Social Strategies for Coping with Uncertainty in the Barbados Small-scale Pelagic Fishery

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ABSTRACT

Situations in small-scale fisheries where individualistic social networks prevail instead of social cohesion and community are seldom documented. Yet they may define limits to the feasibility of co-management. This paper examines the fishery-related uncertainties perceived by fisherfolk involved in the Barbados commercial, small-scale, pelagic fishery, and the social strategies of atomism, personal networks and formal organizations that they may use to cope with uncertainty. Evidence of social atomism is weak. Social networks, which tend to be individualistically-oriented among fishers, boat owners and processors, but more cooperative among vendors, are prevalent. Attempts by the harvest sector to formally organize have failed repeatedly, but efforts to use this strategy persist. Findings are based upon surveys, social network analysis, and participant observation. An incremental, institution-building approach to co-management, which may be relevant to other similar situations, is proposed for Barbados.

KEY WORDS: Barbados, co-management, network, social, strategy, uncertainty

INTRODUCTION

In Barbados the major fishery is a seasonal, small-scale, commercial, open access fishery for shared stocks of pelagics, such as flyingfish, dolphin, wahoo, tunas and billfish. Harvest is mainly by boats 7-15 meters long, the larger of which carry ice and go to sea for several days (the iceboats), selling dockside mainly to fish processors. The smaller boats land fish uniced after a day trip (the dayboats) and sell fish dockside to vendors, most of whom are women. The majority of boats are owned by investors, not fishers.

The government of Barbados stated, and put into law, its intention to plan the management and development of its fishing industry. However, it was not clear in terms of the social relations and organization in the pelagic fishery whether it was feasible or not to introduce co-management (McConney, 1995).

This paper describes research addressing this lack of information in order to recommend the most feasible approach to introducing fishery planning and management. The three components and sequential stages of the research concerned the uncertainties perceived by fisherfolk, the social strategies they used for coping, and the implications of these for co-management.

CONCEPTS

Uncertainty

Uncertainty permeates our attempts to understand ecological systems (Ludwig *et al.*, 1992). These systems include fisheries in which uncertainty affects fisherfolk (fishers, boat owners, fish vendors and processors) and state officials (policy-makers, fishery scientists, managers and planners). The fisheries management and planning literature focuses mainly, however, on how officials measure and perceive ecological and economic uncertainty, and how the scientific and legal-institutional strategies they devise ultimately affect fisherfolk. But understanding what uncertainties fisherfolk perceive, and why they choose particular social strategies to cope with them, is also important for planning and management.

People in the fishing industry perceive uncertainty and try to cope with it through social strategies. Fishery planners and managers, within the bounds of politics and bureaucracy, have potential to influence actual or perceived uncertainty and coping strategies by sharing information or engaging in collaborative action with fisherfolk.

Social strategies

Fisherfolk utilize social strategies for coping with uncertainty which range from social atomism, through loose or closely knit individualistic or cooperative personal networks, to formal organizations such as cooperatives or associations (Pollnac, 1988). Information on the specific social strategies used for coping can contribute to the construction of a realistic social model of a particular fishery. Based on the open access common property resource theme, the currently predominant approach to fishery planning and management typically assumes social atomism in the fishing industry (Poggie, 1992). In contrast, the increasingly favoured alternative co-management approach typically requires, among other things, that social cohesion and the capability to form organizations exists in the fishing industry or can be induced, most commonly at the community level (Pinkerton, 1989).

The conceptual framework for evaluating social strategies, the second stage of the research, appears in Figure 1. Economic behaviour is considered socially atomistic when social relations are either irrelevant or non-existent (Coleman, 1990). Simple bioeconomic fishery models make this assumption, among others. An alternative to the atomism assumption is social embeddedness, operationalized by the social network concept (Granovetter, 1985).

