

Towards the Cooperative Management of Fishing in Discovery Bay, Jamaica: The Role of the Fisheries Improvement Project

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ABSTRACT

The fishery resources of Jamaica's north coast are heavily exploited by artisanal fishermen using a variety of methods. In 1988, a Canadian International Development Agency funded research project began to study the effects of fishing on fish populations and catches in the Discovery Bay area of the north coast of Jamaica.

The Fisheries Improvement Project was designed to assist with the implementation of gear changes and fishing practices expected to lead to a more sustainable level of exploitation by local fishermen. A self-regulatory system of cooperative management was seen as the ideal medium for introducing needed changes, although no such organization existed in Discovery Bay. Traditionally, the north coast fishery is a subsistence-level occupation. High unemployment, easy access to the nearby reefs (without the need for expensive motors), and a high demand for fish contribute to the problem of overfishing.

An education program was initiated as part of the project in October, 1990. Its objectives were to increase fishermen's knowledge of the fishery resources, to encourage a sustainable approach to fishery management, and to promote changes in fishing behavior expected to result in the long-term improvement of fish stocks and catches. Management goals included the use of larger gauge mesh wire, and the establishment of a protected area as a fishery reserve.

Communication efforts have included questionnaires to assess fishermen's knowledge, attitudes and fishing behaviour, informal discussions, video presentations, and printed materials on notice boards. The project has also produced an educational video about the Discovery Bay fishery. One strategy popular with the fishermen combines education with practical assistance. In return for turning in a fishpot made with small gauge meshwire, fishermen can receive enough inch-and-a-half gauge mesh to make two new pots. This presentation describes some promising results and future directions of the Fisheries Improvement Project, including a movement towards the establishment of a fishermen's co-operative society.

KEY WORDS: artisanal fisheries, cooperative management, education, Jamaica, sustainable exploitation.

INTRODUCTION

Fishermen along the north coast of Jamaica have been catching fewer and smaller fish compared to some years ago. Although the decline in catch per unit effort has not been scientifically documented on this coast over many years, experienced fishermen can attest to the fact that not only has their catch declined, but the composition has changed. Formerly, snappers, groupers, and jacks were abundant, but catches are now dominated by herbivorous species like parrotfish and doctor fish. This phenomenon has been largely attributed to overfishing, although environmental pollution and habitat destruction are also implicated (Woodley, 1987). High unemployment, easy access to the nearby reefs (without the need for expensive motors), and a high local demand for fish are among many factors contributing to the overexploitation of north coast reef fish populations (Allison, 1989).

The Fisheries Improvement Project based at the Discovery Bay Marine Laboratory was started in 1988 in order to address the problems of declining fish populations and catches in the area. Funded by the Canadian International Development Agency, the Project is jointly administered by scientists from the University of the West Indies and Trent University in Ontario, Canada. The Project was designed to monitor reef fish populations, catches and marketing, stimulate discussion of changes in fishing methods that would lead to a more sustainable level of exploitation, and to help fishermen implement the needed changes. Some results of the monitoring program are reported by Miller *et al.*, Picou-Gill *et al.*, and Sary *et al.* (this volume).

Vatcher (1990) reported biological and socio-economic findings of the Project in 1990, including the implementation of an education program. Its objectives are, in brief; to increase fishermen's knowledge of the fishery resources, to encourage a sustainable approach to fishery management, and to promote changes in fishing behaviour expected to result in the long-term improvement of fish stocks and catches (van Barneveld, 1990). Management goals include the use of larger gauge meshwire and the establishment of a protected area as a fishery reserve.

One of the main goals of the education program is to encourage a community-based approach to fishery management in the Discovery Bay area. A fishermen's cooperative society was seen as an ideal medium for educating fishermen about more sustainable methods of fishing as well as for implementing the needed changes through a system of collective self-regulation. The economic benefits of cooperation were seen as a means to help cope with the rising costs associated with fishing, such as gear, transportation, bait, and fuel.

In July, 1991, eight months into the education program, a small group of Discovery Bay fishermen calling themselves the Alloa Fishermen's Cooperative

Society held their first meeting. How the society has evolved and the potential for its success are the focus of this paper.

