

Government-Industry Co-management Arrangements within the South African Deep-Sea Hake Fishery.

T. Hutton^{1,2}, J. Raakjær Nielsen³ and M. Mayekiso⁴

¹ Fisheries Centre, 2204 Main Mall, Vancouver, British Columbia, Canada, V6T 1Z4.

² Marine Biology Research Institute, Zoology Dept., UCT, Rondebosch 7701, South Africa.

³ Institute for Fisheries Management and Coastal Community Development, Hirtshals, Denmark.

⁴ Marine and Coastal Management, Dept of Environmental Affairs and Tourism, P-Bag X2, Roggebaai, 8012, South Africa.

Abstract

As part of a global comparative study of user-participation in fisheries management, a neo-institutional economic framework analysis is applied to the South African Deep-Sea Hake Fishery to evaluate past and present co-management arrangements. It is postulated that the comprehensive partnerships that existed will struggle to remain legitimate and “functional” during major changes in the access rights regime. The government is re-distributing quota to new entrants and “previously disadvantaged” South Africans, resulting in competition between the established demersal trawl fleet and a new longline sector for access rights. The established industry is currently undertaking re-structuring via investment schemes, joint ventures and share agreements. The relationship between “rights to resource” and “user-participation in management”, is one where due to uncertainty, the participants are investing in negotiating security of tenure rather than in co-management arrangements. The current re-structuring and institutional changes are thus impacting on the extensive interaction that existed in the past between the industry and the government. Over the last two decades, extensive government-industry commitments to rebuilding, has reversed the declining trends in CPUE observed in the 1960’s and 1970’s and the hake stock off the west coast of South Africa is now managed at sustainable levels. The challenge in the future is for the government to engaged in co-management arrangements, which replicate the successful agreements of the past, with all the stakeholders, that is both the established industry and the new participants.

Contents

1. The Hake Fishery:	2
1.1 The hake fishing sectors and management	4
1.2 The West Coast Deep-sea (“Offshore”) Fishery: bio -technical and physical characteristics	5
1.2.a <i>Vessel types and factories</i>	5
1.2.b <i>Range of fishing and other physical boundaries</i>	6
1.2.c <i>Administrative and legal boundaries</i>	6
1.3 Characteristics of the market	8
1.4 Socio-economic characteristics	8
1.5 Knowledge of the fishery, compliance, monitoring and enforcement	10
1.6 Decision-making arrangements and fisheries management policy in South Africa	11
1.7 National Management Associations and Committees	14
1.7.a <i>South African Deep-Sea Trawling Industry Association (SADSTIA)</i>	14
1.7.b <i>The South African Deep-Sea Resource Management Committee</i>	14
1.7.c <i>Association of Small Hake Quota Industries (ASHQI)</i>	15
2. The Restructuring of the Hake Fishery	15
3. Incentives to cooperate and patterns of interaction	17
3.1 The fishing industry and the Government (the DEA&T)	17
3.2 Fishers, Stakeholders and the Government	18
3.3 The “fishing communities”, worker’s unions and the industry	20
4. Outcomes	20
4.1 Efficiency	20
4.1a <i>Economic efficiency in the fishery</i>	20
4.1b <i>Efficiency of the management process</i>	20
4.2 Equity	21
4.2a <i>Procedural fairness and representation</i>	21
4.2b <i>Distributive effects of the allocation process</i>	22
4.3 Sustainability	22
4.3a <i>Stewardship of the resource</i>	22
4.3b <i>Institutional resilience</i>	22
5. Future challenges: The co-management of the hake fishery	23
References	24

1. THE HAKE FISHERY

South Africa has a coastline in excess of 3 000 km and an Exclusive Fishing Zone (EEZ) in excess of 1 million km² which contains a variety of fish species. The nation is defined as a medium-sized fishing country, which landed between half a million and one million tons of fish annually within the period 1975-1991 (SFRI 1993). This catch contributes to the wealth of the country forming the basis of a fishing industry which generates foreign exchange. The industry is complex in terms of catching techniques, processing, marketing, capital investment, equipment and infrastructure. In the Western Cape the fishing industry employs more than 25 000 people. In 1994 the harvest for entire the fishing industry had an estimated annual wholesale value of nearly US\$ 400 million, to which the demersal and midwater trawl contribute US\$ 200 million. Table 1 reflects the importance of each fishery in terms of landed catch and wholesale value. Within the commercial sector catches are dominated by the demersal and the pelagic fisheries. These two groups accounted for 88-95% of the reported catch from 1975-1991 (SFRI 1993).

