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COMMUNITY-BASED MANAGEMENT OF FISHERY RESOURCES  
IN THE CARIBBEAN

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by

Bisessar Chakalall  
Regional Fisheries Officer  
c/o FAO Representation  
17 Keate Street  
Port-of-Spain  
Trinidad & Tobago

Note: The opinions expressed in this paper are the author's and do not necessarily reflect those of the agency he works for.

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Abstract: Modern fisheries management strategies, such as closed areas and seasons, quality of catch and gear restrictions, have not yielded the expected and desired results in the small islands of the Caribbean, the Lesser Antilles. Even though the commercial, nearshore, demersal and reef resources are fully exploited or overfished, little or no effort is being made to observe or enforce current management regulations. This paper examines the approach and application of community-based management as a strategy for resolving the 'commons problem' created by the open access fisheries of the Lesser Antilles.

A major conclusion is that community-based management can be applied to the small-scale fisheries of the Caribbean through existing legal and institutional structures and with certain changes in policies. The experience which is lacking can only be gained through trial and error and by building on the existing traditional practices being observed by fishermen. Community-based management would form the backbone for fisheries management, to be supported by modern management strategies. National fisheries management bodies will have to change their functions in that they will now provide advice and technical assistance to the holders of the exclusive-use rights, who will manage the resource in conjunction with the diverse interest groups of the coastal community.

# COMMUNITY-BASED MANAGEMENT OF FISHERY RESOURCES IN THE CARIBBEAN

## 1. Introduction

In the development of modern fisheries management, very little, if any, consideration was given to the indigenous techniques used by local peoples for regulating fishing effort. Some of these techniques survived, evolved and acquired legitimacy in some coastal states, such as Japan, (Shima, 1983) and was succeeded by other concepts, such as 'open access', in other states, such as the Pacific Islands, (Johannes, 1978).

Indigenous practices of fisheries management were mainly applied to small-scale fisheries, and are referred to in the literature pertaining to them by various names, such as 'localized management', 'bottom-up management', 'traditional sea tenure', 'community-based management' and 'self-management'. The term 'community-based management' is preferred by the author, the reasons for which are discussed in Section 4.

Development models adopted by most developing countries have been based largely on centralized planning and management concepts adopted from the developed countries. This is probably one of the main reasons why local knowledge, experience and management skills were ignored and not allowed to evolve and develop. Community-based management systems emerged where local conditions facilitated easy acquisition and defence of exclusive-use rights (Christy, 1982). In some cases, these traditionally acquired rights were legalized. The Japanese Fisheries Law of 1901 designated the 'Village Guilds' of the coasts as Fisheries Co-operative Associations (Hirasawa, 1980). The Co-operatives not only retained their traditionally practiced rights to decide fishing seasons, fishing zones, types of fishing gear, and fishing methods to be

used in respective areas, but were also given fishery rights over all coastal waters. Japanese fishery are treated as land holding rights in their civil code.

Sea tenure and rights over the use of the resource are considered by many fisheries managers as a cornerstone of sound fisheries management. Although there is evidence that community-based coastal fishery management systems have potential for sustained yields and employment (Arzel, 1984; Johannes, 1978) they are not fully recognized by many tropical fisheries management agencies (Johannes, 1981).

The consequences of the transition from communal management to 'open access' fishing has been extensively discussed in scientific literature (Gordon, 1954; Hardin, 1968; Johannes, 1978; Berkes, 1986). In the opinion of the majority of investigators, this transition has facilitated too rapid development in the quest for maximum profits, while paying very little, if any, attention to conservation of the exploited stocks. This situation, which is often referred to as the 'tragedy of the commons' has resulted in the over-exploitation of nearshore demersal fishery resources in the Caribbean.

The primary objective of this paper is to examine the approach and application of community-based fisheries management as a strategy for resolving the 'commons problem' with specific reference to the small islands of the Caribbean, the Lesser Antilles.

## 2. Fishery Resources of the Lesser Antilles

Fisheries production in the Lesser Antilles is limited by factors that affect the ecology of the area. The region lacks an

extensive, shallow, continental shelf; most of the islands have relatively narrow shelf areas. In addition, water temperatures do not fluctuate over a wide range, so that there is a relatively stable thermocline which prevents mixing of surface and deep waters. Although there are upwelling areas, they are not a dominant feature. The result is a restricted nutrient supply which is probably reflected in the limited demersal fish, mollusc and crustacean stocks.

