Benguela Dynamics
Pillar, S. C., Moloney, C. L., Payne, A. I. L. and F. A. Shillington (Eds). *S. Afr. J. mar. Sci. 19: 471–486*
1998

CURRENT DIRECTIONS IN FISHERIES MANAGEMENT POLICY: A PERSPECTIVE ON CO-MANAGEMENT AND ITS APPLICATION TO SOUTH AFRICAN FISHERIES

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There is much current interest in fisheries management policy which centres around the introduction of rights-based management systems, the devolution of control from central regulatory authorities, and the concept of co-management. In order to address the complexity of the last of these, key principles of co-management arrangements need to be identified. In the process of establishing these arrangements, rules and rights are redefined and new institutions are created for the management of common pool resources, where exclusion is costly and every resource harvester subtracts value from the harvest of the others. A preliminary analysis of co-management arrangements is presented that postulates the factors most important for their establishment, reference being made to the applicability of co-management in South African fisheries. As with other studies on management of common property resources, it is concluded that the definition of boundaries, both resource and human, are critical to the process. In addition, the rules governing participation and the allocation of costs and benefits need to be mutually agreed upon by all participants, and most importantly well defined, if successful arrangements are to be established.

Fisheries have become characterized by declining total yields and catch rates, conflicts between sectors and reduced biodiversity (Parfit 1995, Safina 1995). A classic example is found in the bio-economic collapse of the northern cod fishery in Atlantic Canada (Walters and Maguire 1996). For all the stocks worldwide for which data are available, 70% of these are fully or overutilized, requiring urgent attention to halt further declines (Garcia and Newton 1997). These problems have led to calls for privatization or stricter regulation by government authorities, because these are assumed to be the only workable solutions in respect of resource use and allocation (Berkes 1986). In this paper, co-management is explored as an alternative to stricter government regulation and centralized management, because government-imposed regulations are generally not respected and breaking the law in some fisheries is common practice (Beddington *et al.* 1997). The argument is that two main factors influence non-compliance in fishers' behaviour. First, there is a lack of understanding among harvesters of the exact consequences of their actions (on the resource and on other users); second, there is a strong incentive to catch fish before someone else does. That is, the rights and rules (i.e. institutions) governing the total catch of each harvester are inadequate to ensure long-term sustainability. Against this background, it is widely thought that the present global crisis in fisheries can be attributed to inappropriate institutional arrangements and a lack of legitimacy of management regimes (Jentoft 1989).

The legitimacy of regulations and enforcement could be improved by transferring more responsibility to user groups by including them in the decision-making process (Pinkerton 1989a). This belief has spurred a growing interest in co-management, which involves agreements between participants in the fishery and government regulatory agencies. The expanding wish in South Africa to increase user participation in management is consistent with this trend (Hutton *et al.* 1997, Cochrane and Payne 1998). This interest has been articulated in the published works of the Marine Resources Task Group (1997) and Cochrane *et al*. (1997), as well as in papers read at the 1996 South African Marine Science Symposium presenting recent research where the concept has been applied to local resource management situations (e.g. Beaumont and Wynberg 1996, Harris *et al.* 1996, Sowman *et al.* 1996). The aim of the current paper is to explore the concept of co-management, to review the experiences in other jurisdictions and to present a preliminary analysis of co-management arrangements. The relevance of the concept to fisheries management in South Africa is discussed along with the challenges and constraints policy-makers face when considering user participation in marine resource management.

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Manuscript received: June 1997

MANAGING FISHERIES AS NATURAL RESOURCES

Marine fish stocks belong in a category of resources often referred to as common pool resources[1] (see Ostrom 1990, Pinkerton 1994a), characterized by:

(i) non-excludability – it is costly to exclude potential users from access;
(ii) subtractability – each user's harvest subtracts from the welfare of others.

In addition, the resources are renewable and part of complex ecosystems. The fundamental issue is what institutional arrangements are required for the sustainable utilization and management of common pool resources which have these characteristics. The arrangements must consider the effects of environmental variability and uncertainty, so requiring changes to the current management systems, because many of the institutional arrangements for managing fisheries are inappropriate, as already stated. Traditionally, the first measures established by government agencies to regulate fisheries and to achieve biological sustainability and to halt overfishing were "technical", e.g. mesh-size limitation. Economic analyses of fisheries based on some of the early work of Gordon (1954) and Scott (1955) led to recommendations for government regulatory authorities to restrict access in order to reduce further economic losses in fisheries. In fact, limiting access by issuing licenses and permits (i.e. rights to fish) is a method that has been applied increasingly by governments of coastal nations to try to regulate fisheries (see Mollett 1986). The growing interest in rights-based fisheries-management systems reached a peak with the introduction of individual transferable quotas (ITQs) in nations such as New Zealand (Crothers 1988, Dewees 1989, Annala 1996), Iceland (Arnason 1993, 1996) and Australia (Pascoe 1993). ITQs give participants market-driven rights to fish a portion of a given stock.

Many of the rights-based policies implemented to achieve economic objectives ignore social aspects of fisheries management, such as the effects on fishing communities, even though numerous studies have suggested that the social aspects of fisheries and fisher behaviour should be considered in the design of management systems (Wilen 1979, Healey 1985, Pringle 1985). Neglect of social issues has occurred despite the recent acquisition of information on the social structure of fishing, fish production, industry and markets (see for example, McGoodwin 1990). Furthermore, fundamental to understanding of resource management is the fact that people form institutions (rules and rights) around the shared resources they exploit. Therefore, central to the arguments for and against rights-based management of "common pool resources" and the required institutions is the concept of "common property".

Neo-classical economists such as Gordon (1954) and Hardin (1968) have defined "common property" as a case where access to the resource is both free and open, and that in order to achieve sustainability, either government regulation or privatization is required. This view is not shared by all, especially those who make different assumptions with regard to human collective behaviour. Neo-institutional economic analysts such as Ostrom (1990) and Bromley (1991), elaborating on the earlier work of researchers such as Acheson (1975), equate "common property" with alternative forms of collective management of common pool resources. Essentially, they argue that "common property" is property held by a defined group that excludes others, and that access to the resource is not free and open (Ciriacy-Wanthrup and Bishops 1975, as cited in Berkes 1986). In addition, Bromley (1991) states that such situations represent well-defined sets of institutional arrangements concerning who may make use of the resource and also the rules governing the behaviour of the users.