REASONS FOR PROMOTING A COOPERATIVE SOCIETY

A brief description of the Discovery Bay community will illustrate the issues and reasons behind the Project's promotion of a fishermen's organization. Unlike the larger fishing villages on the south coast of Jamaica, which exploit productive offshore banks, the typical north coast fishing community is smaller and, of necessity, less dependent on fishing. Tourism and bauxite mining are the two most important income-generators in the region. A bauxite shipping port is located in the bay, which is also the site of the University of the West Indies' Discovery Bay Marine Laboratory, a leading center of coral reef research for almost 30 years.

Discovery Bay currently has 60 to 70 active fishermen, about 70 percent of whom use fishpots as their principal gear. Five to ten percent use hooks and lines or gillnets. Spearfishing is becoming increasingly prevalent, especially among the young men of Discovery Bay, and the practice is difficult to monitor and assess. Although about 30 percent of the fishermen from whom we regularly collect catch data practice spearfishing, many more spearfishermen are unaccounted for. Most fishing boats (and there are about 40) operate from one or the other of two fishing beaches, Top Beach and Old Folly. Ten fishermen (about fifteen percent) own engines.

The Discovery Bay pot fishermen's average weekly catch is less than 5.0 kg, based on Project CPUE data from 1989 and 1990. Spearfishing is more productive, yielding 2.5 - 3.0 kg/day. There are not enough data on hook and line yields to report.

Small catches translate into small earnings for the fishermen. Fish prices on the beach now range from fifteen Jamaican dollars per pound (0.454 kg) for the smallest fish, to twenty dollars per pound for the preferred larger fish (JA \$1.00 = US \$0.05). From our CPUE figures, a very rough estimate of the range of incomes can be given, from approximately 200 to a maximum of 700 Jamaican dollars per week (US \$12.00 - 38.00/wk). Consequently, most Discovery Bay fishermen hold part-time jobs or do shift work in addition to fishing.

There are very few fishery regulations or wildlife protection laws in Jamaica. Fishing licences are free and unrestricted, and there is no minimum size or bag limit for any fish. Minimum mesh sizes for beach seines are specified (bunt 3.17 cm), but not for fishpots. For spiny lobster (*Panulirus argus*), there is a three-month closed season (April 1 to June 30), a minimum size specified (7.62 cm), and egg-bearing females may not be taken. Enforcement of Jamaican fishery regulations is virtually non-existent and penalties ridiculously low.

There have been three or four attempts to start a fishermen's cooperative in Discovery Bay, all of which have been unsuccessful. Mismanagement (some say theft) of funds is most often cited by fishermen as the reason for failure, but many other factors are likely to have contributed. Despite this record, when asked whether a cooperative would help the fishermen in the area, 96 percent of fishermen surveyed replied "yes." All the men who said "yes" to this question also said they would join a cooperative.

Community-based management of small-scale artisanal fisheries has been advocated as the best and perhaps only realistic option for achieving a sustainable level of harvest (Berkes and Shaw, 1986; Pollnac, 1988; Jentoft, 1989; Chakalall, 1990; Dixon and Sherman, 1990; Espeut and Grant, 1990). A community-based organization could be a useful means of introducing alternative, less damaging income-generating activities (Dixon and Sherman, 1990). From the perspective of the Fisheries Improvement Project, the most important long-term goals of organization are the sustainable exploitation and conservation of reef fish populations and increased local awareness of environmental factors affecting fishery resources.

From the fishermen's point of view, although they agree that cooperation will improve fishery management, short-term economic benefits and improved facilities appear to be the most convincing arguments in support of forming a fishermen's cooperative. In addition to business and fundraising opportunities, financial benefits of membership in a co-operative include access to subsidized fishing gear at the Jamaica Cooperative Union's supply store (fifteen percent cheaper to cooperative members); tax free profits ("surplus"); and reduced transportation costs.

Chakalall (1990) says that community-based management can "create self-confidence and self-regulation at the local level" and that "local commitment is essential for conservation." These benefits, as well as the effectiveness of group action in combating environmental threats, have been recurring themes in the education efforts of the Project.

EDUCATION PROGRAM

The education strategy has been multi-faceted. A varied approach is essential in order to reach a target group of fishermen who differ in level of education, fish at varying times of day and night, and do not meet regularly in any organization. Project staff have frequent, informal discussions on the fishing beaches with fishermen, vendors, and purchasers of fish. A questionnaire to obtain baseline information on fishermen's knowledge, attitudes, and fishing behaviour was conducted at the start of the education program and covered 39 percent of the active fishermen. Notice boards were installed at both beaches in March, 1991, and were supplied with articles and posters on recommended

fishing methods and gear, fishery regulations, the benefits of cooperatives, and other educational objectives of the project.