As the focal individual (centre, ego) of his or her personal network, the fishery actor, uses the social capital embodied in ties to other actors (alters) in strategies for coping with uncertainty, or conversely is constrained by ties to

other actors. Several variables concern the actors (gender, kinship, age, education, etc.) and the relationships (content, strength, reciprocity, conflict, etc.). The major concern here is whether networks are individualistically or cooperatively oriented, and how this varies among categories of people involved in the pelagic fishery.

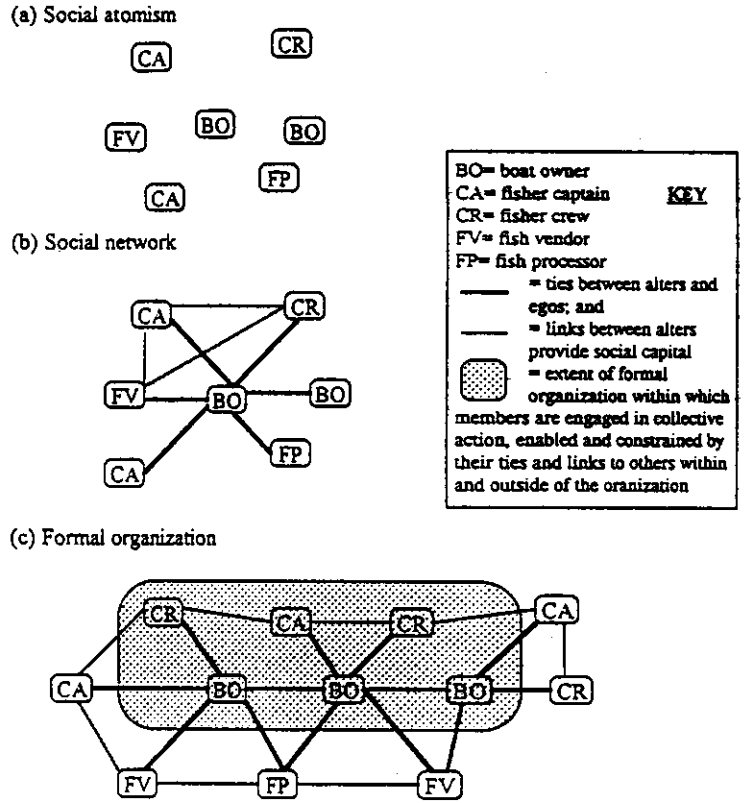

Figure 1. Social atomism, networks and formal organization

The formal organization is a social unit that, from the embeddedness perspective, is superimposed upon the personal networks of the individuals that are its members. An organization can also be a node in a network with other collectives, in which case social relations and power constrain and enable the activities of organizations just as they do individuals.

Co-management

Co-management is "power-sharing in the exercise of resource management between a government and a community or organization of stakeholders" (Pinkerton, 1992). This approach is based on the social embeddedness of fishing as an economic activity not social atomism. But how universally co-management might be applied has been questioned. Kuperan and Abdullah (1994) suggest that there are limits to co-management where resource, political and socioeconomic factors hinder social cohesion or organization formation among fisherfolk.

Situations which limit co-management may be discovered through social investigation. Integrating applied social science can make fisheries planning and management more proactive and better able to detect limits to co-management (Dyer, 1994). Social data could provide information useful for designing the process for management planning, for executing the planning process, and for managing the fishery according to the situation.

Information on social coping strategies can be used to evaluate the social organization of the fishery, and management options — that is, the alternative approaches to state/fishing industry interaction. Some of the relevant options appear in Figure 2, showing the proportion of government versus fishing industry (a) participation and (b) decision-making in planning. Within co-management significantly different power sharing arrangements are possible. Which is feasible depends partly on the social organization of the fishery.

METHODS

Investigating uncertainties was mainly by means of structured, semi-structured and unstructured interviews. Emphasis was placed on a quick survey questionnaire which took on average about 14 minutes to administer to each of 203 fishing industry respondents selected in a manner that was as close to random as circumstances permitted. Also, by informally listening to, and participating in, conversations and activities at fish landing sites, it was possible to get indications about what aspects of their work experience people in the fishing industry felt were most uncertain, and what could be done about them.