Some small-scale nearshore fisheries are more amenable to restricted-access management by local collectives than those targeting migratory stocks or offshore stocks distributed over large areas (Anon. 1996). In such circumstances management is outside the control of the local fishers. However, because local fishers exploit these resources, they need to be included in institutional arrangements for their management (Berkes 1986). Therefore, when stocks are distributed over wide areas, there is no reason why government bodies acting as principle agents cannot bring competing interests together and include them in co-operative management arrangements.

CO-MANAGEMENT

The essence of co-management is that the government and the user groups share responsibility for managing the resource. The user group could be in the form of a single community fishing a local resource or an industry organization fishing a stock with a common gear. Alternatively, in the case of shared

[1] Ostrom (1990) and Pinkerton (1994a) refer to shared resources such as fisheries as "common pool resources" in an attempt to avoid the confusion of terminology between the resource and the regime ("common property"). This paper follows their distinction.

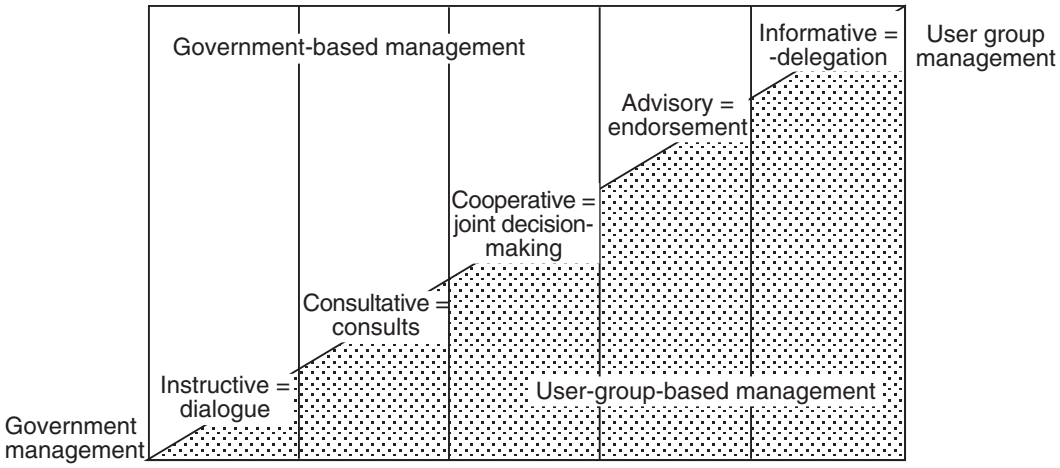

Fig. 1: Spectrum of co-management arrangements (adapted from Sen and Raakjær Nielsen 1996, and used to classify examples presented in Table I)

resources that are widely dispersed, the government could enter into multiple agreements with all the diverse user groups (be they fishing communities or fisher organizations) under the umbrella of multiparty co-management. The process is facilitated if the user groups are organized and have democratically elected representatives. In terms of defining the concept, co-management in some cases has meant the establishment and implementation of joint decision-making, whereas in others it has simply meant the creation of advisory boards with no specific decision-making authority (Paisley *et al.* 1994). In fact, very few attempts have been made to systematically evaluate co-management experiences (Berkes *et al.* 1991). Pinkerton (1993, p. 1) defines co-management where: "The basic principle driving these regimes is the involvement of fisher's organisations and fishing communities in management decision-making through power sharing: sharing both between government and locally-based institutions, and among differently-situated fishers."

Considering the spectrum of involvement available to user groups (Fig. 1), some authors define co-management as situations where management is truly shared ("cooperative" in Fig. 1). Other researchers define the term more widely to include practices where the government either consults extensively with user groups or, at the other side of the spectrum, takes an advisory role (Fig. 1). The broader definition is applied in this paper, but it is accepted that the term co-management should imply that the user groups have some degree of power in the form of a definite influence on the decisions made.

Hersoug and Rånes (1996) argue that co-management is often defined too narrowly in terms of its concentration on resource management only, and that any arrangements should deal with the whole scope of basic issues in fisheries management. This includes sales regulations, subsidies, credit and the development of infrastructure. Based on this logic, Hersoug and Rånes (1996) present five "dimensions" of complexity:

(i) the mode of influence (e.g. instructive, consultative, cooperative, etc., as presented in Fig. 1);
(ii) the scope of issues that shared management covers. (e.g. infrastructure, enforcement);
(iii) timing – the stage of the process at which agreements are fostered (e.g. planning, implementation, feedback);
(iv) the level of interaction (e.g. national, regional, local);
(v) the character of representation (with processors, gear groups, sectors or fishing communities).

The character of representation with regard to the definition of community is often one of the most contentious and highly politizised issues that has to be solved if agreements are to be fostered with such groups. Fishing communities are internally differentiated, not homogenous, discrete units as is often assumed (R. Hasler and M. Sowman, University of Cape Town, pers. comm.), which leads to differences in interest in terms of representation. In addition to these issues, co-management is not only about new institutions, but fundamentally about the new relation-

Table I: Examples from the literature where a co-management arrangement was reviewed (ranked according to the classification used in Sen and Raakjær Nielsen 1996, see Fig. 1)