Videos about coral reef ecology and fishery management outside of Jamaica have been very well received by the fishermen. Encouraged by this response, the Project undertook to produce an educational documentary about the fishing industry of Discovery Bay. Filmed with the help and participation of the Discovery Bay fishing community, the video, "Fish Today, Fish Tomorrow? Tradition and Change in a Jamaican Fishing Community" was completed in October, 1991. At the time of writing, arrangements were being made for its first public showing in Discovery Bay, in mid-November.

The Fisheries Improvement Project's two-for-one trap exchange program was a means of combining education with a tangible form of assistance, which the fishermen visibly appreciate. In return for turning in a fishpot constructed with small gauge mesh wire (1.0 or 1.25 inch), fishermen could receive enough 1.5 inch mesh to make two new pots of comparable size. Preliminary results of this program are very promising and have been documented by Sary *et al.* (this volume).

Project activities have been to take Discovery Bay fishermen to fishermen's meetings, demonstrations of mariculture techniques, and fundraising events in other parts of the island. It is thought that this kind of assistance and interaction has played a key role in motivating the formation of an organization.

Results of the education efforts have been measured mainly by conversations with fishermen, especially questions asked and reactions to notice board items; discussions observed between fishermen; questionnaires; and observed behaviour. We felt that our efforts were greatly rewarded when in May, 1991, a few fishermen from Old Folly requested the Project's assistance in forming a cooperative society.

PROGRESS TOWARDS ESTABLISHING A COOPERATIVE IN DISCOVERY BAY

Cooperatives in Jamaica are governed by the Cooperative Societies Act and Regulations of 1950 (with amendments in 1974 and 1975). The Registrar of Cooperatives, in charge of the Cooperative Department, is responsible for overseeing cooperative development and registration. Since receiving the fishermen's request for assistance, Project staff have been providing and interpreting information such as the Cooperative Department's requirements for establishing a cooperative (Table 1).

Meetings of the fishermen's group have been held almost every other week since July 5, 1991 and are open to fishermen from both beaches. A steering committee comprised of seven fishermen and two Fisheries Project workers has produced a draft constitution, set of objectives and rules, and a fee structure for membership, dues and shares, all of which have been agreed upon by the rest of

Table 1. Criteria for determining whether or not a co-operative should be established.

1. There is a genuine desire for a Cooperative felt by the prospective membership;
2. There is an economically viable operation which can be conducted by the Cooperative;
3. There is a genuine common bond between the people wishing to start the Cooperative;
4. There are sufficient members to make the operations economically viable and that these members have subscribed or are able to raise sufficient capital to finance the business they intend to undertake;
5. There is a dedicated and well-informed leadership who can form a Management Committee;
6. A suitably qualified Manager can be found and the society is able and willing to pay the necessary salary to retain the services of such a manager.

Source: Co-operative Department, Government of Jamaica.

the group at general meetings. Shares (J \$10.00 each) have been purchased by fourteen of the seventeen members, four of whom are from Top Beach. A management committee (Chairman, Vice-Chairman, Secretary and Treasurer) was recently elected from among the fishermen on the steering committee.

A priority for the fishermen is fundraising for several planned projects, the first of which is the improvement of beach facilities, such as gear sheds, storage facilities, and a meeting area. The group plans to renovate a small building, the Alloa Fishermen's Center, donated to Old Folly fishermen by Kaiser Bauxite Company in the seventies, to be used as an office. ("Alloa" is the former name of the property on which the Old Folly fishing beach is situated.)

Their first community event, a "Beach Clean-up Day" and fundraising fish roast, was organized by the Alloa group to mark International Coastal Clean-up Day, September 21, 1991. While volunteers (mostly children) picked up litter from the beach, fishermen cleared bush surrounding the entrances to the beach. Kaiser Bauxite Company sent a front-end loader to grade the beach, improving access for boats. Although profits were small, fishermen reported feeling a sense of accomplishment and receiving positive feedback about the event from local residents.

