

RECOMMENDATIONS FOR THE MANAGEMENT OF SUBSISTENCE FISHERIES IN SOUTH AFRICA

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This paper summarizes recommendations for the management of previously marginalized and neglected subsistence fisheries in South Africa. The recommendations stem from the activities and analyses of a task group appointed by Government and mandated to provide advice about management of the new fishing sector. The following focus areas were identified for attention: planning for implementation; definitions of subsistence fishers and other sectors; assessment and categorization of resources; determination of types of fishing activities; zonation; management systems; training; communication mechanisms; application and allocation procedures; compliance processes; research and monitoring; development of institutional capacity. Subsistence fishers were defined as poor people who personally harvest marine resources as a source of food or to sell them to meet basic needs of food security; they operate on or near to the shore or in estuaries, live in close proximity to the resource, consume or sell the resources locally, use low-technology gear (often as part of a long-standing community-based or cultural practice), and the resources they harvest generate only sufficient returns to meet basic needs of food security. A second group of informal fishers was identified that fishes for profit but cannot be equated to large industrial fisheries, and a new sector was proposed to accommodate these artisanal "small-scale commercial" fishers. Resources were classified for use by these different sectors based on accessibility, fishing methods, cash value and sustainability. In all, 12 different categories of subsistence and small-scale commercial fisheries were identified, and a preliminary list of resource species suitable for different fishing sectors is presented. A multi-tiered institutional management structure is recommended, with the national agency (MCM) controlling issues of national concern, and supporting and coordinating the activities of provincial and local structures. The management agents required for effective implementation were identified and include a dedicated national Subsistence Fisheries Management Unit, provincial management agencies that have the capacity to be delegated authority, Regional Fieldworkers, an independent Advisory Group for Subsistence Fisheries Management, local co-management structures, and community monitors responsible for observing and recording fishing activities and catches. Co-management, involving both authorities and users in joint management, is advocated in preference to previous top-down approaches, because of its potential to improve communication and compliance.

Key words: coastal zonation, fisheries management, fisheries rights, subsistence fisheries

The first democratic election in South Africa in 1994 was followed by revision of many of the policies and laws, with the aim of correcting past political and social inequities (Branch *et al.* 1996, van der Elst *et al.* 1996, Hutton *et al.* 1997, Martin and Nielsen 1997, Cochrane and Payne 1998). One such result was the promulgation of new fishing legislation within the Marine Living Resources Act (Anon. 1998), which for the first time recognized previously marginalized and ignored subsistence fisheries as a formal fishing

sector. There has been extensive informal (often illegal) utilization of marine resources by the poorer coastal communities in South Africa (Hockey *et al.* 1988, Kyle *et al.* 1997a, b, Tomalin and Kyle 1998). At the time the Act was passed, however, little information was available about the fishers themselves, most of the resources on which they rely and the nature of their activities. The national agency responsible for the management of living marine resources, the Marine & Coastal Management (MCM) chief directorate of

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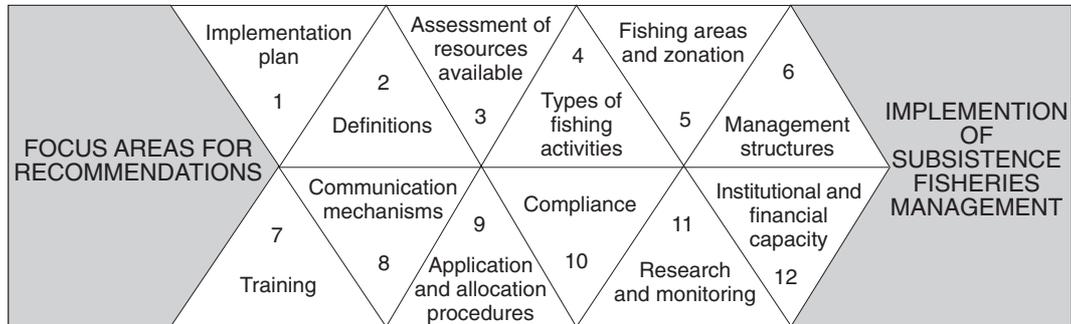


Fig. 1: Focus areas requiring attention during the implementation of subsistence-fisheries management in South Africa

the Department of Environmental Affairs and Tourism, recognized the need to gain knowledge about these informal and subsistence fishers, to consult broadly to ensure informed provision of access rights, and to implement appropriate management systems for this new sector. To meet this challenge, MCM appointed a Subsistence Fisheries Task Group (SFTG) to provide advice for the management of subsistence fisheries.

Details of the composition, terms of reference, context and activities of the SFTG, as well as lessons learnt during the process, are described in Harris *et al.* (2002). The SFTG focused on two key aspects: (1) research to identify subsistence fishers, their activities and the resources they harvest and to gain an understanding of their socio-economic profiles, and (2) consultation and communication to ensure that the needs and aspirations of fishers and the experience of local managers were incorporated in the formulation of recommendations for management. Because the definition of subsistence fishing and the associated qualifying criteria were under review during this process (see Branch *et al.* 2002a), all areas and communities where fishers were involved in informal fishing, and all fishers who considered themselves to be subsistence fishers, were included. This paper is the last in a series describing the process and detailing the outcomes of research and consultation undertaken to inform the development of recommendations.

Field research identified 147 communities, consisting of about 20 000 households and approximately 30 000 fishers, who were involved in subsistence or informal fishing around the coast of South Africa (Clark *et al.* 2002). The study showed that subsistence fishing is more prevalent on the East Coast, generally on or close to the shore or in estuaries. Most communities identified had been involved in fishing activities for more than 50 years and were highly dependent on the resources harvested. In all, 20 of the communities were selected to cover all four coastal provinces and

the range of subsistence and informal fishing activities, and investigated in greater detail to obtain information on socio-economic circumstances, current management systems, fisher perceptions and problems, and the nature and mode of use of resources (Branch *et al.* 2002b, Hauck *et al.* 2002). The availability and suitability of different marine resources in South Africa for subsistence use was also investigated (Cockcroft *et al.* 2002), and a literature survey provided international perspective and information about management models (Hauck 2000). Consultation and communication took the form of local interviews and focus-group discussions, a series of fisher meetings and a national workshop (Harris *et al.* 2002). The results of this research and the insights gained from the consultation process were used by the SFTG in formulating recommendations for subsistence fisheries management in South Africa.

This paper summarizes the resource management problems identified and needs expressed by informal fishers, resource managers and scientists during the SFTG process and outlines the recommendations for subsistence fisheries management in South Africa, presented by the SFTG to the national agency responsible for implementation (MCM) in January 2000 (SFTG 2000).

RECOMMENDATIONS FOR SUBSISTENCE FISHERIES MANAGEMENT

The key issues that emerged during the research and consultation process (Harris *et al.* 2002) provided the motivational drivers for the formulation of recommendations in the following areas: planning for implementation; definitions of fishing sectors; assessment and categorization of resources; determination of fishing activities and areas; management systems; training needs; communication mechanisms; application

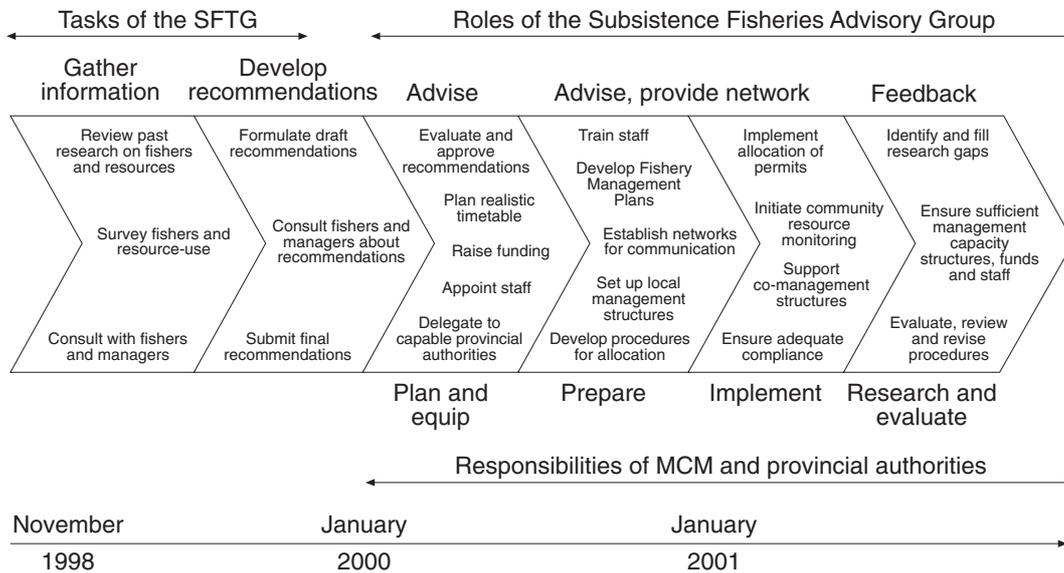


Fig. 2: Proposed implementation plan for subsistence fisheries management in South Africa: actions, phases of events and time-frames. MCM = Marine & Coastal Management

and allocation procedures; compliance processes; research and monitoring; development of institutional capacity to manage this new fishing sector (Fig. 1). The core recommendations for formalization and management of subsistence fisheries in South Africa are outlined below, together with their rationale.

Planning for implementation

RATIONALE

The SFTG activities were completed in just over a year and recommendations were delivered in January 2000. The tight time-scale that was set by MCM was founded in political will of the Minister of Environment Affairs and Tourism to expedite the delivery of access rights to previously disadvantaged communities. The tight time-scale was a significant constraint experienced by the SFTG during development of the recommendations (Harris et al. 2002), and was exacerbated by insufficient capacity at MCM to engage fully in the process, lack of an overall plan for implementation beyond the SFTG activities, and delays in disbursement of funds. Given the benefit of hindsight, the SFTG provided a time-scale and schedule for implementation of the recommendations that clearly outlined the appropriate phasing of actions required, as well as the roles and responsibilities of the organizations or

groups to be involved. This was important, because the proposed process of implementation was complex and many facets of management required primer actions such as preparation of fund proposals, appointment of staff and training.

RECOMMENDATIONS

An implementation plan that identifies short, medium and long-term goals, summarizes the actions required, prioritize activities appropriately, clearly assigns roles and responsibilities and sets realistic time-scales within a specified deadline is essential. The SFTG provided a proposed plan (SFTG 2000) to act as a guideline, but noted that it was important that MCM officials be involved in finalizing the plan so that buy-in could be achieved and responsibilities accepted. The sequence of events and the approximate timetable proposed are summarized in Figure 2.