Area	Type of fishery (or resource)	Co-management arrangement	Scale	Reference
1. Bangladesh	Inland water	A. Instructive	National	Sen & Raakjær Nielsen (1996)
2. Zambia, Lake Kariba	Lake fishery	A. Instructive	National/regional	Sen & Raakjær Nielsen (1996)
3. Malawi, Lake Chiuta	Seine	A. Instructive/consultative	Local	Donda (1997)
4. Iceland	Trawl	B. Consultative	Regional	Hannesson & Kurien (1988)
5. New Zealand	Various	B. Consultative	Regional	Hannesson & Kurien (1988)
6. Canada	Various	B. Consultative	Regional	Hannesson & Kurien (1988)
7. Malawi, Lake Malombe	Lake fishery	B. Consultative	Local	Sen & Raakjær Nielsen (1996)
8. Philippines, San Miguel Bay	Multispecies	B. Consultative	Regional	Sen & Raakjær Nielsen (1996)
9. Moçambique	Seine	B. Consultative	Local	Lopes *et al.* (1997)
10. Washington, USA	Salmon	B. Consultative	Local	Hilborn & Luedke (1987)
11. South Australia	Abalone	B. Consultative	Local	Barker & Watkinson (1994)
12. USA	Various	C. Cooperative	Regional	Jentoft & McCay (1995)
13. Philippines	Trawl	C. Cooperative	Local	Pomeroy & Pido (1995)
14. Norway	Trawl	C. Cooperative	Regional	Maurstad (1996)
15. Denmark	Trawl	C. Cooperative	Regional	Raakjær Nielsen & Vedsmand (1996)
16. St Lucia	Sea urchin	C. Cooperative	Local	Smith & Berkes (1991)
17. Canada, James Bay	Arctic resources	C. Cooperative	Regional	Berkes (1989)
18. Norway	Various	C. Cooperative	National	Hersoug & Rånes (1996)
19. Norway	Various	C. Cooperative	Regional	Jentoft & McCay (1995)
20. USA	Groundfish	C. Cooperative	Regional	Sen & Raakjær Nielsen (1996)
21. Fiji	Multispecies	C. Cooperative	Local	Sen & Raakjær Nielsen (1996)
22. United Kingdom	Various	C. Cooperative	Regional	Jentoft & McCay (1995)
23. Norway	Various	C. Cooperative	Regional	Eythorsson (1995)
24. St Lucia, Soufriere	Beach-seine	C. Cooperative	Local	Brown (1996)
25. Belize	Lobster	C. Cooperative	National	Brown (1996)
26. Canada	Salmon	C. Cooperative	Local	Pinkerton (1989b)
27. Zambia	Lake	C. Cooperative	Regional	Kafumbe (1997)
28. USA, Alaska	Salmon	C. Cooperative	Regional	Amend (1989)
29. Canada, James Bay	Arctic resources	C. Cooperative	Regional	Berkes (1989)
30. Canada, B.C. Skeena River	Salmon	C. Cooperative	Regional	Pinkerton & Weinstein (1995)
31. Japan	Various	C. Cooperative	Regional/local	Pinkerton & Weinstein (1995)
32. Canada, B.C. (Area C)	Clam	C. Cooperative	Regional	Pinkerton & Weinstein (1995)
33. Canada, Kennedy Lake	Salmon	C. Cooperative	Local	Pinkerton & Weinstein (1995)
34. Alaska, USA	Salmon	C. Cooperative	Local	Pinkerton (1993)
35. Canada, B.C.	Salmon	C. Cooperative	Regional/local	McDaniels *et al.* (1994)
36. Canada, Barkley Sound	Salmon	C. Cooperative	Local	Pinkerton (1989b)
37. USA, New Jersey	Clam	C. Cooperative	Local	McCay (1989)
38. Canada	Various	C. Cooperative	Regional/local	Jentoft & McCay (1995)
39. Chile	Benthic	D. Advisory	Local	Minn & Castilla (1995)
40. Denmark, Kattegat	Sole	D. Advisory	Regional	Sen & Raakjær Nielsen (1996)
41. Canada, Yukon	Arctic resources	D. Advisory	Regional	Paisley *et al.* (1994)
42. USA, Kuskokwim River	Salmon	D. Advisory	Local	Pinkerton & Weinstein (1995)
43. Ontong, Java	Reef fish	E. Informative	Local	Doulman (1993)
44. Philippines, San Salvadore Is.	Reef fish	E. Informative	Local	Christie *et al.* (1994)
45. Netherlands	Flatfish	E. Informative	Regional	Dubbink & van Vliet (1996)
46. Denmark	Herring	E. Informative	Internationl/national	Sen & Raakjær Nielsen (1996)
47. Faroe Islands	Wetfish	E. Informative	National	Sen & Raakjær Nielsen (1996)
48. Canada	Arctic resources	E. Informative	Regional/local	Notzké (1995)

ships which result from implementing such arrangements (Pinkerton 1989a). As a result, the success of co-management is predicated upon social learning, and it is naive to think of co-management as a quick-fix solution. Along with it being a time-consuming process, there can be extra costs associated with attempting to obtain full representation (Jentoft 1989). Aside from these negative aspects, Jentoft and Mikalsen (1994) state that the merits of co-management are that greater participation by user groups in decision-making enriches the regulatory process by proving a broader base of information. Inclusion of the users in the decision-making process increases the legitimacy of the regulations. Increased legitimacy results in enhanced adherence to rules and regulations, which contributes to a more efficient management system (Jentoft and Mikalsen 1994).

International experiences

Experiences with the concept of co-management in different countries vary widely. Countries such as Australia have included co-management formerly within their legislation (e.g. the State of Victoria, Fisheries Act No. 92 of 1995). Others, such as Canada, Norway and the USA, apply the concept but do not explicitly state so. Table I lists a number of documented examples of co-management, ranked according to the type of arrangement depicted schematically in Figure 1. Also included in Table I is an indication of the geopolitical scale of the institution.

Examples of co-management experiences are diverse, but they do represent cooperative approaches (Jentoft and McCay 1995). Although the examples are specific, few countries represented in Table I employ just one model consistently for all fisheries, sectors and regions (as is reflected in the replication of countries). Rather, the nations surveyed have a mixture of institutions with a varying degree of user involvement and responsibility (see Jentoft and McCay 1995), depending on the scale of the fishery. This is the case in Norway, which has practiced co-management in the fisheries sector for many years (McCay and Acheson 1987, Jentoft 1989, Pinkerton 1989a, McGoodwin 1990, Hersoug and Rånes 1996). Regulatory councils on both regional and national levels place user groups in positions within the fisheries management decision-making process. A diverse mixture of institutions is also found in the USA, where user participation in fisheries management is practiced within the regional Fisheries Management Councils. Beyond the mandated participation by representatives of state and federal agencies, the councils include commercial and recreational fishermen, consumers, processors and members of the public (Jentoft 1989). There is user participation at other levels in the USA, such as in the management of the Great Lakes fisheries and the co-operative management between Indian Treaty Tribes, the state and federal government agencies in the Pacific Northwest (Anon. 1995a).