FACTORS AFFECTING THE SUCCESS OF A COOPERATIVE

In supporting the development of the Alloa fishermen's group, the Fisheries Improvement Project must consider the following questions: Can a cooperative be successfully established by this group? Can it be an effective means of implementing sustainable fishery management in the area? Due to the

discouragement of past failures, the motivation to start a cooperative in Discovery Bay was envisioned by the Project as the most difficult obstacle to overcome. However, now that the process has started, we find that there are many more hurdles to negotiate, the first being registration of the cooperative as a legal entity.

Factors affecting the potential for success of fishermen's cooperatives have been examined by Verhagen (1981), Pollnac (1988), and Jentoft (1989), among others (Table 2). According to one study (FAO, 1979, quoted by Pollnac 1988, p. 32), some fishermen's cooperatives fail because of the "complex and confusing legislation regarding their establishment and use." This description aptly fits the Jamaican laws and regulations governing cooperatives.

Although the Alloa fishermen have contributed time, labor and money in the early stages of the organization, their small incomes cannot provide the substantial amount of capital needed to establish a cooperative. In order to become registered, the group must be able to satisfy the Co-operative Department that it has sufficient capital, or can raise sufficient capital to finance the enterprises (Co-operative Department n.d., p. 3).

A stated policy of the Cooperative Department is to support larger groups rather than smaller ones, which have less chance of economic viability (Gordon, pers. comm., 1991). The Department will only consider supporting the development of a cooperative once a viable financial plan has been prepared: Once the basic information provided has been considered, it will be decided by the Co-operative Department, whether or not the establishment of a cooperative should be encouraged (Co-operative Department n.d., p. 5).

A shortage of local expertise is likely to hinder the establishment of the cooperative. Apart from the help provided by the Fisheries Improvement Project, information about the functions and benefits of cooperatives is not readily available to the Discovery Bay fishermen. Help from external sources such as international development agencies might be a possibility, but introduces problems regarding acceptance of outsiders. Except for the Montego Bay branch of the Co-operative Department, 80 km from Discovery Bay, the institutions that might help (Co-operative Department, Jamaica Co-operative Union, Fisheries Division of the Government) are located in Kingston, over 125 km away. The Jamaica Co-operative Union has been supportive in allowing the Project to purchase mesh for the fishermen (under the Alloa name) at the fifteen percent discount reserved for cooperatives.

The isolation that makes communication difficult improves the market potential for gear sales by any group that can become established in a rural area. A sales outlet in Discovery Bay would serve several hundred fishermen in villages along the north coast who now have to travel to Kingston to buy gear. However, the same problems affecting Discovery Bay fishermen - declining catches, increasing costs - are affecting most north coast fishermen. Rapidly

Table 2. Summary of factors affecting the potential success of fishermen's organizations; Note: Main factors relevant to the establishment of the Aloa Fishermen's Co-operative Society are italicised.

CATEGORY OF FACTOR	POSITIVE FACTORS	NEGATIVE FACTORS
ORIGINS	Formed by local initiative; develops at own pace	Imposed by outside agency; artificially accelerated schedule
PARTICIPATION	Early investment of time, labour, capital by fishermen	Lack of involvement by fishermen at early stages in formation
GROUP STRUCTURE	Existing social organizations	Past failures of co-operatives
FINANCES	Capital available; economically viable prospects exist	Lack of capital; no viable business prospects
LEGAL STRUCTURE	Legal framework exists for the formation of co-operatives	Laws absent; laws not adapted to local needs; laws difficult to understand
GOVERNMENT SUPPORT	Co-operative development is encouraged	Training needs not adequately met; lack of support
INTER-AGENCY CO-OPERATION	Established groups willing to assist, e.g., co-op unions, ministries.	Lack of support from agencies involved in fisheries &/or co-ops
ADMINISTRATION and LEADERSHIP	Local expertise is available to manage the business aspects	Lack of expertise among members to direct the co-op
GROUP SIZE	Size reflects traditional patterns of interaction	Size required for economic viability is not socially viable

Table 2. Continued.

CATEGORY OF FACTOR	POSITIVE FACTORS	NEGATIVE FACTORS
MEMBERSHIP CRITERIA	Homogeneity (common interests) is often linked to success	Heterogeneity can produce conflicts and lead to failure
RESOURCE BASE	Underutilized or sustainably exploited	Overexploited or depleted
SEA TENURE	Traditional fishing rights allocated	Common property resource rights
Compiled from Pollnac (1988), Jentoft (1989) and Verhagen (1981).		

increasing inflation as a result of the decline in value of the Jamaican dollar (Figure 1) has sent gear prices soaring beyond the reach of many fishermen. The cost of a roll of 3.17 cm trap mesh, for example, has more than doubled in just over a year, rising from J \$949.00 in September, 1990 (Espeut and Grant, 1990) to J \$2148.00 (current price at the Jamaica Cooperative Union).

