has been the relationship between social systems and the environment. The aim was to study, on short terms, whether different social systems are affected differently, as a result of their intrinsic characteristics, by a similar ecological change. The approach used can be compared to Freilich's 'natural experiment', where a situation for study was selected "where change of a clear and dramatic nature has occurred". The occurrence of the oil spills has been used here as the independent variable which offered "the possibility of studying the effects of the independent variable (environmental change) on the dependent variable (social system), since other factors which may influence the dependent variable are in a state of natural control" (12).

The differences of the impacts of the oil spills on the two

communities described here, point up the necessity of acquiring an insight into the basic social and economic structure of a society in order to demonstrate the penetrating effects of ecological change into the socioeconomic sphere. It is felt that additional similar studies will provide the much needed empirical knowledge necessary for providing better damage assessments, and, possibilities for the implementation of successful measures to mitigate adverse effects of oil pollution.



## REFERENCES AND NOTES

1. Little research has been done, to date, on the socio-economic effects of oil spills. Aside from medical and health hazards, studies of effects on humans from oil pollutions were confined to aspects concerning reduction in the quantity or quality of marine produce available to man as a consumer and the accumulation of oil or oil compounds to levels causing taste or odors in marine products consumed, or likely to be consumed, by man rendering them less desirable as food. See for instance:  
  
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Part II: Resource document on Impact of Oil on the Marine Environment.  
Part III: Bibliography. FAO GESAMP VIII/4/2, March 1976 and April 1976.
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3. Rosenblum I., The "Urquiola" Oil Spill - Report of a Socio-economic Study of Effects. La Coruña April-May 1977. IVL Publ. Aug. 1977, IVL, Box 21060, S-100 31 Stockholm, Sweden.
4. Background material is based on information obtained, by the author, from interviews, in particular with fishermen in Tumaco, May 1976.
5. Mintz S., Internal Market Systems as Mechanisms of Social Articulation, in V.F. Ray ed., Proceedings of the 1959 Annual Spring Meeting of the American Ethnological Society, Seattle, Wash.: University of Washington Press, 1959, pp 20-30, p.21.

6. Mintz S., Internal Market Systems, pp 24-25.
7. Background material for the shellfish sector is drawn from: Manuel González Vidal, El Conflicto en el Sector Marisquero de Galicia (unpublished doctoral thesis, 1976).
8. Mintz S., Internal Market Systems, p.21.
9. Mintz S., Internal Market Systems, p.25.
10. The variety in estimates of production losses can be seen from the following table:

Table 1. Estimates of shellfish production losses (ptas.) due to "Urquiola" oil spill for two locations.

Location (Association)	Estimate made by		
	Fishermen's Association	Trade Union Organization	"Trasmallo"
Mugardos	7,254,038	9,430,589	22,160,000
Barallobre	6,309,540	8,202,402	13,190,000

Sources:

- 1) Organización Sindical, Delegación Provincial de La Coruña, Informe y Valoración de Daños Causados con Motivo del Buque Petrolero Urquiola.
- 2) El Equipo "Trasmallo"; unpublished findings of an interview survey in Barallobre and Mugardos, also, "No Coinciden las Estimaciones Sobre los Daños Causados por el 'Urquiola'", summary reprinted in "La Voz de Galicia", Wed., March 8, 1977.
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12. Freilich M., The Natural Experiment, Ecology and Culture, in Southwestern Journal of Anthropology, Vol. 19, 1963, pp 21-39, p.24.