Table 1. The catches and economic value of South Africa's commercial fisheries in 1994 (from Stuttford (1996) \$US 1 = Rand SA 3.57 (exchange rate on 31.12.94)).

Sector	Nominal Catch (t)	Wholesale Value – processed US\$ millions
Demersal and Midwater trawl*	188 842	201
Pelagic	315 545	81
Rock lobster	3 190	47
Linefisheries		
Tuna	4 069	6
Squid-jigging	6 442	19
Handline fishery	12 878	21
Abalone	613	15
TOTAL	531579	390

*Includes hake - the main species targeted which is reviewed in this case study.

The mainstay of the demersal catch consists of hake or stockfish (*Merluccius capensis* and *M. paradoxus*) which occur on the south coast over the Agulhas Bank and are distributed on the west coast of South Africa (Figure 1). Reviews of the biology of hake are provided by Botha (1980), Crawford *et al.* (1987), Payne (1989) and Payne and Punt (1992). The distribution of each species is depth-dependent; *M. paradoxus* occurs in deep water while *M. capensis* is a shallow water species (Botha 1973) (Figure 1).

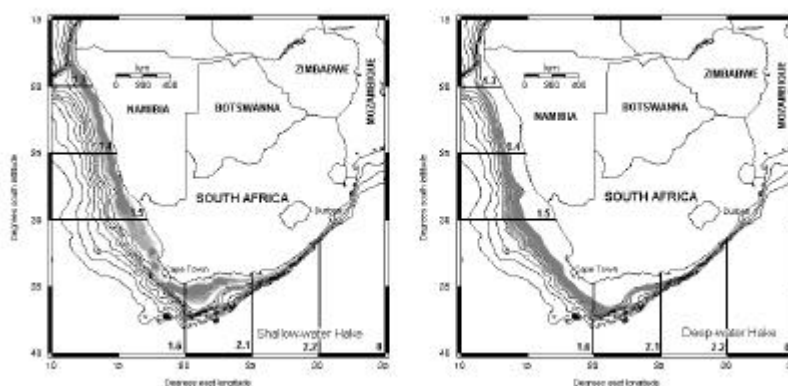


Figure 1. The distribution of *Merluccius capensis* (Shallow-water Cape Hake) and *M. paradoxus* (Deep-water Cape Hake) off the coast of South Africa and Namibia. The ICSEAF divisions are also shown.

The aim of this paper is to apply a research framework based on neo-institutional economics (outlined in ICLARM and IFM 1998) to a case study. The research framework includes applying an analysis of outcomes (e.g. sustainability, efficiency), to the Cape hake fishery in South Africa, specifically the deep-sea hake trawl fishing which targets *Merluccius spp.* off the

west coast of South Africa. The deep-sea fishery operates on the west coast, and in waters deeper than the 110m isobath on the south coast, whereas a small inshore fishery operates over the shallower Agulhas bank. The aim is also to evaluate the opportunities and constraints for co-management arrangements within the fisheries management process in South Africa. The South African demersal trawl fishery developed in the early 1900's as a sole directed fishery (Muller 1938, De Jong 1974). By the end of the First World war the hake catch had increased to about 1000 tons a year (Payne and Punt 1995). The annual catches only fluctuated a small degree until 1932 when the principally "sole-directed" fishery began taking a larger amount of hake. By the end of the 1940's the catch was approaching 60 000 tons. After 1962, hakes was also targeted by foreign trawlers from several countries. By 1973, some 14 different countries achieved a catch of just under one million tons with more than 300 large vessels (Botha 1985). The local fishery reached a peak of 244 000 tons in 1972 (Figure 2). As a result of the fishing pressure in the south east Atlantic the catch rates declined (Figure 3).