Even though information on the current state of exploitation is inadequate, the commercial nearshore demersal fish species as well as queen conch and lobsters, are fully exploited or even overfished in most countries. The deep water demersal species (snapper, grouper) are probably underexploited, although there are reports of local depletion. Few countries have reported a decline in coastal pelagics (ballyhoo, jacks, clupeids). The oceanic pelagics (tuna, kingfish, dolphin, bill fishes) which form a major part of fish landings in the Lesser Antilles, are generally considered to hold the greatest potential for increasing production. Figures for 1988 show a total fish landing of 30,654 mt. (FAO, 1988). Table 1 contains background data on the fisheries of this sub-region.

Fishing is primarily artisanal, with fishermen operating from small boats utilizing relatively simple gear consisting mainly of fish traps, handlines, trolling lines, gill nets, beach seine, trammel nets and longlines. Larger boats with highly specialized equipment are being introduced in the area through foreign vessels, mainly from Taiwan and USA, which are targeting specific species such as swordfish and tuna.

TABLE 1: BACKGROUND DATA ON THE FISHERIES OF THE LESSER ANTILLES

ISLANDS	STATUS <sup>1</sup>	Land Area <sup>2</sup> km <sup>2</sup>	POPULATION	LANDINGS <sup>3</sup>					DEMAND <sup>5</sup> mt	NUMBER <sup>6</sup> OF FISHERMEN	NUMBER OF BOATS <sup>7</sup>	
				1985 <sup>2</sup> mt	1985 <sup>3</sup> mt	1986 <sup>4</sup> mt	1987 <sup>4</sup> mt	1988 <sup>4</sup> mt			5-10 M	11-17M
Anguilla	UK	91	8,000	0	485	0	0	0	1,400 (incl. St. Martin & St. Barthelemy)	350	129	-
Antigua/Barbuda	I	442	77,226	2,246R	1,300	2,246R	2,400F	2,400	2,000	800	250	80
Barbados	I	431	254,000	3,915	3,100	4,227	3,702	9,097	4,300	1,500	500	80
Dominica	I	750	80,300	640	950	644	650F	650F	2,000	1,700	630	11
Grenada	I	344	100,000	1,437	1,100	2,112	2,215	2,001	5,600 (incl. St. Vincent & the Grenadines)	1,255	580	12
Guadeloupe (incl. Marie Galante, Ile des Saintes)	F	1,779	344,000	8,390	8,400	8,500	8,560	8,170	9,100	1,596	1,000	30
Martinique	F	1,101	350,000	4,604F	4,600	4,038F	4,522F	3,000	9,100	855	1,140	26
Montserrat	UK	102	13,000	111R	100	111R	111R	111R	300	200	70	3
Netherland Antilles (Aruba, Bonaire, Curacao & St Martin)	N	1,204	260,000	1,030		1,060F	1,100	1,200				
St Christopher & Nevis	I	262	44,700	1,500	1,500	1,450F	1,500F	1,500F	1,000	850	315	2
Saint Lucia	I	616	140,000	1,052	1,200	840	651	945	3,100	2,000	650	1
St Vincent & the Grenadines	I	388	110,000	483	1,700	599	703	712	5,600 (incl. Grenada)	2,050	740	1
Virgin Islands (UK) (Tortola, Anegada, Virgin Gorda)	UK	153	11,000	318R	760	318R	318R	318R	2,000 (incl. US Virgin Islands)	180	120	
Virgin Islands (US) (St Croix, St. John, St. Thomas)	US	342	120,000	600	519	570	549	550F	2,000 (incl. UK Virgin Islands)	480	325	10

1. F = French, I = Independent, N = Netherlands, UK = United Kingdom, US = United States.

2. FAO, 1985 Yearbook of Fishery Statistics Vol. 60: F = FAO estimate, O = less than half metric ton, R = repetition of data previously reported by country.

3. Extracted from: - WECAFC Fishing Landings, 1985. FAO/WECAFC Working Party on Fisheries Statistics, 1986.  
- Draft Report, Workshop on Data Collection Systems in Eastern Caribbean, OECS Fisheries Unit, 1987.