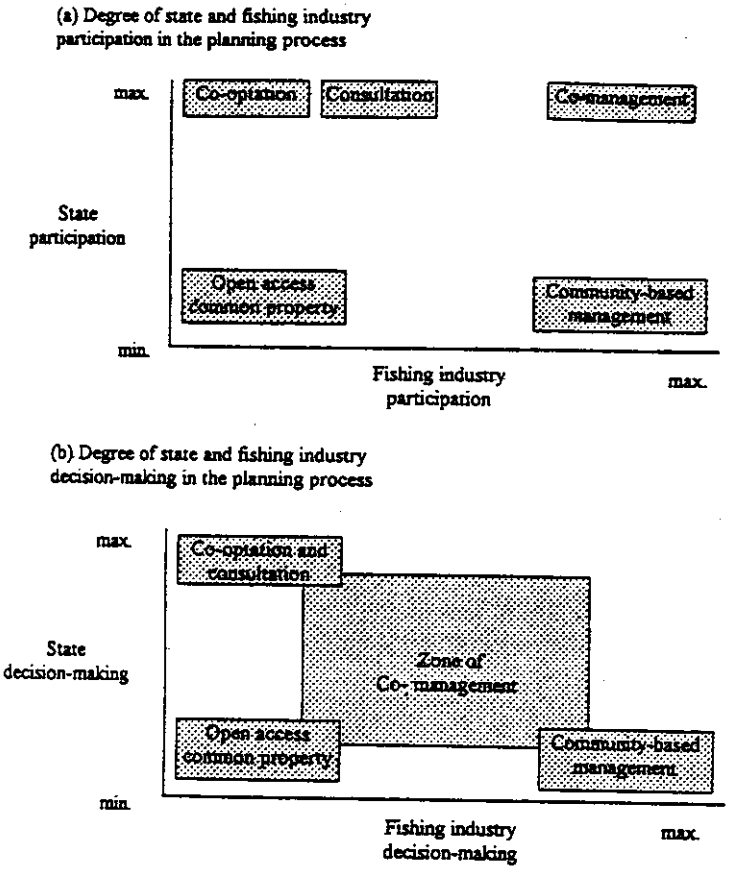

Figure 2. Approaches to fishery management

Findings from the previous research informed social network research design which focused on the major uncertainties which fisherfolk identified. The 37 respondents were drawn mainly from those who had previously participated in the uncertainty survey. The focus was on fisherfolk networks instrumental in providing aid such as information relating to fish catches and prices, marketing arrangements and credit. It was possible to directly observe network relations, particularly with assistance from key informants. Information on prevalent social coping strategies was also derived from participant observation and other interviews at fish landing sites, principally Oistins and Bridgetown. In addition, the opportunity arose to participate in and observe the initial stages of the formation of a fisherfolk organization in response to uncertainty. Research on formal organizations by semi-structured interviews and document analysis was conducted.

Questions in structured and semi-structured interviews soliciting opinions on various aspects of management and planning were posed to both fishing industry and government respondents. All of the 13 government officials in positions capable of directly influencing fisheries management and planning were interviewed. Documentation describing the historical and contemporary planning and political environment was researched in determining preparedness for fisheries management.

RESULTS AND DISCUSSION

Just as the findings from each stage of investigation informed execution of the next, the key results from each stage are presented and discussed before proceeding to the next.

Uncertainties

Most respondents perceived the pelagic fishery to be unpredictable, with uncertainty surrounding fish catches and prices, and hence income, predominating. Both catch and price uncertainty were multidimensional, with the extent of uncertainty about various dimensions differing among respondents.

Regarding catch, over 75% of the fisherfolk surveyed said that they could accurately predict in which months any fishing season would start and end. Their predictions agreed well with documented seasonality. Just under 75% said they could predict the month of peak abundance for the major species. Again, their predictions agreed well with documented evidence, including variability in the timing of peak abundance from season to season.