This variety of institutional arrangements can be explained by the fact that fisheries management systems seldom result from an intended design. Instead, they evolve gradually, through processes of "muddling through" and often as *ad hoc* responses to crises (Jentoft and McCay 1995). This is the situation in Pacific Canada, where the Supreme Court affirmed the rights of First Nations to a priority allocation of fish in 1990. In this context, the federal government adopted a seven-year Aboriginal Fishing Strategy (AFS) in June 1992 (McDaniels *et al.* 1994). Components of the strategy included negotiated agreements between the Government of Canada and aboriginal groups on cooperative management projects (McDaniels *et al.* 1994). In all, 80 agreements under this strategy were negotiated in 1992/93.

Jentoft and McCay (1995) state that the specific models in each country reflect the broader institutional patterns and practices that prevail. Their argument is that fisheries management institutions do not originate in an institutional vacuum and must generally relate to their external political environment. This factor is evident in Canada, where the fisheries management system has had to conform to a more participatory form of governance. In recent years, the Canadian government has attempted to increase user participation in the fisheries-management policy process. User groups were originally consulted about their concerns, but decisions were made by the fisheries minister, whereas more recently in Atlantic Canada, co-management arrangements have been implemented such that industry is involved in making decisions about allocation, monitoring and enforcement (Jentoft and McCay 1995).

Involving interest groups or stakeholders in the decision-making process is not simply a question of representation, but also one of scale of involvement and level of participation of user groups. Jentoft and McCay (1995) state that co-management implies delegation of authority rather than decentralization, and that certain tasks lend themselves to the latter. For example, in the United Kingdom, producer organizations are also actively involved in fisheries management. They are allocated "sectoral" quotas to distribute and administer among their members (Jentoft 1989). Proponents of decentralization argue that, if a federal system of user-group organizations is in place, the role of government in fisheries management could be reduced. However, if that is not the case, then the

Table II: Attributes employed in preliminary analysis of co-management arrangements, in this study and Ostrom's (1990) list of design principles for common pool resources. Acronyms listed in Table III are defined

Attributes used in this study	Ostrom's (1990) design principles
1. Resource boundaries defined (BD)	1. User group and resource have defined boundaries
2. Membership and participation defined (CM)	
3. Rules for allocation of costs and benefits (RA)	2. User rules are appropriate for local conditions
4. All-party management board/committee (MB)	3. Users have rights to organize independently
5. Management plans and reciprocal obligations (MP)	4. Users participate in rule modification
6. Enabling legislation defining control (EL)	
7. Mutually agreed upon enforcement mechanism (ES)	5. Users monitor compliance 6. Users participate in sanctioning
8. Process for dispute resolution (DR)	7. Access to low-cost conflict-resolution mechanisms
9. Information-sharing between participants (IS)	
10. Federal structure in complex cases (FS)	8. In complex cases the system is organized in a federal structure of nested layers

government would have to make up for the structures not in place (Jentoft 1989). In many cases, before user groups were effectively involved they had to be organized not only at local level, but also at regional and national level. This was the experience in the Philippines with community-based coastal resource management, where community organization was a large component of the effort to establish co-management arrangements with local government authorities (Pomeroy and Carlos 1997).

Non-governmental organizations (NGOs) have played a key role in the implementation of management initiatives, particularly in many co-management projects in Africa. User groups are often poorly organized, or else their organizations are incapable of exercising management responsibility (Jentoft 1989). Therefore, Jentoft (1989) suggests that the process of involving user groups in fisheries management should start with organizational development rather than delegation or decentralization. Community-based development is on the agenda of international NGOs and there are a growing number of cases of co-management arrangements which have involved third-party NGOs significantly in collaboration with the responsible government departments and community organizations. This has been the case in management of Lake Nokoue, Benin (Atti-Mama 1997), the fisheries in Luapula Province in Zambia (Kafumbe 1997) and the Lake Kariba fisheries in Zambia and Zimbabwe (Hachongela *et al.* 1997). The main characteristic of these cases is the large investment in the capacity building crucial to initiating the process. International NGOs traditionally cover the high costs associated with the establishment of such arrangements in countries where economic conditions would otherwise inhibit such practices. Alternatively, the cost is borne by donors who finance the fisheries programmes and support the implementation of co-management schemes, as in the management of the beach-seine fisheries in Moçambique (Lopes *et al.* 1997). In the following paragraphs, a diagnostic approach is presented where the objective is to consider key factors for the creation of successful co-management arrangements.

PRELIMINARY ANALYSIS OF CO-MANAGEMENT ARRANGEMENTS

A set of attributes for co-operative management systems is postulated as being a key factor in the successful establishment of such arrangements. Examples which are recognized as being either successful or unsuccessful are evaluated in terms of which postulated attributes were present or absent. This is a methodological exploration, which potentially could be expanded. Unfortunately, the definition of "successful" is problematic because the establishment of arrangements is a process. Pinkerton (1989a, 1994b) herself considered it more important to define success in terms of the process, although it should be defined in terms of evidence of sustainability of a

Table III: Results from preliminary analysis of co-management arrangements. Examples were evaluated in terms of the absence or presence of the postulated attributes (see Table II). Numbers correspond to the examples in Table I. The final column indicates a subjective success rating based on the comments of the referenced authors, where 0 indicates unsuccessful arrangements and 4 indicates successful ones

Example	Adherence to attributes										Rating and Reference
	BD	CM	RA	MB	MP	EL	ES	DR	IS	FS	
Skeena River, Canada (#30)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0. Pinkerton & Weinstein (1995)
Coastal community cooperative, Japan (#31)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	4. Pinkerton & Weinstein (1995)
Regional Associations, Alaska (#28)	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	3. Amend (1989)
San Miguel Bay, Philipines (#8)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1. Pomeroy & Pido (1995)
Lake Kariba, Zambia (#2)	Yes	Yes	No	Yes	No	Yes	No	No	No	No	1. Sen & Raakjær Nielsen (1996)
Lake Malombe, Malawi (#7)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	4. Sen & Raakjær Nielsen (1996)
Customary Fishing Rights, Fiji (#21)	Yes	Yes	No	No	No	Yes	?	Yes	No	No	1. Sen & Raakjær Nielsen (1996)
Pacific Fisheries Management, USA (#20)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	3. Jentoft & McCay (1995)
Kattegat, Denmark (#40)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	4. Sen & Raakjær Nielsen (1996)
Dutch flatfish fishery, Holland (#45)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	?	Yes	4. Sen & Raakjær Nielsen (1996)
Beach-seine, Inhassoro, Moçambique (#9)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	3. Sen & Raakjær Nielsen (1996)
St Lucia, Soufriere (#24)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	4. Brown (1996)
Olifants River harder fishery, South Africa	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	See text, Sowman *et al.* (1996)
Intertidal mussels, KwaZulu-Natal, South Africa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	See text, Harris *et al.* (1996)