4. FAO Year book of Fishery Statistics. Vol.62, 1986; Vol. 64, 1987; Vol.66, 1988, resp.

5. Extracted from: - Olsen, D.A. et al, 1983. Ciguatera in the Eastern Caribbean, WECAFC/83/Info. 10.

6. Includes part-time fishermen.

6 & 7. Extracted from: - 3 and 5 above  
- Chakalall, B., 1984. Perspectives and Alternatives for Fisheries Development in the Lesser Antilles. Proc. of 37 GCFI.

With the exception, in some cases, of expatriate residents (who may acquire a special permit to fish), anyone who chooses to fish may do so, and as such the fishery is classified as an 'open-access fishery'. Since there is practically no control of fishing effort, coupled with the fact that demand greatly exceeds supply, overfishing of the most important economic species is quite possible.

The people of the Lesser Antilles are large consumers of fish, about 25 kg per head per year, in comparison to the per capita consumption of 12.5 kg per annum in the Greater Antilles. An estimated 16,400 mt was imported by the Lesser Antilles countries in 1987 at an estimated cost of US\$56 million (FAO, 1987) to assist in satisfying this demand.

The small island states of the Lesser Antilles have few natural resources and their economies are centered mainly around agriculture, fisheries, tourism and light industry. Comparative studies by Gajraj (1978) and Putney (1982) indicate that the living natural resources in the Lesser Antilles are under greater stress than anywhere else in the region. The resource base of these islands is so limited that virtually all of their resources are critical for the maintenance and development of their human population.

### 3. Management Regime

Community-based fisheries management hinges on the accessibility to and exclusive-use rights of the fishery resources. With the widespread adoption of the 200 mile extended economic zone, the opportunity and interest exist for the practical application of this concept in modern fisheries management.

For centuries marine fishery resources have been exploited by the nations of the world as 'common property', under the doctrine of the freedom of the seas. Common property resources are those to which access is both free and open to a set of users or potential users from a particular country or community and from any country (Christy, 1982). The condition of common property exists if there is no control to access, even though the right to do so may exist. The use of the fishery resources of the Lesser Antilles is subject to central, government control to protect the interest of the general public. Controls include closed areas and seasons, gear restrictions and quality of catch. However, these controls are not always enforced and as such the condition of common property exists. One of the main reasons for lack of enforcement, is that overfishing is more politically acceptable than unemployment. The fisheries sector serves as a safety valve for the unemployed from the other economic sectors.

The United Nations Convention on the Law of the Sea (UNCLOS, 1982), has made it possible for coastal nations to assert exclusive-use rights and jurisdiction over all marine resources within their 200 mile Exclusive Economic Zone or EEZ. This new 200 mile limit marks the end of the doctrine of the freedom of the seas and of 'open access' to the nations of the world. At the same time, it has converted the EEZ into a national 'commons problem', in that access is free and open to all nationals. Most of the Caribbean countries have ratified the Law of the Sea Convention and declared a 200 mile EEZ or Fishery Zone (Table 2). This exclusive right over the use of the fisheries resources also includes responsibility for its management to prevent over-exploitation and to maintain sustainability.



TABLE 2: NATIONAL LIMITS RELATING TO TERRITORIAL SEAS, EXCLUSIVE FISHING ZONES AND EEZs

Country	Territorial Sea	Fishing Zone	EEZ
Antigua & Barbuda*	12 mi (1982)	200 mi (1982)	200 mi (1982)
Barbados*	12 mi (1977)		200 mi (1978)
British Virgin Islands (UK)	3 mi (1878)	200 mi (1977)	
Dominica*	12 mi (1981)	200 mi (1981)	200 mi (1981)
Martinique & Guadeloupe (France)	12 mi (1971)	200 mi	200 mi (1977)
Grenada*	12 mi (1978)		200 mi (1978)
Montserrat	3 mi (1878)	200 mi (1983)	
Netherland Antilles	12 mi (1986)	200 mi (1991)?	
St. Christopher/Nevis*	12 mi (1984)		200 mi (1984)
Saint Lucia**	12 mi (1984)		200 mi (1984)
St. Vincent & the Grenadines	12 mi (1983)		200 mi (1983)
US Virgin Islands	3 mi	200 mi (1977)	200 mi (1983)

\* Country is a signatory to UN Law of the Sea Convention.

\*\* Country has ratified UN Law of the Sea Convention.