New definitions for subsistence and small-scale commercial fishers

RATIONALE

The definitions in the Marine Living Resource Act (Anon. 1998) for both subsistence and commercial fishers were deemed to be inadequate, because they

neither characterize the users nor provide sufficient precision for practical or legal implementation (Branch *et al.* 2002a). Furthermore, information gained during research and consultation yielded new insights relevant to categorization of fishing activities, and highlighted the negative implications of applying the definitions provided in the Act for both the needs of fishers and resource sustainability. To replace them, the SFTG recommended new definitions and accompanying criteria. In putting forward the new definitions for subsistence and commercial fishers, the SFTG recognized that they excluded an identified sector of informal fishers seeking commercial rights, who might previously have been considered as "subsistence fishers" or "artisanal fishers". The SFTG therefore recommended that a new sub-category be created to accommodate small-scale commercial fishers. The background and full motivations for these recommendations can be found in Branch *et al.* (2002a).

RECOMMENDATIONS

Subsistence fishers are defined as poor people who personally harvest marine resources as a source of food or to sell them to meet the basic needs of food security; they operate on or near to the shore or in estuaries, live in close proximity to the resource (within 20 km), consume or sell the resources locally, use low-technology gear, and the types of resources (low cash value) they harvest generate only sufficient returns to meet the basic needs of food security. Subsistence fishers may not employ staff to undertake harvesting or processing. In allocating rights, preference should be given to those whose practice of fishing has a long-standing cultural or traditional role (transmitted through at least three generations or 50 years) in the coastal community in question. To qualify for consideration, fishers should not have other employment that yields sufficient income for the resource to no longer be necessary to meet their basic food requirements. Fishers must not exceed sustainable levels of harvest, which need to be set for each resource and in each locality. Subsistence fishers may barter or sell excess catches beyond consumption needs (within legal catch limits), provided that the sale is by the fishers personally, and the resource is sold and used for consumption within their local area (i.e. within 20 km of the point of harvest).

Commercial fishers operate for profit and earn an income that is sufficient to meet more than the basic needs of life, may operate as individuals, in groups or companies, can employ staff or operate as profit-sharing collective groups, focus on resources that are managed by setting a Total Allowable Catch (TAC) or by a Total Allowable Effort (TAE) and which have

high value or can be caught in large quantities, and may use capital-intensive high-technology gear and methods of processing. Capture of the resources is not limited to the shore or estuaries, and sale of the resources is not restricted to the vicinity of capture. The resources are often processed to increase their value, and at least a part of the catch is often exported. Permit-holders must have the capability to make use of commercial rights, and must share in the risks involved in establishing a commercial venture.

Small-scale commercial fishers can be distinguished within the broader commercial group by the size of their operations and the fact that the owner of the permit must be personally involved in the day-to-day running of the enterprise (including active involvement with harvesting or processing). Furthermore, they should live close to their operations and must have a history of involvement with fishing, and a reliance on fishing for a living, which must generate >75% of their total income. While it is clear that there should be a limit to the size of the group, company or cooperative that can qualify as being "small-scale", the SFTG did not define these limits, but suggested that there are recognized ways of distinguishing small, medium and micro-scale enterprises (SMMEs), including the number of people involved, the amount of capital invested, the economic turnover and the number and size of boats owned. Expert economic advice should be sought to define limits to differentiate between sectors.

The key criteria defining these three different sectors are amplified in Branch *et al.* (2002a; see their Fig. 2 for a summary).

Species suitable for use by subsistence harvesters

RATIONALE

A number of important resource-use issues were noted. First, most of the resources have been over-exploited, e.g. linefish and abalone *Haliotis midae* (Attwood and Farquhar 1999, Hauck and Sweijd, 1999, Penney *et al.* 1999, Griffiths 2000). In some instances informal/subsistence use of the resources overlaps with the other formal fisheries sectors, but because it has not previously been factored into the fishery management strategy, it represents an additional unaccounted catch and in many cases this has contributed to unsustainable use and resource depletion (Cockcroft *et al.* 2002). Second, there have been real or perceived inequitable allocations of resources among fisher sectors, informal/subsistence fishers lacking access to resources, either because of legislation that curtails their traditional methods and quantities or as a

result of unattainable infrastructural or financial requirements (Hauck *et al.* 2002). Third, resources with high market value are seldom utilized to provide basic food security, but rather form the basis of illicit business operations, so that it is economically inappropriate to consider these high-value resources for subsistence use (Branch *et al.* 2002b). Fourth, some resources present opportunities for development of subsistence or small-scale commercial fisheries, because they are not targeted by commercial or recreational fishers but are suitable for subsistence or commercial use on a small scale (Cockcroft *et al.* 2002). These resources have, however, mostly not received the same research attention as more lucrative commercial or sought-after species, which necessitates a precautionary approach to allocation.

RECOMMENDATIONS

In parallel with the identification of different types of fishers, all resources (or groups of resources) must be classified in terms of whether they are best utilized by recreational, subsistence, small-scale commercial or large-scale commercial fishers, or combinations thereof (Cockcroft *et al.* 2002). The nature of the marine resources themselves should form the basis for these decisions. To be considered suitable for subsistence fishing, a species should fulfill the following criteria: (1) they should be accessible on or near the shore or in estuaries, (2) fishing methods should be based on low-technology gear, (3) the resources should be of low cash value and (4) fishing for the resource should be sustainable. These assessment criteria should be applied whether or not there exists a long-standing, community-based or cultural use for a species, and a species should fulfill all criteria to qualify as a subsistence resource.

Collectively, these criteria are intended to ensure sustainability, protect the rights of subsistence fishers and ensure optimal economic returns. In this spirit, it was recommended that, in the event of a conflict between new entrants to a fishery and established users, preference should be given to those who have a long-standing association with the resource. In cases or times of resource shortage, consideration should be given to granting preference to subsistence users over recreational and commercial fishers. The cash-value criterion should be used to ensure that resources are utilized in a way that provides maximum economic return. Of all the criteria, this was the most controversial, because it was perceived to deny subsistence fishers the right to improve their earning power. This was not its intent: anyone who has the capability should be entitled to apply for commercial rights, but not under the guise of subsistence fishing. At the

Table 1: Recognized categories of resources recommended for subsistence and/or small-scale commercial use on the South African coast

Category of resource use	Species groups
Rocky-shore intertidal benthic invertebrates	Limpets Polychaete worms Mussels Oysters Gastropod snails Octopus Red-bait
Sandy-beach invertebrates	Gastropods Bivalves Ghost crabs Mole crabs
Marine subtidal invertebrates and seaweeds	Rock lobsters Abalone Kelps and seaweeds
Marine shore-based rod and handline fishery	Fish
Marine non-motorized boats; rod and handline	Fish
Marine motorized boats; rod and handline	Fish
Marine gillnet and seine-net fishery	Fish
Estuarine benthic invertebrates	Mud/sand prawns Polychaete worms Bivalves Mangrove crabs
Estuarine seine- and cast-nets	Swimming prawns Crabs Fish
Estuarine gillnets	Fish Swimming crabs
Estuarine trap-fishery	Fish
Estuarine shore-based rod and handline fishery	Fish

heart of the controversy lay West Coast rock lobster *Jasus lalandii* and abalone. For a temporary and interim period, "subsistence" permits were granted for these species, although they were being used to gain profit, not for subsistence. They are clearly more suited for industrial and small-scale commercial operations. This approach does not imply that poor people who are currently considered subsistence fishers may not have access to these resources, but rather that they would have to apply for the rights to harvest them on a commercial basis. The recognition of a "small-scale" category of commercial fishing caters for this situation, generating the opportunity for people with relatively little capital to begin commercial enterprises.

The sustainability criterion is inviolate, and if a species cannot be fished in a sustainable manner or without significant collateral environmental damage, it is not suitable for subsistence fishing – or indeed for any other sector. Geographic variability in the suitability of a species as a subsistence resource could

arise, for example if a species is locally overfished, or if the fishery is located at the geographic limit of its range where it may be less resilient to exploitation. Because biological information crucial for fisheries management is lacking for many species suitable for subsistence harvesting, the Precautionary Principle should be applied. Thus, no increase in fishing effort should be recommended unless there is scientific evidence that this would be sustainable. Lastly, the dynamic nature of natural populations makes it mandatory that management strategies be flexible. Species assessed as suitable for subsistence fishing on the basis of current biological data may not always be so. Natural variability and changes in fishing pressure necessitate that subsistence fisheries should be monitored and subject to periodic review. This could result in species being removed from the list of subsistence resources, or the rate of harvest being altered.

The SFTG prepared a preliminary list of species groups potentially suited for use by subsistence harvesters and/or small-scale commercial fishers (Table I), and these are discussed in more detail in Cockcroft *et al.* (2002). In compiling this list, recent reviews of the status of marine resources in South African were used (e.g. Fielding *et al.* 1994, Lamberth *et al.* 1997, Penney *et al.* 1999, Mann 2000). It was recognized that these data are incomplete and that assessments of individual species must be made to produce a definitive list. Therefore, the recommendation is only that these species should be investigated further for their suitability as subsistence resources.

Types of subsistence fishing activities

RATIONALE

The SFTG research and consultation process confirmed the existence of a number of informal fisheries, primarily operating nearshore, on the shoreline or in estuaries (Clark *et al.* 2002). Many of these fisheries were not using legitimate fishing techniques and no regulations (such as gear limitations, bag and size limits) were in place to control them, as is required by the Marine Living Resources Act (Anon. 1998). A clear need identified was to evaluate each of these fisheries, and to formalize those that are sustainable, manageable and satisfy the recommended criteria for subsistence resources (see above). Further, it was noted that this exercise should seek to formalize existing fishing activities, and not to create new subsistence fisheries. A preliminary list of the main species being targeted by each recognized fishing activity was prepared and, based on the recommended definitions, these species were classified in terms of their suitability for subsistence

or small-scale commercial fishing (SFTG 2000, see also Cockcroft *et al.* 2002).

RECOMMENDATIONS

A total of 12 different categories of subsistence and small-scale commercial fishing activities was recognized, based on the history of the fishery, tools/gear used, habitat (estuarine/intertidal) and type of resource (Table I). Generic fishery management plans should be developed for each of these fishing activities.