fishery. The postulated attributes (Table II) are compiled from the work of Ostrom (1990) and Pinkerton (1993). Ostrom's (1990) design principles for the establishment of successful collective management arrangements are also presented in Table II for comparison, and because these principles were incorporated into the attributes. Naturally, adaptations have been made to Pinkerton's (1993) key factors because they are relevant to Government-First Nation salmon management agreements in British Columbia, Canada.

The first three attributes appear to be critical for the establishment of successful co-management arrangements (see Tables II and III). The reason that these three are deemed crucial is because they frame the patterns of interaction between the users of a common pool resource and the responsible government authorities, with regard to rights and rules, so forming the foundation of institutional arrangements. In the preliminary analysis (see Table III) this is evident, because the examples considered unsuccessful have institutional arrangements that lack one of the first three attributes listed in Table II. It is recognized that further studies are needed to validate such a method of analysis.

The three critical factors for the establishment of successful management arrangements are

- defining clear boundaries for the resource;
- defining the criteria for participation in the fishery and management;
- establishing rules for the allocation of costs and benefits between the participants.

The other attributes (4–10 in Table II), which are important but not crucial, include involving representatives of participants within formal structures such as management boards that establish management plans, creating dispute-resolution mechanisms, facilitating information sharing, and establishing enabling legislation and negotiated enforcement mechanisms. These attributes are key to the success of the arrangements as cumulative elements, as presented in Pinkerton's (1994b) analysis. That is, the more attributes (of Types 4–10 in Table II) present, the more likely the project will be successful. Most of these attributes in one way or another reflect capacity, that is the user group's capability of being involved in management.

In the example from the Skeena River (British Columbia, Canada, Table III), one of the key attributes which was not established was the lack of clearly defined rules for membership (attribute CM). The process of establishing multiparty co-management processes to save steelhead stocks have been unsuccessful. Anybody can buy a licence to fish recreationally and one could therefore postulate that, until

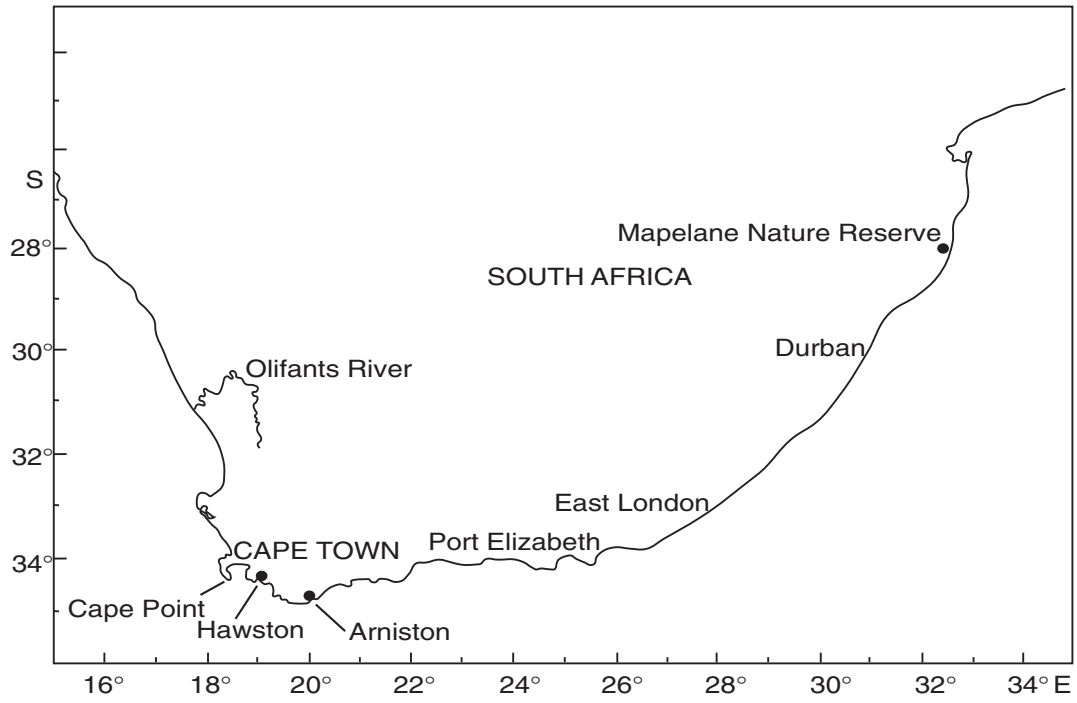

Fig. 2: The locations of Arniston, Hawston, the Olifants River harder fishery and the Mapelane Nature Reserve within South Africa

a limited licence scheme is in place with members accepting the rules, sector conflict will continue. This generalization is applicable to any multisector fishery with recreation as one of the sectors, although it is difficult to imagine how the public would accept a limited entry system for recreational fisheries. Examples from other fisheries are also presented in Table III in order to present the diversity of institutional arrangements. Further analyses would require a larger sample from the case studies that exist.

Japanese coastal fishing community cooperatives are considered successful and, in the case of the analysis, every attribute exists. However, the apparent success of these arrangements can be related to the inherent culture of collectivism in Japan, and therefore this analysis should be evaluated in terms of its general predictive capabilities. This fact must be taken into consideration when suggesting rules for the establishment of co-management arrangements in South Africa. Even if attempts are made to establish co-management arrangements where all the attributes are present, the project may not necessarily result in success. A culture specific situation, such as the history of inequity in resource allocation, could derail the process. However, as a preliminary analysis it does present critical factors for the successful establishment of cooperative management systems.