On the other hand, only about 10% reported they could predict the species composition of daily catches, reflecting the multispecies nature of the pelagic fishery. Less than 5% felt they could predict the proportions of the various species in a catch or the total catch. Fishers appreciated the relationships

between some oceanographic features (e.g. water colour and temperature) and catches, but there was considerable uncertainty about where to find good fishing locations since they found the occurrence of favourable oceanographic features to be unpredictable.

Regarding prices and income, just under 15% were confident about their predictions of daily fish prices, but fish buyers were more certain about prices than those in the harvest sector. Less than 5% of fisherfolk said they could predict their daily or seasonal earnings. Here again, the harvest sector respondents were more uncertain, reflecting among other things that they are largely price-takers in the market for fish.

In general, fisherfolk and government officials shared similar perceptions of uncertainty. In most cases it appeared that uncertainty relating to the fishery resources could be reduced by information exchange and closer collaboration since the problem was mainly one of large gaps in knowledge.

Social strategies for coping with uncertainty

Social atomism — There was little evidence to suggest that taking decisions and acting in isolation was a customary means of coping with uncertainty. Between 60 - 80% of fisherfolk reported having to regularly rely on others to cope with uncertainty, and the remainder cited only a few instances where socially atomistic action was possible. In some cases, such as very competitive dayboat harvest strategies, social ties were temporarily severed in order to achieve a specific purpose. But there was conscious recognition of the existence of ties in doing so. Subsequent related economic action such as marketing the catch often returned to the instrumental use of network relations. Consequently, it could be misleading to plan or manage on the assumption of social atomism.

Social networks — Evidence was found of both individualistic and cooperative social networks. The co-existence of both supportive and competitive (perhaps even conflictual) strands in ties between fisherfolk was observed. Dayboat fishers at sea and ashore demonstrated the greatest tendency towards individualism and flexibility in their use of networks. This is consistent with the findings of Rodman (1971), given their struggle for physical and economic survival in the face of greater uncertainty when compared to other fisherfolk either at sea or ashore.

Iceboat fishers show a greater tendency towards cooperation than dayboat fishers. This is partly due to their interdependence for survival far at sea, and the apparent spillover effect that this has on other areas such as sharing harvest information. The latter behaviour, which results in ties between fishers on the different boat types, serves to reduce conflict, particularly between dayboats and iceboats, that otherwise might exist due to competition. The other major factors

iceboats, that otherwise might exist due to competition. The other major factors contributing to conflict reduction among fishers are: (1) partial market segmentation ashore, since dayboats sell mainly to vendors and iceboats to processors, and (2) fishing together in the offseason fisheries.

However, once ashore, individualistic network strategies are adopted by most fishers when faced with the price-setting power that vendors achieve through their more cooperative networks. Typically, marketing ties to vendors are strong for reasons involving credit and gender. In contrast, ties to owners are often weak or conflictual because of pre-existing socioeconomic status differences between fishers and owners. Fishers demonstrated an opposing strong desire for egalitarianism and minimization of status differences.

In comparison to fishers, the instrumental networks of owners were geared more to achievement than survival. This is consistent with the findings of Rodman (1971) as one moves up the socioeconomic ladder. It is also due to the availability of alternative income sources given the relatively high proportion of non-fishing owners, estimated to be around 70%. But the achievement orientation of owners, especially those with alternative income, is not only a pervasive source of strain in ties with fishers, but among owners themselves as well. They exhibit the same dockside price competition observed among fishers, and the loan defaulting of some appears to have reduced access to credit for all.