The concept of transferring this exclusive-use right to communities, individuals or other entities was first discussed by the Organization of Eastern Caribbean States (OECS)<sup>1</sup> Fisheries Administrators in 1983, during an FAO/Norway sponsored workshop on the Harmonization of Fisheries Legislation. The harmonized Fisheries Legislation adopted by the OECS countries gives the Minister responsible for fisheries the power to "designate an area as a local fisheries management area" and to designate any local authority, fishermen's co-operatives or fishermen's associations or other appropriate body representing fishermen in the area as the "Local Fisheries Management Authority" (LFMA) for that area. Where there is no body representing fishermen in the area, "the Minister may promote the formation of such a body".

<sup>1</sup> Antigua & Barbuda, Dominica, Grenada, Montserrat, St. Christopher & Nevis, Saint Lucia, St. Vincent & the Grenadines. The British Virgin Islands is an Associated Member of the OECS.

#### 4. Community-based Management

Management as applied to natural resources can be defined as the set of rules, labour, finance and technologies that determine the location, extent and rate of resource depletion, or renewal when applied to renewable resources (Renard et al, 1991). According to this definition, the users of the resource, in this case the fishermen, are its managers, because they make conscious decisions regarding the resources and method of their applications. In order to manage, the fishermen may require technical assistance and advice from experts and decision makers. The OECS countries based their concept of Local Fisheries Management Authority (LFMA) on this definition.

The utilization and state of fishery resources not only depend on the harvesters, but also on the diverse interests within the community, such as recreation, transport, industrial needs and waste disposal, that compete for the use of the coastal waters. Here community is defined as a group of people bound together by some functional link, such as occupation, place of residence, economic activity, hobby or religion (Renard et al, 1991). It is accepted that the status of fish stocks is affected not only by harvesting, but also by other factors such as the market and its demand for high-valued species, pollution, coastal industries, and the activities of coastal communities. Hence the need for the wider community to be involved in the management and development of the fishery, rather than the fishermen only, who would have acquired exclusive-use rights to the resource.

It should be pointed out that, by the abovementioned definition, a community may not be restricted to one province or country. For transboundary stocks, shared and migratory resources, the 'community' could involve more than one country. The nature and composition of the 'community' in community-based management

will be determined by a number of factors such as the attributes of the target species, geography and critical habitats.

Community-based management, as being proposed, is basically the transference of management responsibility to the fishermen and the coastal community, and thus, incorporation of indigenous management practices, wherever practical and appropriate, and the resource users' cultural, social and economic concerns, into modern fisheries management strategies. It can be seen as fine-tuning modern management strategies, by focussing more attention on the people who make their livelihood from the sea. Community-based management would therefore be the backbone of fisheries management, which will be supported by modern management strategies, such as closed areas and seasons, gear restrictions, catch quotas and quality of catch. With exclusive-use rights the fishermen will have a major say in the management of the resource. In community-based management, one of the major roles of scientists, experts and government fishery managers would be to provide technical assistance and advice to the holders of the exclusive-use rights.

##### 5. Rationale for Community Involvement

The LFMA in the OECS countries was viewed as a tool to give local fishing communities preferential fishing rights within their own areas, and encourage the spirit of self-reliance and self-management, with the main incentive being the auto-control of harvesting in the interest of sustainability. The formation of LFMAs was also seen as an attempt to involve the fishermen in the formulation of laws and regulations from the 'grass roots' of the local communities, rather than to impose laws from 'above'.

The most important justification for community-based management is that it seeks to redress economic and social imbalances, promote the equitable distribution of resources and benefits, restore social harmony and enhance the creative potential of individuals and communities (Renard, et al, 1991). Community management has a direct effect on the distribution of wealth to the users (individuals or community) in that fishermen get protection from the more technologically and financially efficient sector of the community, as the value and scarcity of the resources become known. Modernization and technological change can affect the status of the stock, and more importantly, the livelihood of small-scale fishermen, and force them to seek alternative means of earning a living. In Barbados, for example, the larger ('ice') boats have a lower profit margin per ton of fish harvested, than do smaller ('day') boats, which employ twice as many fishermen per ton of fish harvested than do 'ice' boats (Hunte, 1986). In addition, establishing community management is seen as an insurance against the development of situations that could create a class of 'sea lords', which could well worsen the plight of small-scale fishermen (Christy, 1982).