Subsistence fishing areas

RATIONALE

Subsistence and small-scale commercial fishers were found to harvest close to where they live (within 20 km) and usually over relatively short sections of coastline (<10 km), although notable exceptions are found in subsistence linefishing, and small-scale commercial operations on the West Coast (Clark *et al.* 2002). The subsistence fisher communities generally have habitual areas of operation (sections of coast or a particular estuary) and, despite lack of legal access, have a sense of ownership of the resources in the area. Most of the communities engaged in subsistence activities have a long history of use of resources, reaching back to before the imposition of apartheid and colonial restrictions, as evidenced by the personal accounts and memories of the oldest harvesters. Many fishers expressed frustration at being denied legal access to traditional resources in areas close to their homesteads, while witnessing utilization of these resources by recreational and commercial fishers (Hauck *et al.* 2002).

Informal fishing is occurring in some marine protected areas (MPAs). In most cases this is illegal, but there are a few instances of fisheries that were legalized in the past by provincially issued permits (Attwood *et al.* 1998a). Fishers living next to MPAs expressed the strong wish to gain access to the resources therein for subsistence or small-scale commercial purposes (Branch *et al.* 2002). This desire for access should be seen in the context of the core functions of marine protected areas. International standards (see Kelleher and Kenchington 1992) and a new protected area policy in South Africa advocate that "no-take" reserves should be recognized as essential means for managing resource harvesting (Attwood *et al.* 1998b), and that representative habitat in all biogeographic zones should be fully protected to ensure biodiversity conservation (Hockey and Branch 1994, 1997, Attwood *et al.* 2000, Roberts *et al.* in press a, b).

RECOMMENDATIONS

Allocation of subsistence fishing rights should be area-based and exclusive to individual subsistence communities. Therefore, areas of coastline and particular estuaries should be zoned for subsistence use, and permits issued should be valid for specific zones only. This system will be facilitated by the implementation of community subsistence fishery rights, associated with local individual permits (see below). In some cases it will be possible to manage multiple sectors within a zone (e.g. linefishing) but, where necessary, sectors should be separated to prevent user-conflict, promote custodianship and facilitate the evaluation of sustainability of fishing by different sectors. A notable example of a fishery that could be zoned for non-overlapping use is that of intertidal (rocky and sandy shore) invertebrate harvesting by recreational and subsistence sectors. The allocation of small-scale commercial fishery rights could also be area-confined, but is more likely to overlap significantly with large-scale operations and recreational activities.

The general rule should be that no subsistence harvesting should take place in MPAs. Possible exceptions to this no-take policy should be considered as individual cases, and only if an area has been used historically (>50 years) for subsistence or small-scale commercial fishing, particularly when there is cultural basis for the activity (e.g. the use of fish-traps in Kosi Bay in northern KwaZulu-Natal). Exceptions should only be approved if the MPA in question is large enough for it to be zoned to allow subsistence or small-scale commercial fishing in a portion of the MPA, and an adequate core area (sanctuary) with no extractive harvesting is maintained that will not be compromised by adjacent fishing zones. Furthermore, this should not conflict with national commitments to meet international standards set for biodiversity conservation (Attwood *et al.* 1998b; Biodiversity Convention of the Rio United Nations Conference on Environment and Development [Resolution A/RES/55 1992]).

Establishment of dedicated management structures

RATIONALE

Because subsistence fisheries were not previously recognized as a formal sector in South Africa, very few management structures currently exist to cater specifically for them (Clark *et al.* 2002). Where they do exist, they are usually the product of arrangements set up at provincial or local level. For example, KwaZulu-Natal Wildlife has issued permits, determined and enforced permit conditions and, in some instances, set up local

co-management systems that have involved fishers in decision-making (Attwood *et al.* 1998b, Harris *et al.* in press). In most other provinces, capacity for management of the activities of these resource users has been lacking, and subsistence fishing has been unregulated or has been dealt with purely as a law enforcement problem. The national agency responsible for fisheries (MCM) has until recently seldom interacted directly with subsistence fishers. This situation has led to a lack of information and mistrust between fishers and authorities. This became clear at meetings and workshops where fishers, most of whom had not had previous opportunities to voice frustrations, highlighted areas of conflict with authorities (Branch *et al.* 2002b). In addition, the research showed that informal/subsistence resource users generally felt excluded from established management structures, and want to be consulted and to take a more active role in decision-making (Hauck *et al.* 2002). This suggests that management models that allow local decision-making and embrace the principles of co-management (see Pinkerton 1989, Berkes *et al.* 1991, Pomeroy and Berkes 1997, Hara 1999) are required to address the problems and ensure that effective and appropriate regulatory mechanisms are developed. Although the new Marine Living Resources Act (MLRA) places the responsibility for all marine resources squarely in the hands of the national agency, it does allow for the devolution of management functions to adequately equipped provincial agencies (Anon. 1998).

Several other lessons relevant to management of subsistence fisheries were gained from the SFTG process (Harris *et al.* 2002). First, the activities of the SFTG provided an opportunity for key stakeholders (user-groups, researchers and managers) to participate and advise the national agency on subsistence fisheries management. In some areas there already exist "local co-management structures", which consist of committees that include representatives of fishers and authorities. For example, such management arrangements have been explored for intertidal invertebrate harvesters in KwaZulu-Natal, at Sokhulu (Anderson and Griffiths 1997, Hutton and Pitcher 1998, Harris *et al.* in press) and Kosi Bay (Kyle *et al.* 1997a, b), as well as with estuarine gillnet fishers at St Lucia and Kosi lakes (Mann 1995), and Ebenhaeser on the West Coast (Sowman *et al.* 1997). The communicative and consultative approach they fostered and explored was of significant benefit, given the lack of experience and knowledge about subsistence fisheries at a national level and the diverse range of issues that emerged, and it is important that this approach be continued and expanded to guide the implementation phase. Second, valuable insights were gained from fieldworkers who interacted directly with fishers during the SFTG pro-

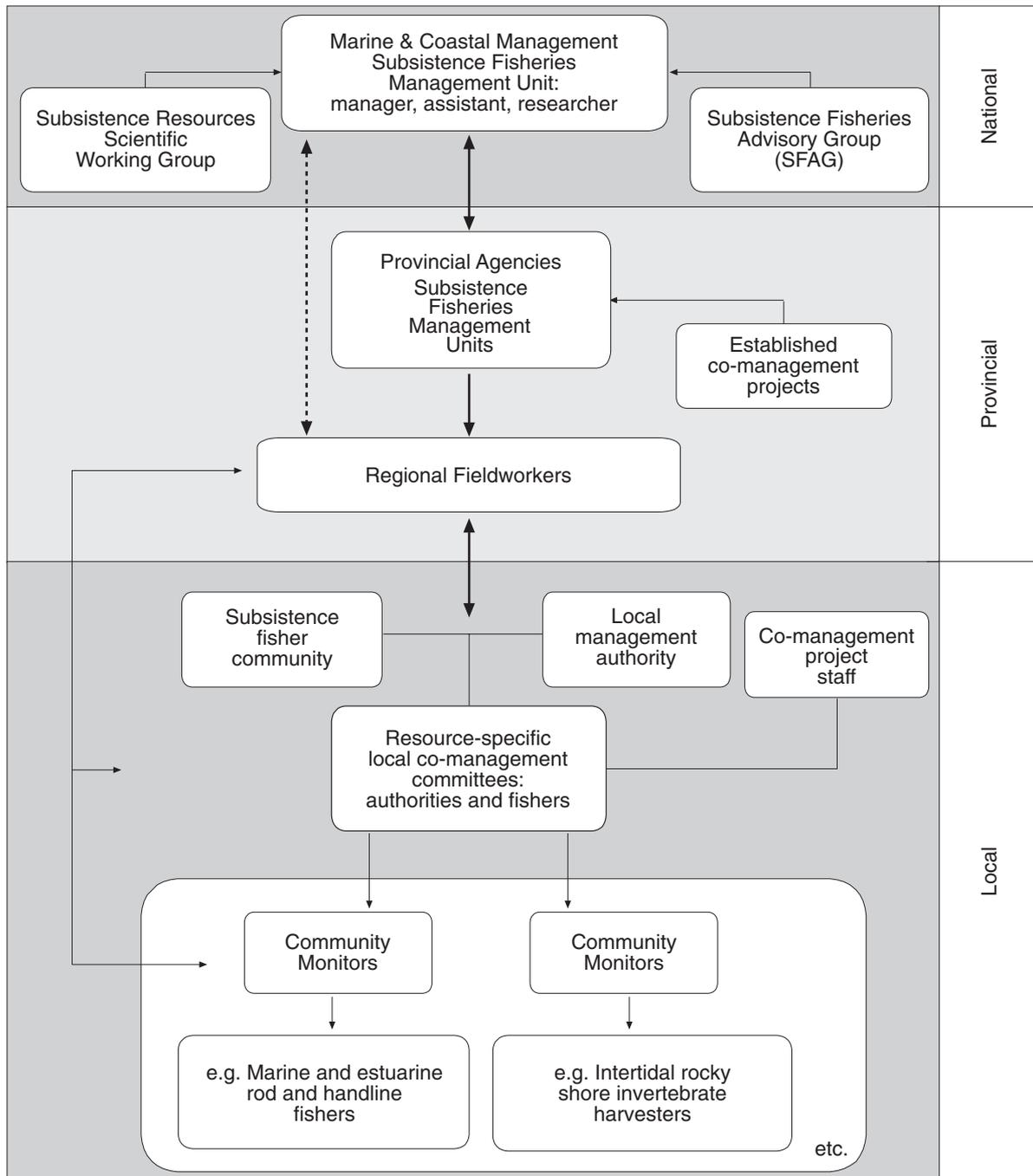


Fig. 3: Recommended multi-tiered institutional management structure for subsistence fisheries in South Africa

cess (Hauck *et al.* 2002), demonstrating the need for the appointment of dedicated extension workers at a regional and local level to facilitate communication and mitigate conflict. Those communities that already have some form of local co-management structures in place have benefited from the services of community liaison officers to assist with mediation (Branch *et al.* 2002b). Third, several existing subsistence fisheries had established community-monitoring programmes. These have proved to be an integral part of the management system (see Kyle *et al.* 1997a, b, Attwood *et al.* 1998a, Harris *et al.* in press). In addition to data collection, they promote observance of local harvesting rules and improve understanding of resource-management principles among the fishers (Harris *et al.* in press).

RECOMMENDATIONS

The principle of co-management of subsistence resources should be encouraged at all levels of management of subsistence fisheries (i.e. between national, provincial and local agencies and fishers) and a multi-tiered institutional structure is recommended (Fig. 3). The national agency (MCM) should control issues of national concern, and support and coordinate the activities of provincial and local structures. To this end, a dedicated national Subsistence Fisheries Management Unit should be established, including expertise in fisheries biology and management, social science, communication and conflict-resolution. This unit should be advised by a multidisciplinary Subsistence Fisheries Advisory Group consisting of representatives of regions and different types of subsistence fishers, as well as members with expertise and experience in management, science, law and socio-economics. To ensure continuity, it should, at least in the interim, include some members of the SFTG. Also at a national level, there should be a Scientific Working Group, whose function it will be to generate and guide research and to integrate the findings to provide information and advice for management.