Vendors have the most cooperative networks of the fisherfolk as demonstrated, for example, by their price-setting collusion and cooperation in marketing. This is done with strong social sanctions against violating norms. Although gender is an important variable, cooperative networking is more related to occupation than gender as evidenced by its presence among the male vendors at Bridgetown. Credit ties with fishers may play an important role in vendors' economic success, but details on the nature of these relationships are not easily obtained due to sensitivity about borrowing among Barbadians in general (Makiesky-Barrow, 1976) and fisherfolk in particular (Tropical Agricultural Services International, 1982). Thus, it was not possible to ascertain the extent to which such ties are used for exploitation, although fishers claim that they are. Vendors also appear to act as bridges or brokers between processors, fishers and owners. They broker purchases of fish on processors' behalf despite their competition with them in some retail markets. They broker boat owners' relations with fishers through information exchange.

Processors' networks were distinctive in having more non-fishery members and more multistranded ties than other fisherfolk, but with no reported ties amongst themselves. Their networks were most clearly directed towards ensuring profitability for their businesses, and the use of network ties as a source of power was apparent. The basis of this power was both their economic position in terms of being able to supply credit to the industry, and their

connections to government which allowed them to navigate a path through the bureaucracy in a way that owners or vendors could not. While clearly being perceived to be powerful, the nature of the processors' relations with the state remains unclear. Government appears to have acted on behalf of processors where gains in national economic terms had the potential to be greater than losses in terms of popular support from the harvest sector. It appears, however, that processors more than other fisherfolk are in the policy domain of the state where their problems become issues to be dealt with.

Familiarity with the state, and instrumental relations with it, increased from being very low among fishers, to moderate among owners and vendors, to high among processors. Fishers' perceptions and expectations of the state differed from those of other fisherfolk. They perceived a much greater contribution from fishing to the economy than did other fisherfolk. Consequently, their expectations of state support for fishing were also higher. Lack of access to documented information that fisherfolk widely accepted as legitimate and authoritative were contributing factors to confusion about the state.

There was no evidence that strategies in the pelagic fishery were geared towards fishery conservation. However, network relations were found to both increase and decrease exploitation in ways that differed between boat types and were linked to market conditions. The state was also inadvertently engaged in conservation through underdevelopment. From the earliest records of the fishing industry, poor infrastructure and some input limitations (e.g. ice) have limited fish catches, and prevented a "tragedy of the commons" (Hardin, 1968). This is countered by increasing private sector capitalization to extend fishing range and capacity. Fishers' reported tendency to be satisfied with less than maximum catches also reduced resource exploitation, although this may have been countered by increases in efficiency due to communication cooperation in harvest operations.

Formal organizations — The significance of formal organizations rests on the premise that co-management is only feasible if fisherfolk are organized into one or a few stakeholder units able to formally share power and responsibility with the state for fishery planning and management (Pinkerton, 1989).

A major factor in determining which of the fisherfolk were in favour of organization was the relative levels of social power obtained through their network ties. Fishers, having the least social power, were most in favour of collective action. They said that they wanted to be free from the constraining aspects of ties with vendors which reduced income. Furthermore, most of the fishers interviewed had an ideal of achieving "unity" in the fishing industry in which all fisherfolk would conduct their business cooperatively, without conflict. Few fishers opined that conflict within an organization comprising all

categories of fisherfolk would be overwhelming due to diverse interests. Conflict with the postharvest sector was anticipated since the main reason for organizing was to acquire the collective bargaining power necessary to secure higher ex-vessel prices.

No fisherfolk thought that fishers were likely to organize themselves. Fishers perceived that their networks were deficient in the resources necessary to achieve successful organization, and that they had to rely on owners to initiate collective action despite conflictual relationships. Fishers stressed illiteracy and lack of education amongst their ranks as barriers to organization.