Figures 2 and 3 compare the price increases in basic foods in Jamaica over the period 1989 to 1991. One trend particularly relevant to the socio-economics of the fishing industry is the price of imported salt cod, a staple in the Jamaican diet and in fact part of the national dish, "saltfish and ackee." Note that the price of fresh fish has not risen nearly as steeply as that of imported cod. This has further increased the demand for fresh fish on the local market.

The factors outlined above, particularly the financial factors, point to an uncertain future for the Alloa Fishermen's Cooperative Society. At the same time they underscore the need for protecting the resource base to avoid a total collapse of the fishing industry. Evidence of positive attitudes towards fishery conservation among the Alloa fishermen is shown in the following rule, unanimously adopted by the society:

Every member who takes fish or other sea products should do so using gear and methods appropriate to the long-term, sustainable exploitation of fishery resources (Alloa Fishermen's Cooperative Society, Draft Rules).

SUSTAINABLE FISHERY MANAGEMENT

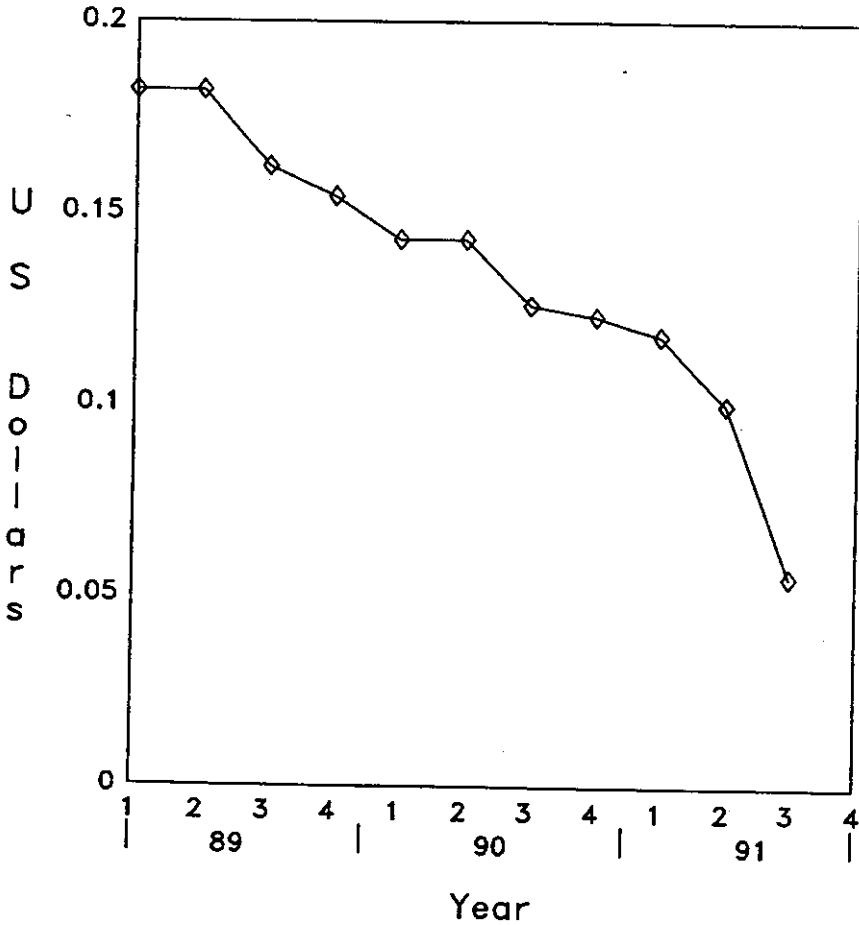
According to Aiken and Haughton (1987b), rehabilitation of [north coast] stocks can only be achieved by a reduction in the fishing effort or an increase in the mesh size or both.

Munro and Williams (1985) recommend the establishment of permanent reserves and a system of permanent, saleable, transferable licences to existing fishermen, in conjunction with a buy-back scheme to retire excess fishermen.