Where the capacity is available and the agency is willing, the responsibility for implementing and managing subsistence fisheries should be devolved to provincial agencies. In this event, the relative roles and responsibilities of national and provincial agencies must be clearly defined. The provincial agency should not work in isolation, but should be supported by MCM and work within a national management framework. It clearly also cannot handle all levels of functions. For example, matters such as procedures for applications and criteria for identifying subsistence fishers and resources need to be unified at a national

level to ensure consistency. Functions assigned to the provincial agency should include (a) facilitation of the establishment of local forums and structures necessary for management; (b) active participation in local co-management; (c) coordination of the process for application and allocation of permits in the province; (d) assistance with the identification and screening of subsistence fishers; (e) compliance; (f) supervision of Regional Fieldworkers, and (g) coordination of data collection.

Where the provincial agency does not possess the capacity to fulfill these functions and manage the fisheries, the national agency will have to assume this role, but should actively initiate a programme to build capacity within the province.

Regional Fieldworkers who have a "hands-on" approach and work directly with fishers in the field are needed. They should operate under the direct supervision of MCM or the delegated provincial management agency, and should play major roles to (a) establish communication networks between fisher forums or co-management structures and MCM (or the delegated provincial authority), (b) identify effective means of communication with and within each subsistence fishing community, (c) facilitate the establishment of local fisher forums and co-management structures, (d) facilitate the provision of capacity-building and training, (e) assist with permit applications, (f) attend relevant regional and provincial fishery or coastal forums, (g) communicate information about permit applications to fishers, (h) coordinate/facilitate data collection and monitoring programmes.

At a local level, co-management committees should be established for each appropriate community or fisher group, to involve fishers and the relevant local authority in the joint management of particular resources. These local co-management structures should be designed to handle groups of resource species in which people have a common interest. For example, there could be one committee dealing with linefish, another with intertidal rocky-shore invertebrates and a third with estuarine invertebrates. Where a local or provincial authority is not capable of participating in the local co-management structure, MCM will have to interact directly or appoint a suitable local organization as a partner. The few established and successful subsistence fishing co-management structures in South Africa should be used as models for local fishery management structures and to provide lessons on the appropriateness of co-management in various circumstances, and the types of co-management models that are most successful (Hauck and Sowman 2001). Local co-management structures should act as the channel of communication between fishers and authorities,

and their responsibilities should include (a) identification of *bone fide* subsistence fishers in the community and maintenance of a register of all subsistence fishers within the community, (b) preparation of community permit applications, (c) decisions on how to share the resource quota allocated to the community among the registered fishers, (d) administration and management of a local permit system, (e) supervision of community monitors, (f) informing fishers of new developments, (g) representation of fishers at regional fishery forums. The role of the management authority partner in the local co-management structure should be to (a) participate fully in decision-making by local co-management structures, (b) enforce the system of harvesting agreed on by local co-management structure and permitted by MCM, (c) monitor the local co-management structures to ensure that it is representative and fair, (d) assist in training and capacity building, (e) provide information necessary for effective decision-making to the local co-management structure and assist with interpretation of this material. Community monitors are essential in each community to monitor resource-use, to contribute to internal communication networks, to assist with compliance and to act as capacity-building agents.

Training and capacity-building

RATIONALE

Surveys of the fishing communities indicated that there is generally a very poor relationship between authorities and subsistence fishers (Hauck *et al.* 2002). This can be attributed in part to the enforcement of unfair access laws in the past. However, it is also clear that unsustainable harvesting practices are being used in many cases, and are linked to two main factors. First, there are some unrealistic expectations from fishers as to the possible yields from fisheries and fishers have a weak understanding of the principles of sustainable use and management of resources. A key contributing factor to this problem is that traditional harvest systems are often no longer appropriate in the face of exploding population numbers in coastal communities and diminished access to the coast. For example, fishers who were able in the past to operate over large stretches of coast are now restricted by developments, nature reserves, etc., and concentrate their efforts more intensely in small areas of access. Furthermore, many subsistence fishers no longer use traditional implements and have turned to more sophisticated tools, such as monofilament nylon gillnets instead of simple traps, in estuaries. Similarly, pangas (large-bladed knives) and wheel springs are now used

by intertidal harvesters instead of traditional pointed sticks. Second, there is a very high dependence on the resources by the fishers because they have few alternative options to sustain their livelihoods. The natural resources are seen as the last resort and the fishers feel that they do not have the "luxury" of saving for the future.

Participation of fishers in management also requires that they have the skills and information necessary to be equal partners in decision-making. This is a key area that requires attention, because there is generally poor access to information within the communities and a lack of organizational and administrative skills. The establishment of local co-management structures requires that the capacity exists at local level, within both the community and the authority, to perform administrative and organizational functions, such as arranging and running meetings, record-keeping, issuing permits, financial control and law enforcement. The negative attitude of fishers to management agencies is exacerbated by the poor knowledge and understanding that authorities have about traditional harvesting strategies, and of the livelihood circumstances experienced by fishers. Conflict is fostered because of the lack of information and communication between the fishers and the authorities, and also because management staff often do not possess the mediation and facilitation skills needed to deal with conflicts appropriately.

RECOMMENDATIONS

The SFTG recommended that a training programme be initiated to build capacity for participation in management, to enhance knowledge about resource management, to reduce conflict, and to promote alternative livelihood skills to reduce dependence on living marine resources. A phased/modular programme should be developed with input from experienced independent marine educators, and should cover legal aspects, basic fisheries management, an understanding of basic ecology and foodwebs, the functioning of local management structures, strategies for alternative livelihoods, and conflict-resolution (Fig. 4). The following target groups need to be catered for within this training programme: subsistence fishers, management agents (national, provincial and local), Community Monitors, Regional Fieldworkers and participants in local co-management structures.

The agents who should execute various aspects of this training programme were identified as experts in marine education, the MCM Subsistence Fishers Management Unit (and delegated provincial management agency), Regional Fieldworkers and Community Monitors. The Unit should develop appropriate training

TRAINING AGENTS	TRAINING TARGETS		
	Fishers	Local co-management structures	Field management staff
Expert marine educators	Community monitors	Regional Fieldworkers	
National Subsistence Fisheries Management Unit	KEY TRAINING NEEDS		
	Legal aspects		
	Basic fisheries management principles		
	Local co-management structure functioning		
	Facilitation and conflict-resolution		
	Alternative livelihood strategies		
Regional Fieldworkers			
Community monitors			

Fig. 4: Capacity-building requirements for subsistence fisheries management in South Africa: identified targets, training agents and needs

programmes that have principles applicable to all subsistence fisheries, but are flexible in that they can be adapted and applied to specific regional and local circumstances. A specific function of the Regional Fieldworkers should be to facilitate and conduct capacity and training programmes at regional and local level, within the national framework. Local co-management structures and community monitors should act as a vehicle for information dissemination, capacity building and training. Community Monitors could play a key role here, because they interact frequently with fishers and should be provided with training in basic fisheries management and ecology, as well as skills to communicate this knowledge to fishers. The South African Network for Coastal and Oceanographic Research (SANCOR) has established a Marine and Coastal Educators' Network, whose skills and network could be drawn upon in designing training courses. Some excellent courses specifically aimed at providing a basic understanding of fisheries management have been developed and conducted in particular fishing communities (notably by the Seaworld Education Centre in KwaZulu-Natal – see Harris *et al.* in press). Based on creative techniques such as games, role-playing and models, these courses are extremely effective in communicating principles (J. Mann-Lang, Sea World, Durban,

pers. comm.; JMH, pers. obs.).

Although a comprehensive ongoing training programme is required, certain training is urgent for effective implementation of subsistence fisheries management. Regional Fieldworkers require immediate training in how to facilitate the formation of local co-management structures, conflict-resolution, basic fisheries management principles and legal requirements. Field staff in local/provincial management agencies who interface with fishers need familiarization with the new legislation that recognizes subsistence fishers, as well as training in appropriate law enforcement methods, facilitation techniques and conflict resolution.

Communication mechanisms

RATIONALE

It was clear from the SFTG process that subsistence fishers are ill-informed about current developments, do not have access to information about the resources they utilize, and generally mistrust the motives of the authorities (Hauck *et al.* 2002). This has led to many problems, including conflict, overexploitation of resources and non-compliance. A particular problem

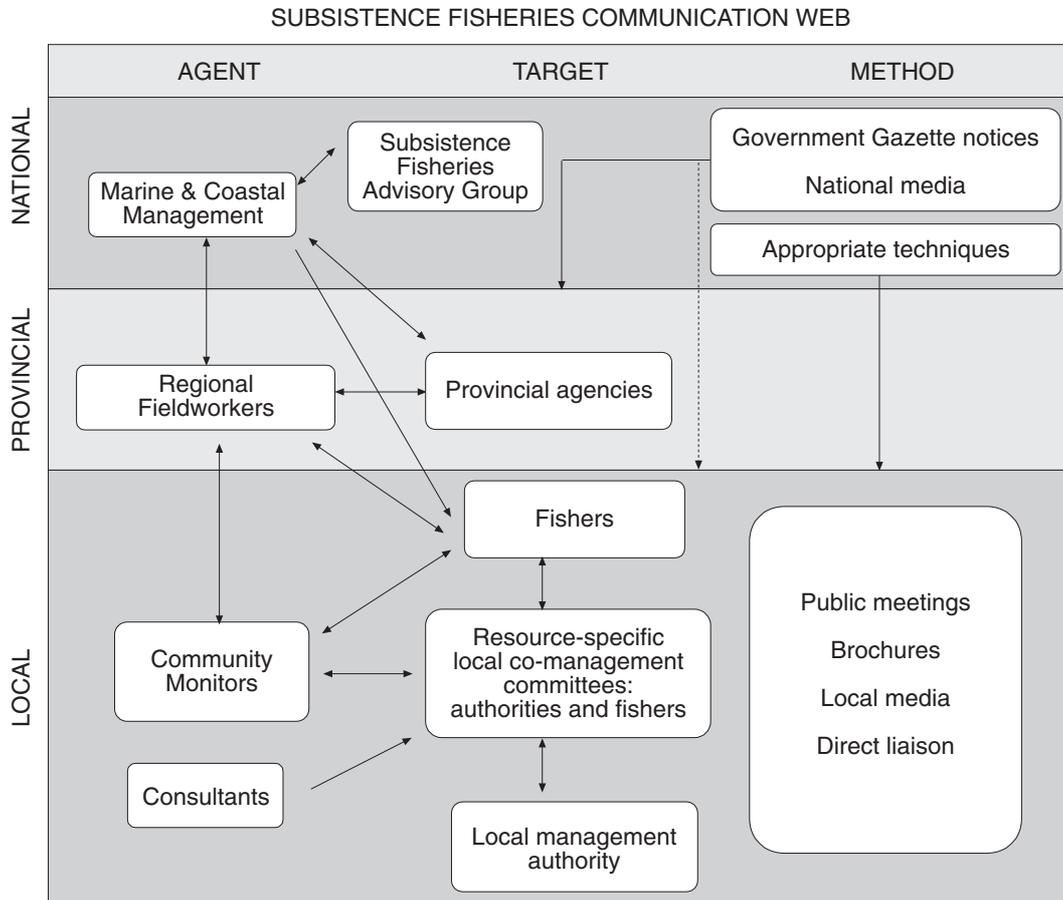


Fig. 5: Network needed to effect communication between management and subsistence fishers: roles, agents, targets and appropriate techniques