FISHERIES MANAGEMENT POLICY IN SOUTH AFRICA

In the past decade South Africa has gone through major political change with the introduction of multiparty participatory democracy (Giliomee 1995). The first all-party elections took place in April 1994 and now many policies of the new government are aimed at addressing inequalities of the past (Hatchard and Slinn 1995). Key objectives of the government with regard to fisheries include decreasing unemployment, promoting sustainable use, earning foreign exchange, increasing economic efficiency, increasing equity in the distribution of benefits, and increasing user participation in management (Hutton *et al*. 1997, Cochrane and Payne 1998). Hutton and Lamberth (in press) review the possibilities and constraints of including users at the community level in management

of the linefishery at Arniston on South Africa's south coast (Fig. 2). Hersoug (1996) reviewed the policy-development process and made reference to the inclusion of users in the management of marine resources.

South Africa has an array of fisheries that include commercial, recreational and subsistence sectors, with more than 26 000 people being employed in the formal commercial sector alone. Commercial catches are dominated by those of the demersal and pelagic fisheries, which together accounted for 88–95% of the reported catch for the period 1975–1991 (Chief Directorate Sea Fisheries 1993). Payne and Crawford (1989) reviewed the major fisheries in South Africa and reviews of the fisheries management process are given by, among others, Bergh and Barkai (1993), Anon. (1995b), Cochrane (1995) and Cochrane and Payne (1998). Since 1948, a series of Sea Fishery Acts and amendments have limited entry by imposing controls and restrictions on fishing, including licensing, permit requirements and quota allocations. The central government has played the major role in assuming responsibility for management of marine resources. At present, the Department of Environmental Affairs and Tourism administers government policy through the Sea Fishery Act (1988).

The Minister is required to appoint a Sea Fishery Advisory Committee (SFAC) and an independent Quota Board (the latter to allocate quotas), and has the responsibility to grant and terminate rights of exploitation. The Minister also sets the Total Allowable Catch (*TAC*) for the quota species. The SFAC currently has 11 members, appointed by the minister for their personal expertise, to advise him/her. The day-to-day decision-making of the responsible parties at central government level is reflected in Figure 3. The government has delegated a few responsibilities to the provinces, especially to KwaZulu-Natal, which administers enforcement and licensing of local stocks through the Natal Nature Conservation Ordinance (No. 15 of 1974). However, the management of marine resources in South Africa remains the principle responsibility of the central government.

Sea Fisheries (SF) has established scientific working groups, which also include independent and non-State scientists, to determine the scientific basis for management strategies. Recommendations from all these and other sources are directed to the SFAC and ultimately the Minister. In South Africa, the elements of user participation fall short of the government sharing management responsibility (i.e. through the presence of joint decision-making structures). However, in terms of the Sea Fishery Act, the Minister may recognize any industrial body or interest group. These have the power to advise and make recommendations either to the SFAC or the Minister. Table IV lists the interest groups or industrial bodies recognized under the Act. This recognition has resulted in organizations such as the South East Coast Inshore Fishing Association (SECIFA) playing an active role in the management of the inshore trawl fishery in partnership with the government. Formal liaison between these organizations, other stakeholders and the research component is through so-called INSEFs (Industry – Sea Fisheries Forum) established at the discretion of the Director of Sea Fisheries (Fig. 3).

In the past, structures such as Sea Management Committees have also been created to exchange information and have facilitated consultation. However, not all decisions were made purely by government agencies and, on many occasions, established industry had an input greater than mere consultation (though generally falling within the definition consultative in Fig. 1). The major fisheries sectors have found the management liaison committees to be ideal interfaces for

Table IV: Interest groups or industrial bodies recognized in terms of the Sea Fishery Act (1988), as of 23 October 1992 (Source: Government Gazette No. 4967)

Organization	Principle fishery
Interest groups	
South African Marine Linefish Management Association	Linefish
False Bay Trek Fishermen's Association	Beach-seine fishing
Mariculture Association of Southern Africa	Mariculture
Industrial bodies	
South African Deepsea Trawling Industry Association	Hake demersal trawl fishery
Abalone Sea Management Association	Abalone
South African Seaweed Concessionaires Association	Seaweed
South East Coast Inshore Fishing Association	South Coast inshore trawl
South African Frozen Rock Lobster Packers (Pty) Ltd	West Coast rock lobster
South African Squid Management Industrial Association	Squid