Most owners, because of their individualistic network strategies for economic advancement, did not desire organization formation or show commitment to sustained collective action. The latter was demonstrated by a high level of free-ridership in the organizations which had failed in the past. Owners were aware that often the relations between fishers and non-fishing owners were not cooperative. They knew fishers resented them visibly aspiring to higher socioeconomic status. On the other hand, not all organization-minded boat owners wanted fishers to be included in an organization with them. They thought that fishers would not participate meaningfully. Owners with a connection to fishing, either by being current or former fishers or by being from a fishing family, appeared most interested in organizing. Few of the recent non-fishing owners interviewed showed much interest. As with fishers, owners listed dissatisfaction with prices as the main reason for organizing.

Vendors generally saw no need to have an organization of their own unless it was for the management of fish markets. Except for a few at Oistins, they saw high potential for conflict in multistakeholder organizations, and did not hold fishers' ideal of unity. Many were supportive of boat owners forming an organization to represent themselves, particularly against the power of the processors to dictate ex-vessel fish prices. Vendors said that in order to be taken seriously by government and other stakeholders, any harvest sector movement had to be led by owners since fishers had no capital investment in the industry.

Processors agreed that fierce market competition amongst themselves made a body of their own unworkable, but neither was it necessary nor wanted since each processor felt able to succeed on his own. From past experience, a joint negotiating position in dealing with the government was easily achievable in the case of a threat to their common business interests. Unity among fisherfolk, and multistakeholder bodies were thought unrealistic, but they claimed to support harvest sector organization. They saw in this the potential for dialogue that could lead, for example, to greater production and profit for all through increased landings volume, not prices.

Regarding state involvement, the first attempts to form fisherfolk organizations were government-inspired, starting with savings societies and

cooperatives in the 1960s. The more recent initiatives came from within the industry itself. However, all attempts to form fisherfolk organizations in Barbados have failed after a few months or years. The organizations investigated included cooperatives, a union, a company and associations. All but the union were entirely harvest sector oriented, and female participation in all was low or absent. It was found that network relations with persons outside organizations, such as vendors and processors, had greater potential for constraining or destabilizing, than assisting, harvest sector organizations. Poor management also contributed to failure. Socioeconomic factors, such as the distrust and conflict between owners and fishers described previously, played a role in their demise. Most respondents thought that government did not do enough to promote and support fishing industry organization.

In terms of networks of organizations, there is a potential conflict between fish landing sites wanting to retain their autonomy by forming site-specific organizations, and the opposing view that there should be only one organization representing all stakeholders and fishing sites in the harvest sector. Fear was expressed that several organizations would, each on their own, be too small and weak to be effective in negotiations with the state about benefits for the fishing industry. Differences in interests suggest that a single or umbrella organization may not meet the needs of the various landing sites. The magnitude of this problem is generally not appreciated in the harvest sector. Consequently, the formation of inter-organizational networks may be impeded by the notion that the harvest sector should form only one representative organization which is a more difficult task.

Implications for co-management — The implications for co-management of the social strategies described above must be examined from the perspectives of both the fishing industry and state in relation to their capacity for management. Fisherfolk, particularly in the harvest sector, have been unable to organize themselves into effective stakeholder groups capable of negotiation with the state, and collective action has tended to occur mainly in response to crisis. Given the high opportunity cost of sustained participation (Bay of Bengal Programme, 1990), and the prevalence of individualistic competition rather than cooperation in the apparently marginally viable harvest sector (Burtonboy, 1988), this is not surprising. The foundation of social cohesion on which many of the conditions in favour of co-management rely is absent in the Barbados pelagic fishery. As a result, one is left to seek other factors in favour of co-management.

Regarding orientation toward management, fisherfolk apparently have no conservation ethic with regard to the pelagic fishery as no reason has existed for it to arise. There is only slight concern over flyingfish since much of the fish

resources caught by local fishing boats are largely speculative, but all range outside of Barbados' potential EEZ. There is no sense of resource ownership among fisherfolk. Indeed, this has led to fishing access disputes with neighbouring countries. The international and regional harvest stakeholders are not well known due to the lack of information on the resource, and this adds to the uncertainty. There is evidence from the demersal fishery that stimulating a conservation ethic may be possible if fisherfolk are made aware of the issues involved and allowed to make input (Mahon and Drayton, 1992), but because of the nature of the resource, this may not happen as easily in the pelagic fishery.