identified was the mode and style of previous communication efforts. For instance, notices published in the Government Gazette (the official medium for communicating governmental intentions) are totally inadequate as means of communication with subsistence fishers. Many of the fishing communities live in remote rural areas, have informal or traditional transport and information systems and do not have access to formal government and media communication systems. Furthermore, many subsistence fishers are illiterate, and language differences create barriers between fishers and authorities: South Africa has 14 official languages, four of which are commonly spoken by coastal fishers.

A further stumbling block to communication can be traced to the past history of interactions between

authorities and fishers; many of the latter were disadvantaged and marginalized during the apartheid era in South Africa (van der Elst *et al.* 1996). Most of these fishers regard previous laws and regulations as unjust, and expressed concern and anger during the first interactions with authorities (Hauck *et al.* 2002). Consequently, issues of access and allocation are likely to involve conflict. This must be acknowledged from the outset, and facilitation mechanisms must be devised to deal with it.

To address the current communication problems, a climate of consultation, trust and information exchange between fishers and authorities must be cultivated. In particular, there is a need for MCM and provincial authorities to establish first-hand contact with the

fishers, especially when changes are being made to the system of management. The fishers repeatedly expressed to the SFTG the need for high-level officials from MCM to interact with them when important decisions are being made. Public meetings appear to be an appropriate means to communicate with fishers in this regard, especially when matters of general nature are being dealt with. The distribution of information brochures and pamphlets is also useful and appreciated by the fishers, and local radio station broadcasts are also effective. Fishers also expressed a strong desire to have someone interact regularly with them to air concerns and obtain information (Hauck *et al.* 2002).

RECOMMENDATIONS

Urgent and active efforts need to be made to ensure effective communication between MCM, fishers, provincial management agencies and local authorities (Fig. 5). To meet the need for regular communication channels between fishing communities and MCM/provincial agencies, it is important that Regional Fieldworkers be appointed and that they be accessible to and make regular contact with all fishing communities. Local subsistence fisheries co-management committees should involve local fishers in decisions about the management and control of fisheries, and should also act as a key vehicle for communication between fishers and authorities.

It is vital to use appropriate techniques for communicating information to subsistence fishers. Current avenues must be supplemented by media that will successfully reach subsistence fishers, particularly those in rural areas. Translation into appropriate languages is imperative. The Subsistence Fishers Management Unit at MCM should develop and coordinate a national programme on communication, information and awareness for subsistence fishers, using (a) public meetings and workshops, (b) brochures and pamphlets, (c) local media, including local press and radio, (d) direct liaison with local fisheries co-management structures, and (e) involving provincial and local authorities. Regional Fieldworkers and community monitors should be central to promoting and facilitating the programme at local level, and ensuring its execution.

Fishers must be informed about (1) the Marine Living Resources Act (Anon. 1998) and regulations, (2) the definition of subsistence fishing and the possibility of small-scale commercial rights, (3) the protocol and requirements for applying for fishing rights and permits, (4) opportunities such as capacity-building and training, (5) the management structures being developed for their use of resources, (6) basic resource-management principles and (7) feedback from research and data-monitoring systems so that users are

informed about the status of the resources they utilize. It is recommended that conflict be dealt with in two complementary ways: (a) the Regional Fieldworkers should be provided with training in facilitation and conflict-resolution skills, and (b) the possibility of contracting independent consultants or facilitators to assist with conflict resolution on an *ad hoc* basis should be considered, and funds set aside for this purpose.

Although not related solely to the subsistence-fishing sector, it is worth noting here that the need for Regional Fisher Forums or Coastal Forums was raised in a number of contexts during the SFTG process. To be effective, these forums need to be formally recognized by MCM and accepted by the communities, and should represent all fishing sectors, local, regional and provincial authorities, and interested and affected parties concerned with the coastal zone. Strong linkages should be made with the process of implementing the new Coastal Zone Policy (Anon. 2000).

Application and allocation procedures

RATIONALE

Equitable and fair allocation of resources among and between the sectors is essential for effective management and is a subject that has generated much debate (Branch *et al.* 1996, van der Elst *et al.* 1997). Current communication between MCM and fishers with regards to the process of applying for rights is weak. The act of obtaining application forms and filling them in is an obstacle, and the format and content of current application forms are problematic as they do not promote an understanding by the fisher of the information required, nor do they yield adequate information for rational screening of the applicants. Furthermore, fishers conveyed mistrust about the identification of fishers by the authorities and expressed concern that existing informal fishing activities could be curtailed by the new laws. There is a perception that previous allocation decisions by national authorities have been made in isolation and without consultation with local co-management agents or with the fishers. It is essential that these perceptions be dispelled by implementation of appropriate systems, and by communication of these systems to the fishers. Political pressure, lack of planning and inappropriate time scheduling also appear to have resulted in rushed and *ad hoc* decisions about allocations, which has exacerbated the situation. Whether permits should be issued to individuals or to entire communities was one of the issues raised and discussed by both fishers and authorities during the consultation process (Harris *et al.* 2002). Different models may be needed under different circumstances, and it

will be necessary to retain some flexibility, depending on the cohesiveness of fisher groups and the capacity of local management agencies.

RECOMMENDATIONS

It is proposed that application and allocation procedures be coordinated nationally, but that provincial authorities and local co-management structures be involved in the process; their relative roles need to be clarified and defined (Fig. 6). Application procedures and allocation decisions need to be transparent, fair and participative. They must also be orderly and not *ad hoc* or rushed.

Information about application procedures must be disseminated to each subsistence fishing community. The survey by the SFTG located about 147 communities that potentially qualify for either subsistence or small-scale commercial rights (Clark *et al.* 2002), although others may exist that have not been detected. The distribution of information must be done using appropriate decentralized techniques, i.e. local press (radio and newspapers), brochures, local structures, Regional Fieldworkers and local or regional authorities. A network needs to be established and coordinated by the Unit at MCM to disseminate information about applications for fishing rights. Application forms need to be straightforward, provide clear explanations of the information required and probe the characteristics of applicants in a manner that allows assessment of whether they meet the criteria for being classed as subsistence or small-scale commercial fishers. These criteria must be clearly outlined. Information requested should include the number of fishers, resource types, tools/gear, description of any local allocation system already operating, monitoring plan and history of previous involvement. Attention must be given to translation into various languages, and the need to provide verbal versions for illiterate fishers. Adequate time (at least 3 months) must be allowed between publication of a call for applications and the due date, to allow information to reach remote fishers and to allow them time to seek advice on how they should fill in the application forms. The Regional Fieldworkers should be responsible for providing assistance to fishers in the preparation of applications.

Screening of applications must be based on criteria underpinning the definition of subsistence fishers. In this process three steps need to be recognized. First, the permissible fishing activities (resource types, fisher profiles, types of gear) should be determined nationally, but in consultation with any delegated provincial authority. If no delegated provincial authority exists, then other local/regional authorities should be consulted to ensure these decisions include local knowl-

edge. Second, once a fishing activity has been accepted as "subsistence", it will be necessary to identify *bona fide* subsistence fishers to whom permits should be granted. Local co-management structures should play a central role in this process. If a local co-management structure does not exist, MCM or the delegated provincial authority should assume this role. Third, decisions will need to be made about the amounts of harvest that can be taken. This will depend on the quantity determined to be sustainably available and the number of fishers who qualify to harvest the resource. It may be necessary to limit the number of participants and/or the amount of harvest per person. These decisions should also involve local co-management structures, but have to be grounded on the principle of sustainability and based on the best available scientific information. The total harvest per area should be set by the responsible authority, but the division among fishers should preferably be decided by local co-management structures.

The SFTG recommends that access to resources should be by means of individual or community permits issued by MCM. Where local co-management structures exist, community permits should be encouraged, but in their absence it will be necessary to issue individual permits. In the case of community permits, the local co-management structure should be the recipient, and should be mandated to then issue local permits for the specific fishery to individual fishers within the community, within the permit conditions set by MCM. It is, however, important that all applications for an area or fishery be collated at a local level and sent through as a batch, so that MCM can get a composite picture for each fishing community or fishery before allocation to any applicants from that area or fishery. An appeal process must be established, to allow fishers recourse where they feel that consideration of their application has been prejudiced or unfair.