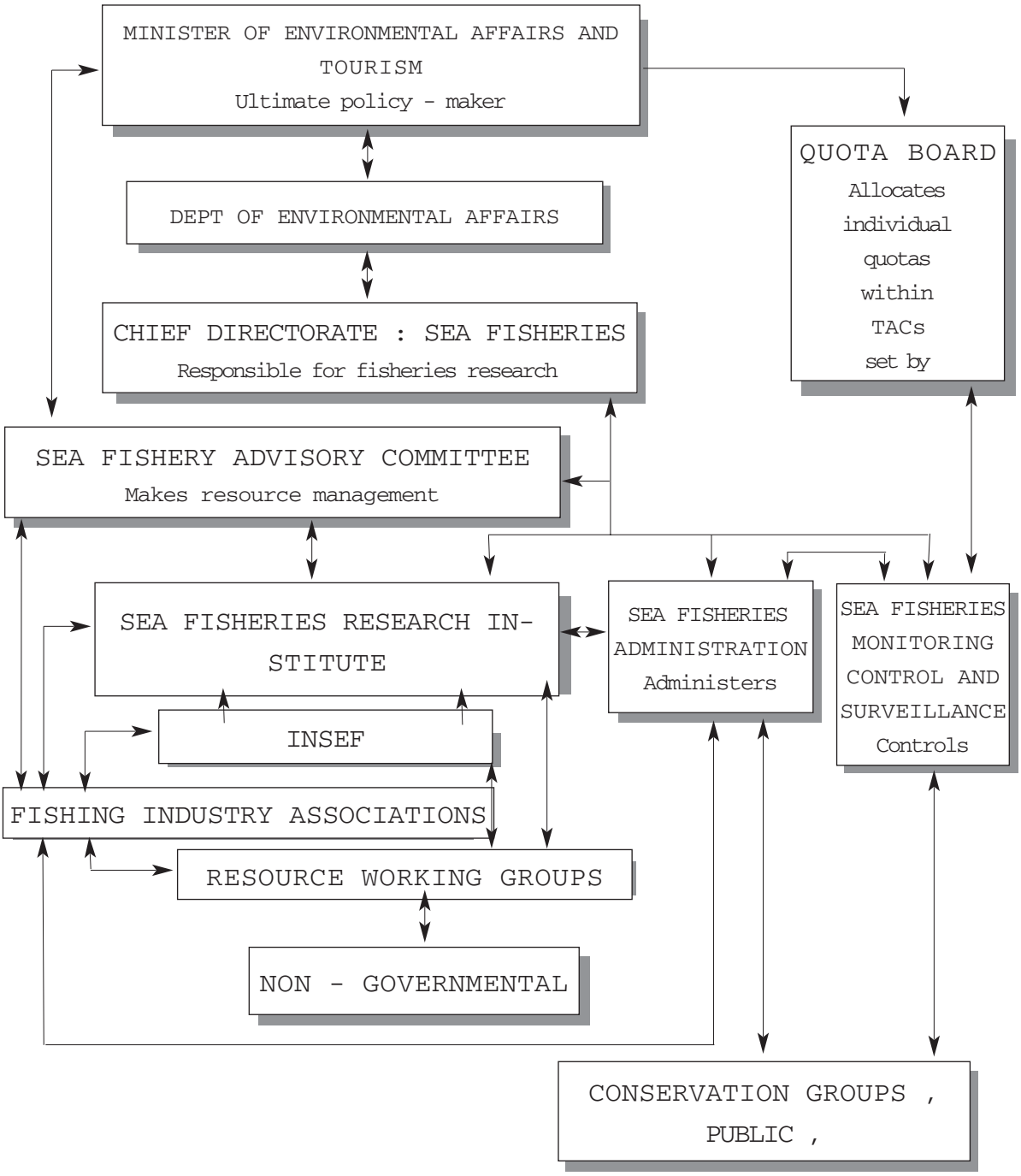

Fig. 3: Organogram of structures emanating from the Sea Fishery Act of 1988 to manage the marine resources of South Africa (adapted from Chief Directorate Sea Fisheries 1993)

policy, commerce and science (Bross 1987), but have expanded them during the past decade to include the INSEFs mentioned above. As key principles are extracted from these experiences, there is a possibility that these local associations will adapt to suit the new policy environment. In summary, co-management is not a new concept in South Africa and was practiced by the government before 1994. However, those processes and structures are not necessarily accepted as legitimate by those disadvantaged in the past.

Including other types of user groups such as fishing communities directly in resource management was never attempted on a large scale. Defining such groups is often problematic. This became evident in the early 1990s, when the government experimented with the Fishermens Community Trust System. Although communities were not given the opportunity to catch their own fish, they were responsible for "managing" the distribution of the benefits after being allocated a share of the *TAC*, a function reflecting the tasks they would perform if delegated responsibility for management of marine resources and the distribution of the benefits thereof. The problem of identifying beneficiaries in the communities led to conflict, and the Supreme Court decided in 1995 to terminate the system. This case highlights the problems that can manifest when attempts are made to involve users at the scale of communities in management responsibility.

USER PARTICIPATION IN MANAGEMENT: CHALLENGES AND OPPORTUNITIES

In October 1994, a national fisheries management policy-development process was initiated, with extensive consultation and stakeholder participation in the formulation of a draft policy. The Fisheries Policy Development Committee (FPDC) was set up by the Minister of Environmental Affairs and Tourism, with the mandate to ensure participation at all levels. The committee consisted, *inter alia*, of representatives from industry, the coastal provinces (governments and regional fora), the central government, labour, the environmental sector, the recreational sector and the "informal sector". Regional fishing fora represented fisheries interest groups at "grassroots" level (Cochrane and Payne 1998).

Within the draft fisheries policy document were specific clauses implying that management authority could, under certain circumstances, be delegated to lower levels. In addition, the clause that deals with user participation addressed guidelines for participation at all levels. Also, there was a clause which dealt with user participation in management plans. Moreover, in the section that discussed levels of management and institutional structure, reference was made to the delegation of management responsibility. Lastly, the potential role of the fishing fora and how they could gain access to decision-making was dealt with in the section on structures and institutions. That process was completed in June 1996 when the draft policy was submitted to the Minister. However, several problems remained unresolved. Consequently, extensive redrafting then took place by the department and its advisers, culminating in May 1997 in the release of a White Paper "*A Marine Fisheries Policy for South Africa*, Anon. 1997). In that document, efficient consultation is presented as an option (because of concerns with legitimacy), but clauses are included which stipulate the need to minimize costs and bureaucracy in terms of user-group participation in management (Anon. 1997). This is one of the reasons that the White Paper reaffirms the government's will to control fisheries at a national level. Co-management is recognized as a potential option for special attention, but only in the case of non-mobile marine resources which are nearshore and do not overlap provincial boundaries. The practicality of multiparty co-management arrangements for shared resources appears to be outside the realm of government policy in the White Paper, probably as a result of the need to meet the objective of minimizing bureaucracy, something not highlighted in the FPDC document. There is a willingness to facilitate consultation between government and fishing fora, but only if they are self-generative and self-supported (Anon. 1997).

Local initiatives and research in South Africa

Although several authors and studies have made reference to the relevance of the concept of co-management in South Africa (Anon. 1996, Hutton *et al*. 1997, Cochrane and Payne 1998), very few attempts have been made to apply the concept to management of fisheries resources at local levels (e.g. Beaumont and Wynberg 1996, Harris *et al.* 1996, Sowman *et al.* 1996). More recently (June 1997), a workshop was held to establish a national programme on coastal and fisheries co-management, and there are attempts to coordinate the development and implementation of projects. Some preliminary results have been obtained from case studies such as the Western Cape Olifants River fishery for mullet or

harder (Mugilidae) and from experiences in the Mapelane Nature Reserve (KwaZulu-Natal, see Fig. 2). Sowman *et al.* (1996), in a review of co-management in the Olifants River harder fishery, noted that the project has strengthened relations between the responsible government agencies and the fishing community and so facilitated both conservation and development.