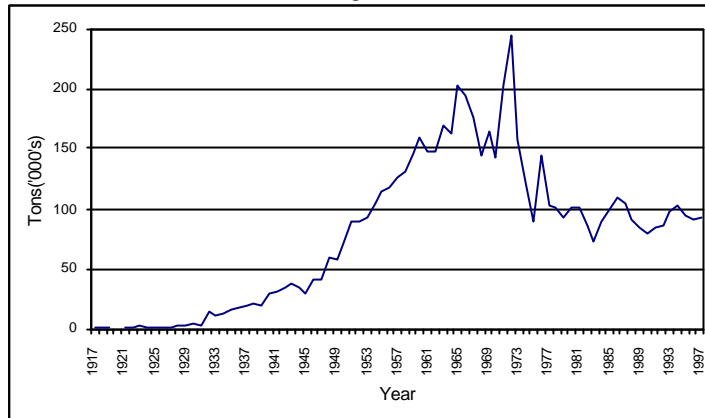


Figure 2. The total catch from 1917 to 1997 in ICSEAF division 1.6 (see Figure 1, data from Leslie 1998).

The International Commission for the Southeast Atlantic Fisheries (ICSEAF) was established in 1972 to investigate and control the international fisheries for hake off South Africa and Namibia (Andrew and Butterworth 1987). The overfishing forced ICSEAF to introduce an observer program and allocate quotas to member nations. In 1975 the minimum mesh size was increased from 102 to 110 mm. In 1977 the South African government declared a 200 nautical mile EEZ forcing the foreign fleets to withdraw from South African waters (fleets from Japan, Spain, the then Soviet Union and other Eastern bloc countries). With the realization that global quotas were not effective, individual quotas were introduced in 1979. The apportioning of individual quotas was negotiated with the industry and the stakeholders were involved in negotiations as to the proportions they received. With the declaration of the EEZ and a conservative rebuilding strategy (which included the co-operation of the industry), there has been a halt to the declining catch rates observed in the 1960's (Figure 3). Annual hake catches by the South African fishing fleet over the period 1982-1991 remained fairly constant, averaging 138000 tons per year. The hake TAC has increased to a current annual level of over 150 000 tons.

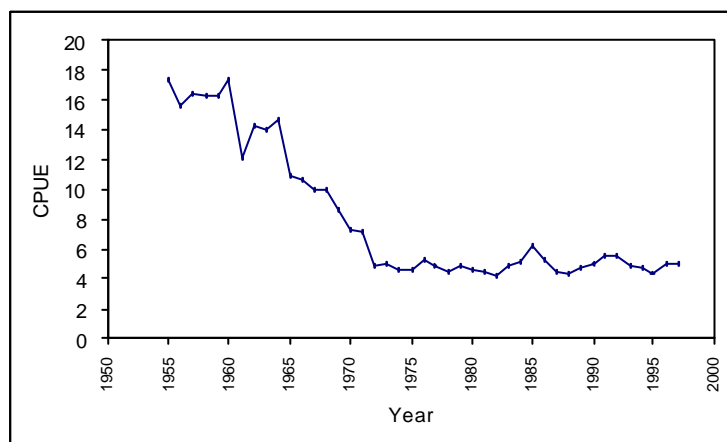


Figure 3. The hake CPUE from 1955 to 1997 in ICSEAF division 1.6 (see Figure 1, data from Leslie 1998).