Permit conditions should include a monitoring system, fair allocation of rights within the community, harvesting constraints (specific resources or tools may be excluded), and any limitations on the amounts of harvest. Local co-management structures should contribute to developing the permit conditions within their fishery: during the application phase they should be invited to supply details of any local permits or allocation arrangements currently in place, as well as to provide proposals on this issue. The local co-management structure should decide on the local permitting system within the area/community, on distribution of the allocated quotas/areas to individual fishers in the community, i.e. how many fishers participate in fishery, how many individual permits are issued, how much resource per fisher, etc. Re-issue of permits should be reliant on past performance, compliance and resource

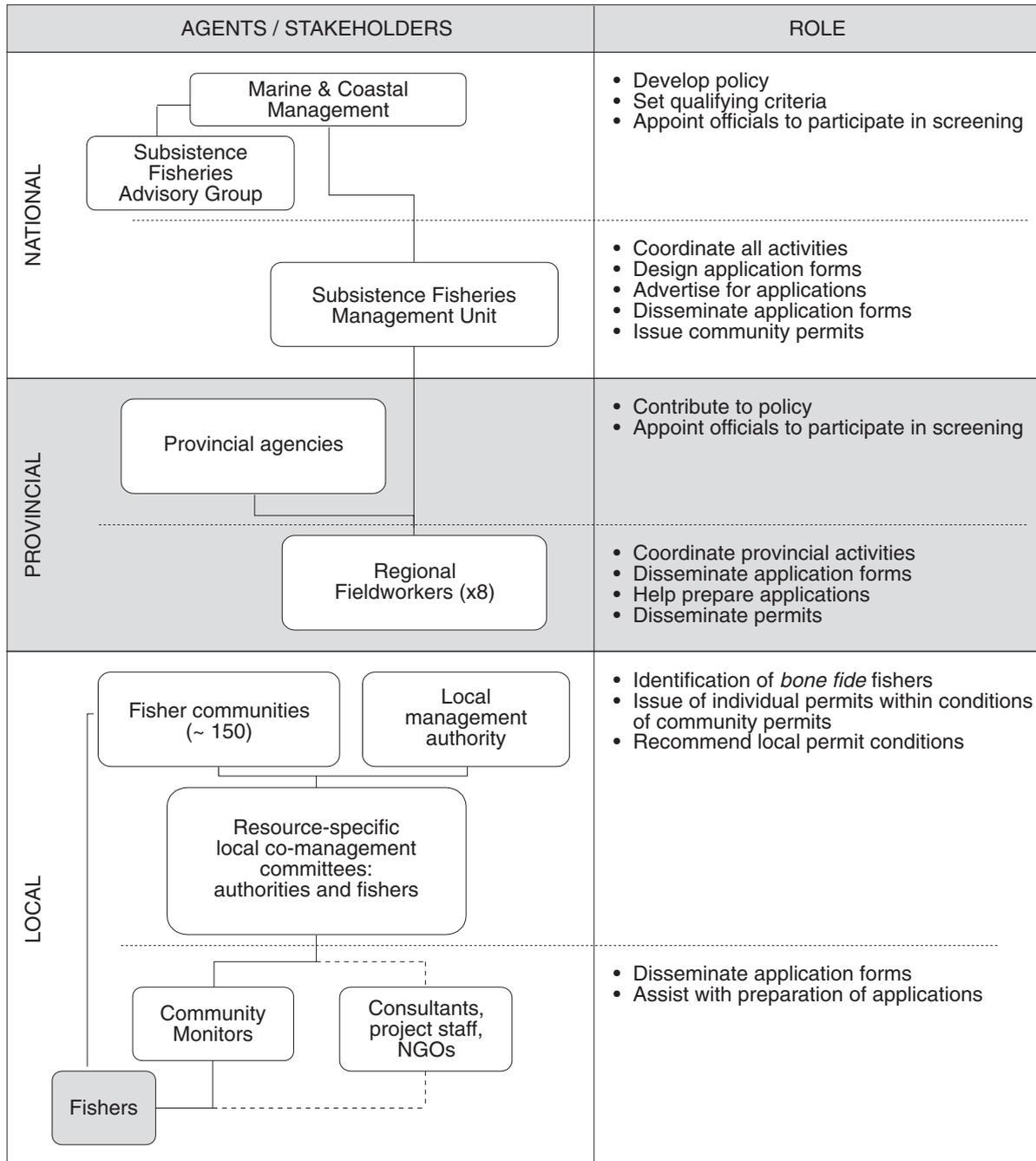


Fig. 6: Recommended allocation and application procedures to provide access rights to subsistence fishers in South Africa: agents, responsibilities and actions

availability, both at the national level (community and individual permits) and at the level of local co-management structures (individual local permits). Permits should be issued on an annual basis for a trial period, with the vision of longer-term access. The permit fee should be negotiated with the fishers by MCM via the local co-management structures and should be set at a level consonant with the fact that subsistence fishers are by definition poor. Administration of the permit system should be the responsibility of MCM or the delegated provincial management agency. The local co-management structure should administer the issue of local permits within the conditions of the community permit.

Compliance mechanisms

RATIONALE

There is presently no specific formal compliance programme for the subsistence fishing sector, because it has not been recognized as a legal fishing sector in the past, nor assigned harvesting regulations. The enforcement of the previous laws therefore meant that the activities of subsistence fishers were illegal, and conflict between fishers and authorities was identified as a major issue (Hauck *et al.* 2002). Compliance staff are currently accustomed to regarding subsistence fishers as poachers. Training will be essential to develop a re-orientation of their approach to that of education of fishers about new laws and the rationale for these laws, and to mitigate conflict.

RECOMMENDATIONS

Special compliance systems need to be developed to cater for the subsistence sector. These need to take into account the unique history and characteristic features of these fisheries. They must form part of local law-enforcement networks and be independent of political influence. Compliance is a national responsibility, but it can be delegated to a provincial authority where capacity exists. Practical law enforcement matters should be discussed with participants of the local committees and forums to ensure transparency. Members of the community and public should play a supportive role in compliance, but community policing is not recommended, because of the risk of violent retribution. Community powers therefore should be limited to reporting and collecting of evidence of illegal activities and reporting this to the authorities for further investigation.

Effective compliance requires that a number of issues be addressed. First, there is a need to create an inde-

pendent chapter of regulations for the subsistence sector. These regulations should prescribe permit requirements, harvesting methods, subsistence fishing areas or communities, method of harvesting, and various bag limits. They should be simple and practical to ensure that they are understandable by fishers and managers, and sufficiently flexible to allow specific conditions for individual fisheries (e.g. areas of harvest, allocation within the community, local restrictions). Second, the development of fishery-specific regulations and conditions of permits must be developed with the participation of the users prior to permit conditions being implemented and enforced. All legal requirements should be explained to fishers by means of a specific information programme. This awareness programme should also ensure that other users are kept informed of the management of the subsistence-fishing sector. Third, compliance staff require specific retraining to deal with the special challenges related to the subsistence fishing sector. They need to be familiar with legal requirements for subsistence fisheries and the specific fisheries in their areas, and must develop the skills necessary for good communication, facilitation and conflict resolution.

Research and monitoring

RATIONALE

During the information-gathering phase of their research, the SFTG identified major gaps in knowledge about subsistence fishers, resource use patterns and the resources. Little effort has been devoted to determining the quantities harvested, the size of the stocks and the sustainable levels of harvest for subsistence fisheries. Many species used by subsistence harvesters are not collected by recreational or commercial fishers, or are of a low market value, and have therefore not been researched or monitored. Information about their stock status, biology, growth rates, recruitment, etc. is therefore scarce. There are, however, a few good examples of monitoring of subsistence use, e.g. Kosi estuarine and intertidal harvesting (Kyle *et al.* 1997a, Harris *et al.* in press).

There are good reasons why it is imperative that research and monitoring be conducted for all key organisms harvested by subsistence fishers. The survival of subsistence fishers depends on the healthy status of the stocks they use, and it is therefore critical that their usage be conducted on a sustainable basis. Large-scale and significant ecological effects of subsistence harvesting have been demonstrated in a number of cases (e.g. Hockey and Bosman 1986, Lasiak and Field 1995, Castilla 1999), and these occur at a scale

that threatens biodiversity and population dynamics over large regions, e.g. Maputaland and Transkei (Dye 1992, Dye *et al.* 1997, Lasiak 1998). In addition to this ecological research, it is important that socio-economic profiles and other social research be conducted.

RECOMMENDATIONS

Because in many cases there is a lack of information about stock status and effort, it will be necessary to proceed with fisheries on a precautionary basis. Monitoring and research of these fisheries will then be needed to determine sustainable levels of harvest and to adjust quotas in subsequent years. An important principle that must be adopted and promoted is that of fisher-participation. Permits or licenses should be linked to a requirement that fishing communities collect monitoring data and participate in research activities. Community monitoring of resource harvesting should be implemented wherever possible. The primary function of these monitors will be to collect data on harvesting effort and catch. Community monitors, however, can play a far greater role in resource management than just collection of data. They should be expected to enhance control of harvesting by advising fishers of permit requirements, inform the local co-management structures of any problems being experienced and increase awareness among fishers of the principles of sustainable use. Databases need to be developed and maintained to allow submitted data to be accessed and analysed, and this should be the responsibility of MCM or the delegated provincial authority. In many cases, it may be necessary to contract independent tertiary institutions and NGOs to assist with this task. Furthermore, the results of the research should be explained to fishers so that they are provided with sufficient information to contribute meaningfully to decision-making with regard to the resource use.

Some of the current information gaps are: development of Operational Management Procedures for key target species (including stock assessments, models of sustainable yields, recruitment dynamics of harvested species); impacts of subsistence use on non-target organisms and on biodiversity; harvest patterns; analyses of management models; effectiveness of compliance strategies; social and economic profiles of fishers.

Resources needed for the management of this new sector

RATIONALE

A key issue is the availability of funding to develop, implement and manage subsistence fisheries. Because

this has only newly been recognized as a formal fishing sector, new systems will need to be implemented to manage it, and this has financial implications not previously factored into the budgets of the agents responsible for implementation. Furthermore, additional capacity (involving appointment of staff, training and research) will need to be developed, and resources (including administrative equipment and vehicles) made available, because none was previously deployed to manage these fisheries. The SFTG identified funding needs and prepared fund proposals. Proposals covering the first three years of implementation (2000–2002) were submitted to the Marine Living Resources Fund and the Norwegian Funded Environmental Programme respectively, and were successful in gaining funding. However, although funds were secured, there were considerable bureaucratic obstacles to timely disbursement. This problem caused severe delays, both during the process as well as in the initial stages of implementation (see Harris *et al.* 2001 for details).

RECOMMENDATIONS

The ongoing financial needs of implementation and management must be built into national and regional governmental budgets. Several important areas require specific funds: salaries and operational costs of the MCM Subsistence Fisheries Management Unit, Regional Fieldworkers, and Community Monitors; support for provincial authorities and local co-management structures; programmes covering information and awareness; training courses; running costs for the Subsistence Fisheries Advisory Group.

All of these will cost money. Forward-looking plans about financial needs, responsibilities and sources must be a central part of the agenda for subsistence fisheries, and the procedures for the disbursement of funds need to become streamlined and efficient.

CONCLUSIONS

The published literature on subsistence fisheries is sparse (Hauck 2000) and the recommendations presented here are mostly derived directly from the information and insights gained from the research and consultation process (see Harris *et al.* 2002); they also pertain to the unique history and circumstances in South Africa. However, they confirm the conclusions of the few well-documented examples reported in the international literature that the activities of subsistence fishers are critical to the economic well-being of many coastal communities (Berkes 1988, 1990, Fall, 1990) and that special systems for management of these

fishers are required (Jentoft and McCay 1995, Hauck and Sowman 2001).