Furthermore, the state is not in an authoritative position in relation to the industry, particularly in terms of enforcement and the scientific resources necessary to continually research and adjust a control and command type of regulatory framework. In order for the state to engage in any type of management, the compliance and cooperation of the fishing industry will be necessary. In Barbados, within the bureaucracy, the Fisheries Division lacks status and power. Co-management will not be feasible if the Fisheries Division is marginalized. To remain small, but become more effective, it will need to collaborate with fisherfolk. Relations between the state and industry are not such that co-optation is likely to be successful. Selective consultation a few fisherfolk will not achieve the level of legitimacy required. This is born out by international experience (McGoodwin, 1990). Since the Division's jurisdiction is much smaller than the resource distribution, it's role in regional management arrangements must also be considered.

The fishery planning experiences investigated indicate that the state has been only weakly committed to consultation with the fishing industry. State officials had reservations about the industry playing a role other than a purely advisory one through people who represented not a constituency of fisherfolk, but particular individual expertise and experience. This perspective is reflected in the requirement for a Fisheries Advisory Committee under the 1993 Fisheries Act. The planning experiences also reveal an absence of creative, collaborative problem-solving. Progress in collaboration is largely dependent on stakeholders (within both the state and industry) being able to negotiate on the basis of mutual interests, rather than be purely adversarial as in the past. Fisherfolk may not be initially accepted as full co-management partners even if the state had the requisite management capability. An approach which incrementally prepares the industry and state for co-management could be most appropriate at this time.

The impetus to engage in co-management may come from the uncertainties associated with the fishery resource. Both fishers and the state are deficient in fishery resource information, and their deficiencies differ in ways that could make information exchange mutually beneficial. Given its scarce supply of human, technical and financial resources, the Fisheries Division is likely to remain

technical and financial resources, the Fisheries Division is likely to remain constrained in planning and management capability in the short to medium term. Information on species distribution suggests that only management on a regional or larger scale is likely to be effective, and the management of shared stocks introduces a high degree of uncertainty about the attainment of the necessary geopolitical coordination. Therefore, the flexibility for state and industry to adapt to widely variable and unpredictable fluctuations in species abundance or availability from both natural and human causes is needed. This suggests that collaborative planning between the state and the industry would be mutually beneficial.

Adaptive flexibility can perhaps be feasibly accomplished through an incremental, institution-building approach to co-management. The Fisheries Advisory Committee, while useful, will be insufficient to be the primary device of co-management based on its present structure. State and industry stakeholders need to negotiate a purpose-built arrangement. Considering the current disorganization of the fisherfolk it will not be possible to involve the entire industry in the initial stages.

An initiative could be aimed at improving the trust and cooperation within the fishing industry, and between it and the state, through information exchange. The uncertainty surrounding the fishery, and the weakness of the state, provide a strong incentive for the harvest sector and government to introduce co-management starting with the relatively simple and straightforward exercise of joint data collection and analysis. There is sufficient available ordinary (fisherfolk) and scientific (state) knowledge to start the process inexpensively.

What may be feasible is intensive state collaboration with groups having the organizational potential to engage in a limited co-management pilot project. Oistins is the largest landing site with the full range of fisherfolk occupations that shows a propensity towards true community spirit and cooperation. The thrust of the project could consist of collaboratively formulating a process to allow the fullest participation of Oistins fisherfolk in management on a partnership basis with the Fisheries Division. This collaboration, in whatever form it may take, would plan joint activities, such as data collection and analysis, in keeping with the needs and capabilities of both state and industry.

Ideally, if the pilot project was successful, the system devised could be enlarged to cover more of the fishery's participants. It is possible that fisherfolk's contacts with neighbouring islands could assist in constructing a regional grassroots foundation for fisheries management planning in the eastern Caribbean to which the political directorate would positively respond. In this manner one could introduce a practical bottom-up cooperative management and planning approach. Incrementally, co-management could be introduced as the strategy for coping with the uncertainties of the pelagic fishery.