Elsewhere in the Western Cape, there have been other initiatives, such as a proposal for an abalone *Haliotis midae* re-seeding project in Hawston which would involve all stakeholders (Fig. 2, Hauck and Sweijd 1997). One of the most comprehensive projects has been undertaken in KwaZulu-Natal to address the illegal, unsustainable subsistence use of intertidal mussels (Harris *et al.* 1996). A Joint Mussel Management Committee was established with representatives from the Sokhulu community, the KwaZulu-Natal Nature Conservation Service (KZNNCS) marine reserve officials and researchers (KZNNCS and University of Cape Town). The need for training to enable all players to participate fully in the process was deemed essential to the long-term success of the project (Harris *et al.* 1996). The last authors found that meaningful participation by the Sokhulu community in management and decision-making requires that they have the information, skills and confidence to voice their needs and to challenge proposals. Within the project, training is taking the form of workshops on committee structure and functioning, literacy training and basic environmental education (Harris *et al.* 1996). Therefore, development of capacity within communities and their local organizations is critical to the process, as identified in the international experiences.

The above two case studies are included in Table III as part of the preliminary analysis, and both possess the essential first three attributes. That is, the boundaries of the resource are well defined, there are criteria for membership and the rules for the distribution of benefits are established. One would like to predict that these arrangements will be successful, but it is still too early for their thorough evaluation.

Constraints to greater user involvement in management

The potential for user-group involvement in management could be harnessed in various forms, such as government arrangements with single parties for example a community fishing a local resource or an association of industries fishing a stock with a common gear. Alternatively, in the case of shared resources that are widely dispersed, the government could enter into multiple agreements with all the user groups (be they fishing communities or fishing organizations or associations) under the umbrella of multi-party co-management arrangements. The role of industry associations is well established and they will continue to be involved in many aspects of marine resource management. However, including user groups of the form of fishing communities is often problematic. Communities are rarely homogenous and the word is often used as a political term to designate a following for political action and an audience for political rhetoric (Thornton and Ramphele 1988). There can be no guarantee that a community actually exists. There may in fact be no willingness to cooperate and no coherent social organization. Scott (1993) states that it is this heterogeneity that prevents people from cooperating, especially when they disagree over fishing rights. Within fisheries there is a general perception of unfair distribution of access rights, a mistrust of authority and lack of faith in government control, within certain sectors of the population. If co-management agreements are going to involve joint decision-making, they will have to deal with both the exploitation of the resource and its distribution. It is therefore critical that the allocation of resources (i.e. access rights), a political issue and not a technical one, be dealt with as soon as possible.

Within South Africa, any strategies that are aimed at inclusion must be sensitive to the historical, political, social and economic factors which continue to influence target communities (F. Khan, Environmental Evaluation Unit, University of Cape Town, pers. comm.). Given the disparities in access to decision-making structures, there is a need to provide disadvantaged users/stakeholders with some intervention strategies to empower them where disparity has been exacerbated by the past political situation (Fowkes 1996). The last author states that the level of user rights in decisions should be negotiated in order to facilitate sustainability. However, within communities there are economic and social legacies, such as poverty and illiteracy, which constrain community involvement in decision-making. Also there has been considerable uncertainty as to the role of previous local government structures and an apparent general unwillingness on the part of government agencies to devolve power, citing scepticism that other levels of governance can accept responsibility and be accountable for management of local resources. Establishing local organizations with legitimate representation that government agencies will recognize is therefore a key stumbling block to facilitating arrangements with greater user participation in management.

Opportunities for participation in management arrangements

Overall, the impetus for greater user involvement in marine resource management in South Africa does exist, because the country has a new constitutional dispensation based on participatory democracy. Jentoft and McCay (1995) argue that the fisheries management system will come to reflect the overall political framework and ideology in a country. One of the key questions is whether participation will end up being more apparent than real, as Felt (1990) argues is the case in Atlantic Canada. However, the government policies in South Africa truly aim to be transparent and inclusive in encouraging public participation. There is a national will to make participatory democracy work, and numerous examples exist of negotiated settlements, using the ideals of consensus, compromise and debate. Therefore, the socio-political environment really does exist to embrace concepts such as co-management within South African fisheries management policy.

SUMMARY

- Co-management can generally be defined as shared decision-making between government agencies and user-group representative structures.
- International experiences reflect the diversity of political systems and, in most countries, mixtures of institutions with a varying degree of user involvement exist. In fisheries which are of regional importance, regulatory councils allow user-group representatives consultative positions. Alternatively, examples exist where arrangements are established between government agencies and communities, when the resources are locally based. The practices tend to reflect the broader institutional patterns in each country.
- Preliminary analysis of co-management arrangements points to key attributes which need to be considered if successful systems are to be established. The definition of boundaries (resource and human) and the rules for participation and the allocation of costs and benefits need to be well established.
- The relevance of co-management needs to be evaluated in South Africa. It is not a new concept and there continues to be industry-government interaction, although it is recognized that this has been mostly of a consultative nature with industry associations. Involving users at other levels (e.g. communities) in the decision-making process is often a question of representation, and user groups are often poorly organized and not capable of exercising management responsibilities.
- The process should begin with the development of locally based organizations rather than delegation or decentralization, but the costs can prohibit government action. This is the case in many of the African examples considered where NGOs have been extensively involved in the implementation of projects.
- In South Africa it is likely that greater user participation in management will be a key part of future fisheries management. Not only does the broad policy environment support it, but there are also good examples where it is currently being applied. The most obvious challenge to the success of this policy is the controversial issue of access rights and the lack of capacity within user groups such as fishing communities.
- The impetus for user involvement exists in the form of a new constitutional dispensation of participatory democracy. If the fisheries management system comes to reflect the overall political framework in the country, then some form of user participation in management is inevitable.

ACKNOWLEDGEMENTS

We thank Ms M. Hauck and Dr B. Clarke (University of Cape Town, UCT) and Dr K. L. Cochrane (F. A. O.) for providing comments on an early draft. Mr D. Preikshot (University of British Columbia), Dr J. Raakjær Nielsen and an anonymous reviewer are acknowledged for their helpful comments on the final draft. We also acknowledge Ms T. Greene for preparing the document for press. The Fisheries Center (University of British Columbia), the South African Foundation for Research Development, SANCOR and the Marine Biology Research Institute (UCT) are acknowledged for financial and logistical support.

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