The recommendations advanced by the SFTG yield several principles about the implementation of subsistence fisheries in South Africa. First, subsistence fisheries in South Africa need to be implemented to protect the rights of fishers who have historically and traditionally made use of marine resources and who depend on these, and this must be done in a manner consistent with the recommended definition of "subsistence fishers". Second, coupled with latter concept, sustainability of resource use and fisheries is imperative, particularly given the high dependence of the fishers on the resources to provide basic food security. Third, the aim of implementation should be to formalize existing subsistence fisheries (most of which would previously have been illegal), and not to create new subsistence fisheries or to admit additional fishers who were not previously involved. The central reason for this is that there are not sufficient resources to meet demands, and primacy should be given to those who already depend on the resources and who have historical connections and experience. Subsistence fisheries should be a shrinking, not expanding, sector and they should not be seen as the last-stop solution to coastal poverty. This points to the importance of the fourth principle, i.e. that alternative resource use and livelihood strategies should be explored to alleviate the harvesting pressure. One possible avenue is that nearshore resources that are more suitable for commercial operations than subsistence fisheries, and which are sufficiently accessible to be harvested without major capital expense, can be re-allocated to allow the development of small-scale commercial enterprises. Two obvious candidates are abalone, which can be collected by divers, and nearshore West Coast rock lobster, which can be harvested by hoopnetting (Cockcroft *et al.* 2002).

Implementation of subsistence fisheries management systems should draw on the information gained in the process of developing recommendations and embrace the basic principles outlined above. Inappropriate implementation that discounts the lessons learnt during the SFTG process will inevitably lead to conflict and unsustainable use. Many of the current problems are founded in misunderstanding and lack of information about fishers and inadequate communication with them. The way forward lies in co-management, including the joint participation of fishers and authorities in (a) management; (b) application for rights and their allocation; (c) research and monitoring, and (d) compliance with regulations. From the perspective of the responsible authorities, this will require buy-in and clear apportionment of responsibilities among the various tiers and agents of management.

The challenge of implementing a system of management for subsistence fisheries is complex and large, given that no previous attempts have been made to formalize this sector on a national scale, and that there are so many communities and fishers involved. Leadership and clear direction are needed. At present, capacity among management authorities is inadequate and involvement of provincial agencies should be sought and capacity built. Existing management personnel are also unprepared for the special needs that attend implementation of this new sector. Furthermore, a change of attitude among authorities is required where they have become conditioned to regarding subsistence fishers as illegal poachers and are quick to apply the stick of legislation rather than educating fishers about the necessity of compliance. Mistrust of authorities by fishers and conflict between them are legacies of historical politics, and are exacerbated by a low level of knowledge among fishers about the principles of fisheries management, and by poor communication networks between authorities and fishers.

Many resources are already fully utilized or even overharvested, and there are few additional opportunities to open new resources to subsistence fishers. Information about stocks is inadequate in many instances. To establish or re-establish regimes that are sustainable, fishing on overharvested resources will have to be reduced. Informal activities that are unsustainable and threaten ecosystems need to be curtailed or phased out. Marine protected areas will be important to ensure the maintenance of representative no-take zones, particularly where subsistence fishing compromises biodiversity conservation and there is a need for research in pristine localities to obtain baseline data. All these measures are likely to be unpopular among fishers, but they are a necessary trade-off if subsistence fishers are to gain rights that will be sustainable and defensible in the broader context of balancing conservation and utilization. Again, co-management involving cooperation and consultation will be important in achieving acceptance of difficult decisions.

The development of formal and legal subsistence fisheries, however, presents a unique opportunity to rectify the past marginalization of this sector. Even in the brief period of its existence, the SFTG gained substantial insight, information and knowledge. This should be acted upon, fostered and expanded during implementation. The national authority responsible for implementation, MCM, has accepted the recommendations (Augustyn *et al.* 2000), but implementation needs to be carefully planned and phased, as well as adequately resourced. The establishment of a Subsistence Fisheries Management Unit within MCM and an independent Advisory Group are essential steps, and the develop-

ment of a special research focus to bring managers and researchers together would enhance knowledge about this neglected sector. There is a strong case for promotion of local co-management arrangements that have the potential to enhance communication, data-gathering and compliance.

Publication of the processes and findings of the SFTG will contribute to the scarce formal documentation of information about subsistence fisheries worldwide (Berkes 1988, 1990, Fall 1990), and the global debate about the appropriateness of different approaches to fisheries management (e.g. Berkes 1985, 1994, Pinkerton 1989, Odendaal *et al.* 1994, Young 1995, Horemans 1997, Pomeroy and Berkes 1997, Dahl 1998, Pitcher *et al.* 1998).

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LITERATURE CITED

- ANON. 1998 — Marine Living Resources Act, 1998 (Act No. 18 of 1998). *Government Gazette, S. Afr.* **395**(18930): 66 pp.
- ANON. 2000 — *White Paper: Sustainable Coastal Development in South Africa*. [Cape Town: Department of Environmental Affairs and Tourism]: 134 pp.
- ANDERSON, L. G. and C. L. GRIFFITHS 1997 — Community co-management of intertidal mussel resources: progress and problems, workshop report. *S. Afr. J. Sci.* **93**: 151–152.
- ATTWOOD, C. G. and M. FARQUHAR 1999 — Collapse of line-fish stocks between Cape Hangklip and Walker Bay, South Africa. *S. Afr. J. mar. Sci.* **21**: 415–432.
- ATTWOOD, C. G., MANN, B. Q., BEAUMONT, J. and J. M. HARRIS 1998a — Review of the state of marine protected areas in South Africa. *S. Afr. J. mar. Sci.* **18**: 341–367.
- ATTWOOD, C. G., HARRIS, J. M. and A. J. WILLIAMS 1998b — International experience of marine protected areas and their relevance to South Africa. *S. Afr. J. mar. Sci.* **18**: 311–332.
- ATTWOOD, C. L., MOLONEY, C. L., STENTON-DOZEY, J., JACKSON, L. F., HEYDORN, A. E. F. and T. A. PROBYN 2000 — Conservation of marine biodiversity in South Africa. In *Summary Marine Biodiversity Status Report for South Africa*. Durham, B. D. and J. C. Pauw (Eds) Pretoria: National Research Foundation: 68–83.
- AUGUSTYN, C. J., OOSTHUIZEN, W. H., VERHEYE H. M. S., PENXA J., SCHOLTZE C., COCKCROFT A. C. and M. A. MEYER 2000 — Report on the feasibility of implementation of the Subsistence Fisheries Task Group (SFTG) recommendations on the management of subsistence fishers. Unpublished Report, Marine and Coastal Management, Department of Environment Affairs and Tourism, Cape Town: 15 pp.
- BERKES, F. 1985 — Fishermen and "The tragedy of the commons". *Environ. Conserv.* **12**: 199–206.
- BERKES, F. 1988 — Subsistence fishing in Canada: a note on terminology. *Arctic* **41**: 35–42.
- BERKES, F. 1990 — Native subsistence fisheries: a synthesis of harvest studies in Canada. *Arctic* **43**: 35–42.
- BERKES, F. 1994 — Co-management: bridging the two solitudes. *Northern Perspectives* **22**(2–3): 18–20.
- BERKES, F., GEORGE, P. and R. J. PRESTON 1991 — Co-management: the evolution in theory and practice of the joint administration of living resources. *Alternatives* **18**(2): 12–18.
- BRANCH, G. M., BAIRD, D., COCHRANE, K. [L.], MOOLA, Z., ZULU, P., BUTTERWORTH, D. [S.], SOWMAN, M. and P. [A.] WICKENS 1996 — Review of access rights options for South Africa. Final report of the Access Rights Technical Committee to the Fisheries Policy Development Working Committee: 70 pp.
- BRANCH, G. M., HAUCK, M., SIQWANA-NDULO, N. and A. H. DYE 2002a — Defining fishers in the South African context: subsistence, artisanal and small-scale commercial sectors. *S. Afr. J. mar. Sci.* **24**: 475–487.
- BRANCH, G. M., MAY, J., ROBERTS, B., RUSSELL, E. and B. M. CLARK 2002b — Case studies on the socio-economic characteristics and lifestyles of subsistence and informal fishers in South Africa. *S. Afr. J. mar. Sci.* **24**: 439–462.
- CASTILLA, J. C. 1999 — Coastal marine communities: trends and perspectives from human-exclusion experiments. *Trends Ecol. Evol.* **14**: 280–283.
- CLARK, B. M., HAUCK, M., HARRIS, J. M., SALO, K. and E. RUSSELL 2002 — Identification of subsistence fishers, fishing areas, resource use and activities along the South African coast. *S. Afr. J. mar. Sci.* **24**: 425–437.
- COCHRANE, K. L. and A. I. L. PAYNE 1998 — People, purses