Another reason for community involvement is the recognition of the traditional knowledge of the fishermen and their existing fishery management practices. This does not imply that all indigenous techniques can avert over-exploitation, but the ones that do must be incorporated into modern fisheries management processes.

## 6. Possible Management Regimes

The exclusive-use rights of a resource can either be resource specific or site specific. For example, a specific area with benthic resources such as bivalves (oysters), algae (Gracilaria and

Hydropuntia spp.), and conch, can be the exclusive-use right of a fishing co-operative or association. In the same way, a site for a raft for the culture of algae or molluscs can be the exclusive-use right of an individual or group. The value of the right to a site will be affected by the flow of nutrients or pollutants through the site over which the holder of the right may have no control. However, the involvement of the community, which in this case could include the polluters, could result in minimizing the effects of pollution. The applicability and success of this management regime for benthic species was demonstrated by the sea-urchin harvesters of Maria Islands and Laborie, Saint Lucia (Smith and Berkes, 1991).

While community-based management of benthic species and distinct biomes associated with algae culture or artificial reefs and fish attracting devices is relatively simple to establish, it is more complex and difficult for shared and migratory species. In this case, regional co-operation is necessary.

Inter-country, regional, and international co-operation, which is provided for under Article 123 of the Law of the Sea Convention, is necessary for the management and development of fisheries in the Lesser Antilles for a variety of reasons. These include the dangers of exploitation of stocks under the jurisdiction of two or more states, the growing complexity of fishery and environmental problems, species that come under the jurisdiction of more than one country at different times of their life cycles, and the existing disparity in expertise and experience, as well as technical and financial resources. Regional co-operation may be necessary not only for management, but also for the exploitation of resources such as large oceanic pelagics (tuna, swordfish) which seasonally migrate through the EEZs of Lesser Antilles Countries, due to the high investment costs that may be required.

For the Lesser Antilles, regional co-operation in fisheries management and development should be based mainly on the attributes of the resource rather than on economic or political groupings. Oceanography, geography, critical habitats, species range and its attributes, the area occupied by a homogenous ecological community, fishing technology and the area occupied by a unit stock (Stock Distribution Area) are some of the criteria that would determine fisheries management regimes in the Caribbean, Figure 1.

For example, the exploitation of a pelagic stock, such as the flying fish resource in the Eastern Caribbean, whose migratory movements are localized within a certain geographic area would be subjected to joint control by the countries involved. These countries would form a sub-regional body that would determine the MSY (Maximum Sustainable Yield) of the resource and the TAC (Total Allowable Catch) for each country. This TAC would constitute the exclusive-use rights for the flying fish resource for each participating country. This TAC (exclusive-use right) will be transferred to the fishing communities, who would convey their views, concerns and needs to the national fisheries administrative body and vice versa. The respective national fisheries administrative bodies would form the sub-regional body. The various national fishing communities with the exclusive-use right (TAC) would be responsible for the joint management and utilization of the resource in their respective geographical jurisdiction.

This approach could also be applied to highly migratory stocks (tuna, swordfish), the value of which will be affected by 'upstream' use. For tuna, for example, the International Commission for the Conservation of Atlantic Tunas (ICCAT) could be the international body controlling the use of these highly migratory stocks. For these migratory species, the direct user group (fishermen) is far removed from the decision-making body that will decide on the (TAC) exclusive-use right. However, the

approach of involving the resources users' community, if successfully employed, should ensure their contribution to the decision-making process and thus an equitable share of the resources

Fishing techniques and gear also play a role in determining management regimes. Gears that require access to large areas of the sea, and are associated mainly with industrial fishing, such as trawling, purse seines and industrial long lining, are not used by fishermen of the Lesser Antilles. The small-scale fisheries of the Lesser Antilles use mainly artisanal gear (pots, longlines, land lines, gillnets, etc.) that can be easily subjected to definite geographical limits on a permanent or seasonal basis.

Pot fishing, which is a common fishing method in the Caribbean, is practiced mainly between the months of July and December in Saint Lucia. Pot theft among the several groups of fishermen who operate within a specific geographic area is also a common problem, and has never been successfully resolved. When introduced to the concepts of community management, the fishermen groups in the south-east coast of Saint Lucia agreed that it is one way to resolve the problem of pot stealing, and even made suggestions on how it could be implemented (Walters, 1988).