Mesh with holes of 1.25 inch diameter (3.17 cm) is commonly used by Discovery Bay pot fishermen, and some use even smaller 1.0 inch (2.54 cm) mesh. At the beginning of the education program, only 46 percent of the fishermen surveyed said they would be willing to use 1.5 inch (3.8 cm) mesh, and until recently, very few did use it. However, since the introduction of the trap exchange program in May, 1991 (Sary *et al.*, this volume), there has been a significant change in the proportions of the various mesh sizes in use in Discovery Bay, as well as the attitudes towards them. There is now widespread acceptance (and use) of larger mesh.

Although it is widely acknowledged by fishermen that "fine mesh" is detrimental to the fishery, most pot fishermen believe that spearfishing is even more harmful. Among the group forming the cooperative, mostly pot fishermen, the perception is that spearfishing is to blame for the decline in catches because: 1) spearfishing frightens fish; 2) spearmen take the "fine fish" (very small fish)

VALUE OF THE JAMAICAN DOLLAR
IN U.S. DOLLARS, 1989 - 1991



Source: Planning Institute of Jamaica

Figure 1. Value of the Jamaican dollar in U.S. Dollars, 1989 - 1991.

PRICE PER POUND OF FISH
IN JAMAICA, 1989 - 1991

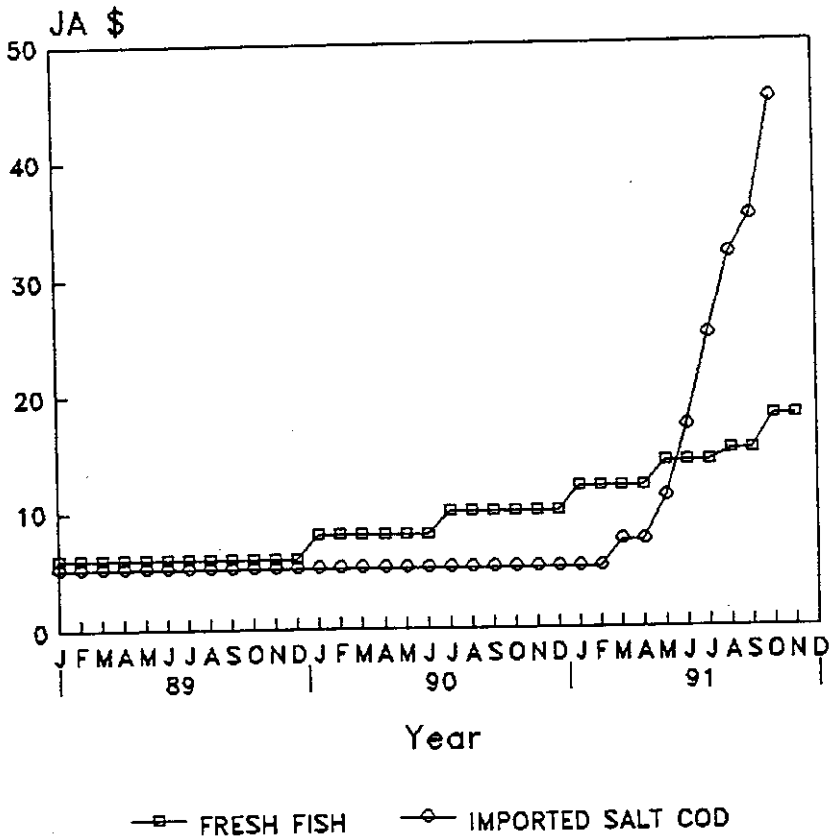


Figure 2. Price per pound of fish in Jamaica, 1989 - 1991.