- and power: developing fisheries policy for the new South Africa. In *Reinventing Fisheries Management*. Pitcher, T. J., Hart, P. J. B. and D. Pauly (Eds). London; Kluwer Academic: 73–99.
- COCKCROFT, A. C., SAUER, W. H. H., BRANCH, G. M., CLARK, B. M., DYE, A. H. and E. RUSSELL 2002 — Assessment of resource availability and suitability for subsistence fishers in South Africa, with a review of resource management procedures. *S. Afr. J. mar. Sci.* **24**: 489–501.
- DAHL, C. 1988 — Traditional marine tenure: a basis for artisanal fisheries management. *Mar. Policy* **12**: 40–48.
- DYE, A. H. 1992 — Experimental studies of succession and stability in rocky intertidal communities subject to artisanal shellfish gathering. *Neth. J. Sea Res.* **30**: 209–217.
- DYE, A. H., LASIAK, T. A. and S. GABULA 1997 — Recovery and recruitment of the brown mussel *Perna perna* (L.) in Transkei: implications for management. *S. Afr. J. Zool.* **32**: 118–123.
- FALL, J. A. 1990 — The division of subsistence of the Alaska Department of Fish and Game: an overview of its research program and findings: 1980–1990. *Arctic Anthropol.* **27**(2): 68–92.
- FIELDING, P. J., ROBERTSON, W. D., DYE, A. H., TOMALIN, B. J., VAN DER ELST, R. P., BECKLEY, L. E., MANN, B. Q., BIRNIE, S., SCHLEYER, M. H. and T. A. LASIAK 1994 — Transkei coastal fisheries resources. *Spec. Publ. oceanogr. Res. Inst. S. Afr.* **3**: 175 pp.
- GRIFFITHS, M. 2000 — Long-term trends in catch and effort of commercial linefish off South Africa's Cape Province: snapshots of the 20th century. *S. Afr. J. mar. Sci.* **22**: 81–110.
- HARA, M. 1999 — Fisheries co-management: a review of the theoretical basis and assumptions. Southern African Perspectives No. 77. Cape Town; Centre for Southern African Studies, School of Government: 32 pp.
- HARRIS, J. M., BRANCH, G. M., SIBIYA, C. S. and C. BILL (in press) — Sokhulu subsistence mussel harvesting – a co-management case study. In *Coastal and Fisheries Co-management in South Africa*. Hauck, M. and M. Sowman (Eds). Cape Town; University of Cape Town Press.
- HARRIS, J. M., SOWMAN, M., BRANCH, G. M., CLARK, B. M., COCKCROFT, A. C., COETZEE, C., DYE, A. H., HAUCK, M., JOHNSON, A., KATI-KATI, L., MASEKO, Z., SAUER, W. H. H., SIQWANA-NDULO, N. and M. SOWMAN 2002 — The process of developing a management system for subsistence fishers in South Africa: recognizing and formalizing a marginalized fishing sector in South Africa. *S. Afr. J. mar. Sci.* **24**: 405–424.
- HAUCK, M. 2000 — Review of literature on artisanal and subsistence fisheries. Unpublished Report, Subsistence Fisheries Task Group Report No. 6, Marine and Coastal Management, Department of Environmental Affairs and Tourism, Cape Town: 16 pp. (mimeo).
- HAUCK, M. and M. SOWMAN 2001 — Coastal and fisheries co-management in South Africa: an overview and analysis. *Mar. Policy* **25**: 173–185.
- HAUCK, M. and N. A. SWEIJID 1999 — A case study of abalone poaching in South Africa and its impact on fisheries management. *ICES J. mar. Sci.* **56**: 1024–1032.
- HAUCK, M., SOWMAN, M., CLARK, B. M., RUSSELL, E., HARRIS, J. M., VENTER, A., BEAUMONT, J. and Z. MASEKO 2002 — Perceptions of subsistence and informal fishers in South Africa about management of living marine resources. *S. Afr. J. mar. Sci.* **24**: 463–474.
- HOCKEY, P. A. R. and A. L. BOSMAN 1986 — Man as an intertidal predator in Transkei: disturbance, community convergence and management of a natural food resource. *Oikos* **46**(1): 3–14.
- HOCKEY, P. A. R., BOSMAN, A. L. and W. R. SIEGFRIED 1988 — Patterns and correlates of shellfish exploitation by coastal people in Transkei: an enigma of protein production. *J. appl. Ecol.* **25**: 353–363.
- HOCKEY, P. A. R. and G. M. BRANCH 1994 — Conserving marine biodiversity on the African coast: implications of a terrestrial perspective. *Aquat. Conserv. mar. Freshwat. Ecosyst.* **4**: 345–362.
- HOCKEY, P. A. R. and G. M. BRANCH 1997 — Criteria, objectives and methodology for evaluating marine protected areas in South Africa. *S. Afr. J. mar. Sci.* **18**: 369–383.
- HOREMANS, B. 1997 — Managing artisanal fisheries with fisherfolk. *IDAF Newsl.* **34**: 4–5.
- HUTTON, T., COCHRANE, K. L. and T. J. PITCHER 1997 — Post-apartheid fisheries management policy in South Africa: the need for a change in management philosophy. In *Developing and Sustaining World Fisheries Resources: the State of Science and Management. Proceedings of the Second World Fisheries Congress, Brisbane, 1996*. Hancock, D. A., Smith, D. R., Grant, A. and J. P. Beumer (Eds). Collingwood, Australia; CSIRO Publishing: 228–232.
- HUTTON, T. and T. J. PITCHER 1998 — Current directions in fisheries management policy: a perspective on co-management and its application to South African fisheries. In *Benguela Dynamics: Impacts of Variability on Shelf-sea Environments and their Living Resources*. Pillar, S. C., Moloney, C. L., Payne, A. I. L. and F. A. Shillington (Eds). *S. Afr. J. mar. Sci.* **19**: 471–486.
- JENTOFT, S. and B. McCAY 1995 — User participation in fisheries management: lessons drawn from international experiences. *Mar. Policy* **19**: 227–246.
- KELLEHER, G. and R. KENCHINGTON 1992 — *Guidelines for Establishing Marine Protected Areas*. Gland, Switzerland; World Conservation Union (IUCN): 79 pp.
- KYLE, R., PEARSON, B., FIELDING P. J., ROBERTSON W. D. and S. L. BIRNIE 1997a — Subsistence shellfish harvesting in the Maputaland marine reserve in northern KwaZulu-Natal, South Africa: rocky shore organisms. *Biol. Conserv.* **82**: 183–192.
- KYLE, R., ROBERTSON, W. D. and S. L. BIRNIE 1997b — Subsistence shellfish harvesting in northern KwaZulu-Natal, South Africa: sandy beach organisms. *Biol. Conserv.* **82**: 173–182.
- LAMBERTH, S. J., SAUER, W. H. H., MANN, B. Q., BROUWER, S. L., CLARK, B. M. and C. ERASMUS 1997 — The status of the South African beach-seine and gill-net fisheries. *S. Afr. J. mar. Sci.* **18**: 195–202.
- LASIAK, T. A. 1998 — Multivariate comparisons of rocky infratidal assemblages from replicate exploited and non-exploited localities in Transkei. *Mar. Ecol. Prog. Ser.* **167**: 15–23.
- LASIAK, T. A. and J. G. FIELD 1995 — Community-level attributes of exploited and non-exploited rocky infratidal macrofaunal assemblages in Transkei. *J. expl. mar. Biol. Ecol.* **185**: 33–53.
- MANN, B. Q. 1995 — Quantification of illicit fish harvesting in the Lake St Lucia Game Reserve, South Africa. *Biol. Conserv.* **74**: 107–113.
- MANN, B. Q. 2000 (Ed.) — *Southern African Marine Linefish Status Report. Spec. Publ. oceanogr. Res. Inst. S. Afr.* **7**: 257 pp.
- MARTIN, R. and J. R. NIELSEN 1997 — Creation of a new fisheries policy in South Africa: the development process and achievements. In *Fisheries Co-management in Africa. Proceedings from a Regional Workshop on Fisheries Co-management Research, Mangochi, Malawi, March 1997*. Normann, A. K., Nielsen J. R. and S. Sverdrup-Jensen (Eds). Institute for Fisheries Management and Coastal Community Development. Fisheries Co-management Research Project. Report No. **12**: 153–171.
- ODENDAAL, F. J., BERGH, M. O. and G. M. BRANCH 1994 — Socio-economic options for the management of the exploita-

- tion of intertidal and subtidal resources. In *Rocky Shores: Exploitation in Chile and South Africa*. Siegfried, W. R. (Ed.). Berlin; Springer: 155–167.
- PENNEY, A. J., MANN-LANG, J. B., VAN DER ELST R. P. and C. G. WILKE 1999 — Long-term trends in catch and effort in the KwaZulu-Natal nearshore linefisheries. *S. Afr. J. mar. Sci.* **21**: 51–76.
- PINKERTON, E. 1989 — *Cooperative Management of Local Fisheries: New Directions for Improved Management and Community Development*. Vancouver; University of British Columbia Press: 299 pp.
- PITCHER, T. J., HART, P. J. B. and D. PAULY 1998 — *Reinventing Fisheries Management*. London; Kluwer Academic.
- POMEROY, R. S. and F. BERKES 1997 — Two to tango: the role of government in co-management. *Mar. Policy* **21**: 464–480.
- ROBERTS, C. M., ANDELMAN, S., BRANCH, G. M., BUSTAMANTE, R., CASTILLA, J. C., DUGAN, J., HALPERN, B., LAFFERTY, K. D., LESLIE, H., LUBCHENCO, J., McARDLE, D., POSSINGHAM, H., RUCKLEHAUS, M. and R. WARNER (in press a) — Ecological criteria for evaluating candidate sites for marine reserves. *Ecol. Appl.*
- ROBERTS, C. M., BRANCH, G. M., BUSTAMANTE, R., CASTILLA, J. C., DUGAN, J., HALPERN, B., LAFFERTY, K. D., LESLIE, H., LUBCHENCO, J., McARDLE, D., RUCKLEHAUS, M. and R. WARNER (in press b) — Application of ecological criteria in selecting marine reserves and developing reserve networks. *Ecol. Appl.*
- SFTG 2000 — Recommendations for Subsistence Fisheries Management in South Africa. Subsistence Fisheries Task Group Final Report. Unpublished Report, Marine and Coastal Management, Department of Environment Affairs and Tourism, Cape Town: 88 pp.
- SOWMAN, M., BEAUMONT, J., BERGH, M. [O.], MAHARAJ, G. and K. SALO 1997 — An analysis of emerging co-management arrangements for the Olifants River harder fishery, South Africa. In *Fisheries Co-management in Africa. Proceedings from a Regional Workshop on Fisheries Co-management Research, Mangochi, Malawi, March 1997*. Normann, A. K., Nielsen J. R. and S. Sverdrup-Jensen (Eds). Institute for Fisheries Management and Coastal Community Development. Fisheries Co-management Research Project. Report No. **12**: 177–203.
- TOMALIN, B. J. and R. KYLE 1998 — Subsistence and recreational mussel (*Perna perna*) collecting in KwaZulu-Natal, South Africa: fishing mortality and precautionary management. *S. Afr. J. Zool.* **33**: 12–22.
- VAN DER ELST, R. P., BUTTERWORTH, D. S., HECHT, T., DE WET SCHUTTE, D. and K. SALO 1996 — Proposed interim relief measures for subsistence fishers. Report of the Fisheries Policy Development Committee. Cape Town; Department of Environmental Affairs and Tourism: 19 pp.
- VAN DER ELST, R. [P.], BRANCH, [G.] M., BUTTERWORTH, D. [S.], WICKENS, P. [A.] and K. [L.] COCHRANE 1997 — How can fisheries resources be allocated . . . who owns the fish? In *Developing and Sustaining World Fisheries Resources: the State of Science and Management. Proceedings of the Second World Fisheries Congress, Brisbane, 1996*. Hancock, D. A., Smith, D. C., Grant, A. and J. P. Beumer (Eds). Collingwood, Australia; CSIRO Publishing: 307–314.
- YOUNG, M. D. 1995 — The design of fishing-right systems – the New South Wales experience. *Ocean coastl Mgmt* **28**: 45–61.