CONCLUSIONS

Although constrained by resource limitations and current planning practice, the state fisheries agency shows willingness to integrate socioeconomic information into fisheries management planning. An approach to planning and management which assumes social atomism is not appropriate due to the prevalence of social networks which influence economic action. Barriers to collaboration and communication between state and industry do not favour co-optation or consultation achieving the level of management legitimacy required for compliance and success. Immediate institution of fishery-wide co-management is not appropriate due to the weak state and absence of social cohesion or formal organization in the industry.

The uncertainties exhibited in the marine and human environments which argue for a flexible response to unpredictable circumstances by both the industry and managers offer the best incentive for co-management. The legal-administrative environment favours at least limited participation. Limited co-management can perhaps be feasibly initiated through an incremental, institution-building approach aimed at improving the trust within the fishing industry, and between it and the state, through information exchange. A co-management pilot project involving fisherfolk and the Fisheries Division is outlined as a practical approach for introducing planning and management. If successful, the system may be expanded and applied at the national scale and ultimately the regional scale. The latter is the smallest scale appropriate for managing the pelagic fishery.

LITERATURE CITED

Bay of Bengal Programme 1990. Helping fisherfolk to help themselves: a study in people's participation. FAO Bay of Bengal Programme, Madras, India.

Burtonboy, A.H. 1988. Fisheries cooperative development Barbados: Project findings and recommendations. FAO Terminal statement.

Coleman, J. 1990. *Foundations of social theory*. Harvard University Press, Cambridge.

Dyer, C. 1994. Proaction versus reaction: integrating applied anthropology into fishery management. *Human Organization* **53**:83 - 88.

Granovetter, M. 1985. Economic action and social structure: the problem of embeddedness. *Am. J. Sociol.* **91**:481 - 510.

Hardin, G. 1968. The tragedy of the commons. *Science* **162**:1243-1248

Kuperan, K and N.M.R. Abdullah. 1994. Small-scale coastal fisheries and co-management. *Marine Policy* **18**:306 - 313.

Ludwig, D., R. Hilborn and C. Walters. 1992. Uncertainty, resource

exploitation and conservation: lessons from history. *Science* **260**:17,36.

Mahon, R. and N. Drayton. 1992. Trap fishery management in Barbados: the fishermen's perspective. *Caribbean Marine Science.*

Makiesky-Barrow, S. 1976. *Class, culture and politics in a Barbadian community.* Ph.D. dissertation, Brandeis University.

McConney, P.A. 1995. *Fishery planning in Barbados: the implications of social strategies for coping with uncertainty.* Ph.D. thesis, University of British Columbia.

McGoodwin, J.R. 1990. *Crisis in the world fisheries: people, problems, and policies.* Stanford University Press, Stanford.

Pinkerton, E. (ed.) 1989. *Co-operative management of local fisheries: new directions for improving management and community development.* University of British Columbia Press, Vancouver.

———. 1992. Translating legal rights into management practice: overcoming barriers to the exercise of co-management: *Human Organization* **51**:330 - 341.

Poggie, J.J. 1992. Intracultural and intrasocial variability as a tool for policy making in fisheries development management. In: J.J. Poggie, N.R. DeWalt and W.W. Dressler (eds.) *Anthropological research: process and application.* State University of New York Press, Albany.

Pollnac, R.B. 1988. Social and cultural characteristics of fishing peoples. *Mar. Behav. Physiol.* **14**:23 - 39.

Rodman, H. 1971. *Lower-class families: The culture of poverty in Negro Trinidad.* Oxford University Press, New York.

Tropical Agricultural Services International. 1982. Social and cultural factors associated with the implementation of Oistins development fishing project. Systems, Bridgetown, Barbados.