PRICES PER POUND OF BASIC FOODS
IN JAMAICA, 1989 - 1991

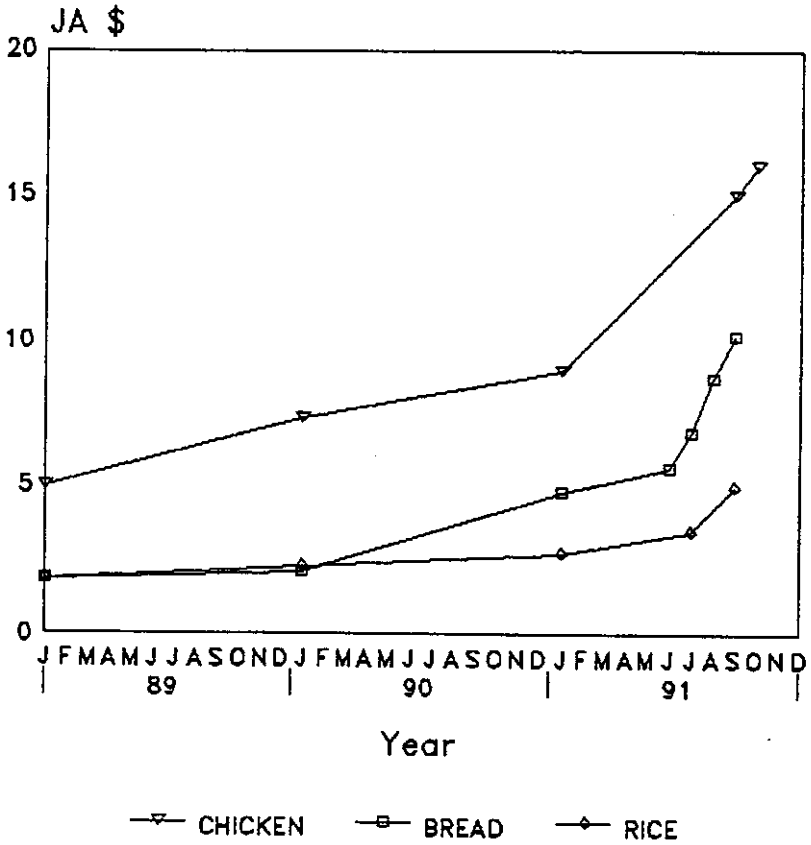


Figure 3. Prices per pound of basic foods in Jamaica, 1989 - 1991.

as well as the "breeders" (larger parrotfish); 3) night spearing is destructive because it takes unfair advantage of sleeping fish; and finally, 4) spearmen are notorious for stealing from pots. Resolving conflicts between pot fishermen and spearfishermen will be one of the most difficult tasks faced by a fishermen's organization.

A protected area is one proposed fishery management strategy that would not discriminate between gear types. This measure is regarded as more equitable and easier to enforce than many other fishery regulations (Salm and Clark, 1989), and results can be seen fairly quickly (Bohnsack, 1990; Munro and Williams, 1985). In response to a question about what regulation would be most useful for the fishery, protected areas (or fish sanctuaries) emerged as the preferred measure, named by 29 percent of the sample (Unpublished data, 1990).

The Alloa group has agreed in principle that a protected area would be a good idea, but they are worried that the area could not be protected against the spearfishermen's intrusions. The Fisheries Improvement Project could play a role in facilitating communication between the older, more traditional fishermen and the younger spearfishermen concerning the implementation of a protected area in Discovery Bay.

The question of limited entry into the fishery remains the most difficult fishery management issue to address. Apart from a few loosely ordered territories, the sea is common property to Jamaican fishermen. Limiting the number of fishermen was one of the least popular regulations among fishermen surveyed. Such a measure could only be implemented with the full cooperation of the fishing community, and would ideally be administered by a community-based fishermen's organization.

CONCLUSIONS

Despite the factors hindering the formation of an economically viable cooperative in Discovery Bay, a community-based fishermen's organization, perhaps modelled along different lines from a cooperative, remains the most likely medium for introducing needed fishery management changes in the area.

The other point which cannot be overemphasized is that conservation of the reef environment is an essential prerequisite for managing the fisheries. If degradation or pollution of reefs is permitted, yields will decline despite all other management measures (Munro and Williams, 1985).

Looking at the fishery from a broader economic perspective, one must also remember that tourism, not fishing, is the most lucrative industry in the Caribbean (Dixon and Sherman, 1990). A "vital source of employment, [it] absolutely requires widespread public awareness of environmental issues" (Eyre, 1989). In this sense, the educational functions of a community-based fishermen's organization are potentially very important.

In conclusion, the Fisheries Improvement Project will continue to explore ways of helping the Discovery Bay fishermen to organize and implement changes that will sustain their traditional way of life, while protecting marine resources for long-term benefits to the community. We hope that the Alloa group will be a catalyst and model for other north coast fishing communities to follow. In the words of Margaret Mead, (we should) "never doubt that a small group of committed citizens can change the world. Indeed, it is the only thing that ever has."

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