#### 7. Application of Community-based Management

Although development planning, in theory and in practice, is widespread in the region, it has not been used in the fisheries sector as intensively as in the agricultural sector. The first step towards sustainable fisheries development in the Caribbean is the preparation of fisheries development plans utilizing the best scientific data and information available. Developmental planning allows for the introduction of appropriate policies and instruments

aimed at the growth, management and development of the fisheries sector, as well as the incorporation of relevant bilateral, regional and international policies and decisions regarding the conservation of the resource. It is a continuous process requiring an inter-disciplinary effort.

The nature and characteristics of the resource require the state to take the lead role in fisheries development planning, the process of which should be integrated and co-ordinated with national planning systems. The work of fisheries developmental planning should incorporate the following principles (FAO, 1984):

- a) Flexibility - fisheries planning systems should provide mechanisms for control, adjustment and periodic updating of formulated plans.
- b) Multidisciplinary - fisheries activity constitute a system that covers a number of scientific disciplines, each with its specific role.
- c) Participation - fisheries planning systems should provide suitable mechanisms for the participation of resource users, the fishing community and other sectors of the economy in plan preparation and implementation.
- d) Integration - plans should be integrated into national development plans.
- e) Universality - plans should take into consideration, as far as possible, other variables and phenomena (social, cultural and economic situation of fishermen, coastal development, environmental concerns, tourism, etc.) that are related to and impact on fisheries.



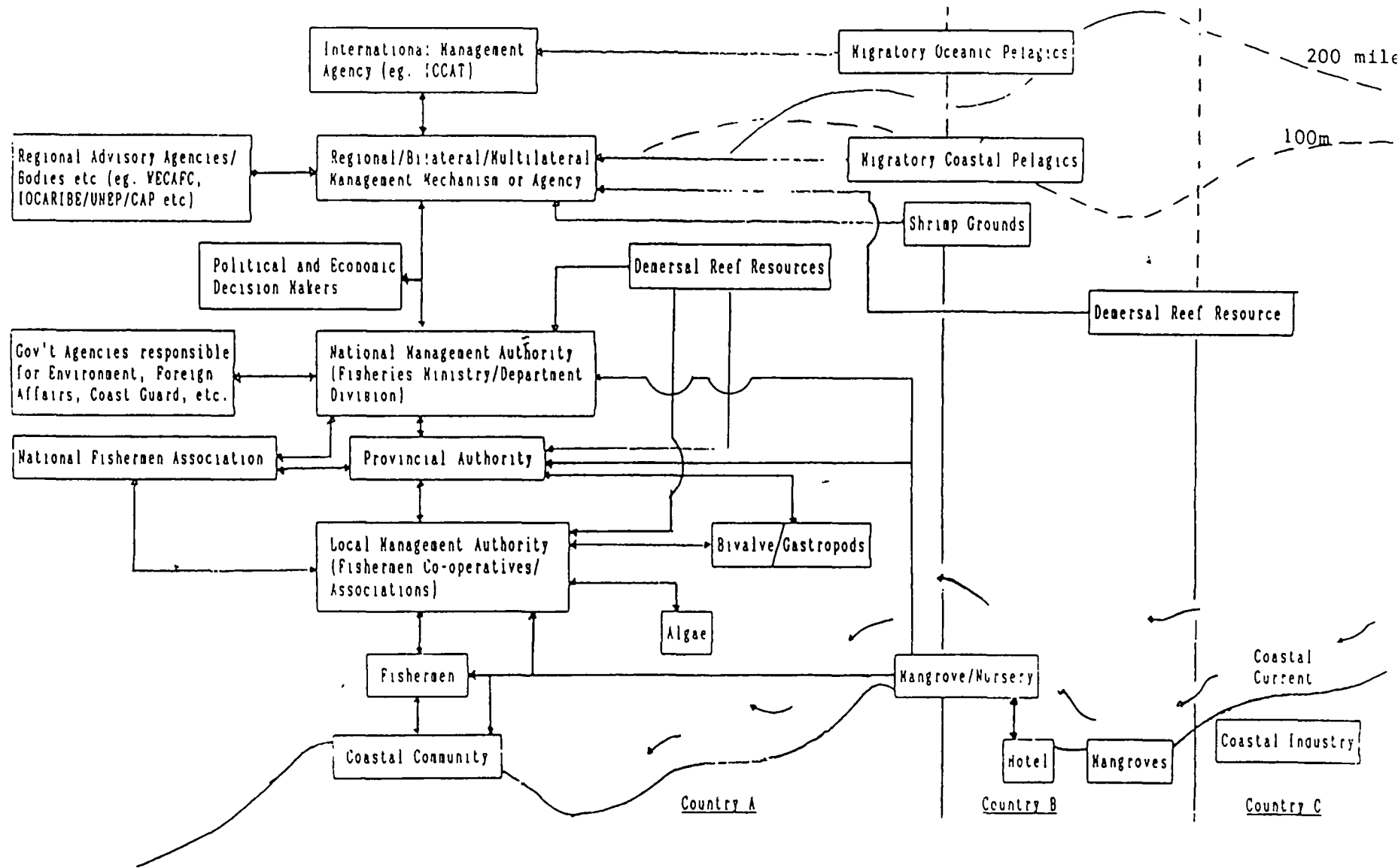
The principle of participation is the most important for the success of community-based fisheries management. The community-based approach would not only address the direct management and development issues of the fishery, but also issues outside of direct fishing that affect the fishermen and the fishing community. Participation of the community should ensure its contribution to the management and development of the fisheries sector. Development goals and objectives are more likely to be achieved if they are approved by the fishing community.

Schematically, Figure 1 illustrates how community-based management is incorporated into existing institutional structures. Its implementation will require changes in policies that will involve the decentralization of decision-making and the empowerment of fishermen. The functions of some of these institutions will have to change, as the management responsibility is shifted to the holders of the exclusive-use rights. National fisheries management bodies will have to change their functions in that they will now provide advice and technical assistance to the fishermen, who will manage the resource in conjunction with the diverse interest groups of the coastal community.

Four organizational levels are identified in Figure 1; 1) The fishermen to whom exclusive-use rights would be transferred and the coastal community whose main responsibility would be to minimize the impact of coastal activities on fisheries; 2) the management authority which will comprise of the holders of the exclusive-use rights and those in the local community that have an interest in the resource; 3) provincial and national management authorities, regional and international management agencies, advisors and other related bodies; and 4) the decision makers in the political and economic system. Levels 1 and 2 will have the responsibility for the management of the resource. This responsibility would be removed from the national management authority (Level 3), whose

Figure 1

Possible Fisheries Management Regimes and Application of Community-based Management in the Lesser Antilles



main functions would include the provision of technical assistance and advice to Levels 1 and 2, arbitration, co-ordination and linkage with relevant regional and international agencies. Level 4 will consider national policy and economic concerns with respect to the management of the resources. Regulation by higher government authorities is necessary to avoid the development of monopolistic ownership and to protect the national interest. All four Levels, and especially the coastal community (Level 1), will be responsible for the ecological health and continued productivity of the resources and its environment.

With the legal backing of the Law of the Sea Convention and the OECS Harmonized Fisheries Legislation for exclusive-use rights, a community-based fisheries management programme could be implemented in the OECS countries, under the umbrella of fisheries development planning. The granting of exclusive-use rights of the resource to fishermen, will facilitate developmental planning. Thus, as shown in Figure 1, implementation could be done through existing institutional structures, but will require change in policies that will include decentralization of decision making and the empowerment of the fishermen. Existing institutions, such as national fisheries management bodies may have to change their functions in that they would now provide advice and technical assistance to the fishermen, who will manage the resource.

Even though the legal authority exists in the OECS countries, no attempts have been made by the Governments to transfer the exclusive-use right to the fishermen through the LFMAs. The main reason is probably the lack of political will to address the age-old problem of access to and control of fisheries resources, in which diverse interests compete for the use of ocean space for fishing, recreation, transportation, waste disposal, mining, etc. The only exception is a co-operative undertaking between the Caribbean Natural Resources Institute (CANARI), a regional NGO, the

Department of Fisheries of Saint Lucia and other NGOs and government agencies, which is attempting to implement the concept of community-based management on a pilot scale in the south-east coast of Saint Lucia (Walters, 1987; Smith and Berkes, 1991).

Most fishery managers of the Caribbean identify inadequate data as a constraint to management, yet no use is made of the knowledge of experienced fishermen. The economy of small, island countries of the Caribbean cannot afford the human and financial resources to generate all the data required for fisheries management. Fishermen are particularly effective allies in research (Goodwin, 1983; ECNAMP, 1983) even though they are often ignored or viewed as antagonistic to management. The knowledge gained by research could only be effectively used in the management of the fishery if it is imparted to the users of the resource in a way they can understand. The best way to impart such knowledge is by involving the fishermen in all stages of the research. Community-based management provides one mechanism for participation and education.

This education process requires both fishermen and fisheries managers to spend more time in each other's working environment. In this way, fishermen learn more about fisheries management and fisheries managers more about fishermen. The long term benefits would be a change from a centralized approach to the community approach in managing the fishery.

## 8. Summary and Conclusions

Modern fisheries management strategies, such as closed areas and seasons, aggregate quotas, and gear restrictions, have not yielded the expected and desired results in the Caribbean. The nearshore fish stocks are reportedly declining with little or no

effort to observe government-formulated management regulations, nor to enforce them. These regulations are probably easier to implement for large-scale fisheries, whereas the fisheries in the Caribbean is artisanal.

Another reason could be the inherent inability of modern fisheries management strategies, to address the social, cultural and economic concerns of the fishermen, as well as environmental concerns. Community-based management provides the mechanism for addressing these concerns in the Lesser Antilles, without significant changes to existing institutional and legal structures.

Community-based management is one option to resolve the 'commons problem', affect the distribution of wealth, cultivate self-confidence and self-regulation at the local level and reduce the decline of coastal fisheries in the Lesser Antilles. It holds great significance for the management of fishery resources in the region. It has the potential of reducing administrative costs to government, using local knowledge and expertise, responding to the needs of the community and being acceptable to the resource users. These potentials are highly desirable due to the scarcity of human and financial resources in the region.

Some critics of community-based fisheries management, claim that the high demand and prices for some species will lead to over-exploitation, in an attempt to earn more cash in a market-driven economy, and that ascribing property rights would accelerate over-exploitation. There is no guarantee against such tendencies, but fishermen who enjoy property rights may be willing to maintain their fishing effort at levels that would guarantee a reasonable income at sustained levels. Exclusive-use rights will require the fishermen to make these decisions.

Only archaeological evidence remain of the aboriginal inhabitants of the Lesser Antilles, who were exterminated by the colonialists. Thus indigenous fisheries management practices have to be rediscovered. In the relatively short history of the recent arrivals to the Caribbean, there are no records of a formal tradition of community involvement in the management of natural resources. There are examples, however, of fishermen acknowledging traditional rights to marine space (in Jamaica and Barbados, Berkes, 1986; in Guyana, Chakalall, per; in Saint Lucia, Koester, 1985) and observing unwritten rules and regulations concerning conservation (in Grenada, Finlay, per com; in Carriacou, Goodwin, per com). Attempts should be made to build on this tradition and to introduce and encourage community-based management on an experimental pilot scale basis in the Lesser Antilles.

In the OECS countries, the necessary legal authority exists to support fisheries administrations in exercising the option of creating and supporting community fishery management bodies. The experience which is lacking, can only be gained through trial and error with pilot projects, such as the successful case for sea urchins in the South of Saint Lucia (Smith and Berkes, 1991). Nevertheless, even though the legal backing exists, the implementation of community-based management of fishery resources is dependent on the willingness and ability of the governments of the region to make crucial decisions on the empowerment of the community. It requires the enactment of policies which involve decentralization of decision making, and for it to succeed, the fishermen will have to assume leadership roles.

In Figure 1, various management regimes are proposed, based mainly on species attributes and selected ecological considerations. A wide range of possibilities exists, most of which have some legal backing for their implementation. The regimes are based on the concept of community-based management.

For some management regimes, it is possible that the costs of implementation might be more than the resource itself is worth, especially in the case of small developing island states of the Lesser Antilles with a small resource base. A management regime for a particular fishery resource should reflect the value of the resource and not be so elaborate that it utilizes more bureaucratic resources than the resource itself is worth. It is possible that the most appropriate action for some countries, is to make no effort to manage certain specific fishery resources. A cost benefit analysis is essential, and should be considered in social, political and economic terms.

The implementation of community-based management does not imply ecologically sustainable fisheries will evolve overnight. Different countries have different concerns, depending on their stage of development and their economic and social objectives. Nevertheless, it appears that community-based management is the best management strategy available to the small-scale fisheries of the Lesser Antilles. To inspire and achieve the participation of fishermen in the management of the fisheries, is a long and difficult process, which requires patience.

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