1.1 The Hake Fishing Sectors and management

Individual quotas were first granted in 1979, the bulk being allocated to the two major companies and a block apportionment of 5 000 t to South East Coast Inshore Fishing Association (SECIFA) members mainly based in Mossel Bay (“the Inshore Sector”). The Inshore fisheries contribution to catches of hake and other demersal species is shown in Table 2. In the Deep-sea sector, after increasing to seven participants, the number of operators were six by 1984 (Stander 1995). In 1985, the Minister announced the 80:20 undertaking and he decided to allocate 80% of any increase in the hake TAC to existing quota holders (South Africa Deep-Sea Trawling Industry Association (SADSTIA) and SECIFA) in the future (Stander 1995), with 20% going to new entrants. The formation of the Quota Board increased the aspirations of those keen to enter the demersal sector. The Board appointed a committee to review its guidelines in 1992, with the specific objective of facilitating the accommodation of new entrants and a decision was made to end the 80:20 rule. The Quota Board (now defunct) was thus able to make new hake allocations (4 000 t divided among four new-entrants in 1993). Excluding allocations made by the Minister, there were forty quota-holders in the hake fishing industry in 1995. The numbers of quota holders have increased more recently under the new governments policy of re-distribution.

Current scientific TAC recommendations for the South African hake fishery are based on a dynamic production model estimation procedure which utilizes catch, CPUE and survey biomass data (Butterworth *et. al* 1992). The CPUE trend has recently been standardized with a General Linear Model (GLM) taking into account changes in power factors, indicating the CPUE has not changed much over the last few years (Figure 3). Thus, under a revised Operational Management Procedure (OMP) in November 1998, a fishing mortality of $F_{0.075}$ has been chosen as the harvest rate for the stock for 1999 (a harvest strategy which assumes the stock is close to F at MSY). It is clear from Table 2 what contribution the “Offshore” Deep-Sea trawl fleet has on landings, capturing 88.3% of the demersal fish in 1994. A new sector in the hake fishery is the longline sector (in addition greater catches are being made by the handline fishery). The demersal trawl fishery is the dominant fishery, however if we consider the number of applicants for longlining then the trend strongly suggests that the longline sector is a growing aspect of the hake fishery in South Africa. The trawl-based fishery requires a large capital outlay as the industry has extensive land-based processing facilities. Whereas, longlining is a less capital intensive method of fishing than trawling and is seen as a means whereby access to the hake resource can be broadened within the government’s objective of redistribution.

Table 2. Live mass of demersal fish landed (tons) by various fishing sectors in South Africa for 1994 (Table modified from TABLE XXVIII in SFRI 1994). Also shown in the wholesale value.

Species	Deepsea trawl	Inshore (South Coast) trawl	Midwater trawl	Longline	Total	Value '000 Rands
Hakes	134104	9569	372	2753	146798	352315
Kingklip	2759	105	41	148	3029	48464
Soles	1	978	-	-	979	10965
Redfish	123	630	21	-	777	3108
Pomfret (Angelfish)	2126	1	-	-	2127	25524
Gurnards	293	281	-	-	575	920
Jacopever	729	-	2	-	731	760
John Dory	1078	1	8	-	1087	4348
Horse mackerel	6951	1527	3576	-	12054	24108
Sharks and St. Joseph	46	1471	-	-	1517	2427
Snoek	6138	11	-	-	6149	24596
Monk	4953	86	18	-	5057	20228
Chub mackerel	2388	7	73	-	2468	4936
Buttersnoek	2649	6	88	-	4743	18972
Cephalopods	271	302	10	-	583	4664
Other + trash fish	494	129	4	-	727 + 1079	
Total	167103	15104	4187	2901	190374	546335
Percentage contribution	88.3%	8.0%	2.2%	1.5%	100%	

1.2. The West Coast Deep-sea (“Offshore”) fishery: bio-technical and physical characteristics

1.2.a Vessel types and factories

The deep-sea fleet consists of about 25 wetfish vessels (fish are laid on ice) and 36 factory vessels (with freezers and processing capability). All the vessels are stern trawlers. In comparison in the inshore fishery there are 35 small trawlers with an average length of 23m. Figure 4 shows the breakdown of size in the fleet and Figure 5 the “age composition” of the fleet. The vessels have an average age of 20.4 years and an average length of 54.1 m. The average power of the vessels is 1284 kW. The freezer vessels have an average crew size of about 46, whereas the average size of the crew on the wetfish vessels is 25 (Stuttaford 1994). The deep-sea fleet has a combined tonnage of over 50 000 tons which had a replacement value of R400 million in 1993 (SADSTIA/SECIFA 1994).

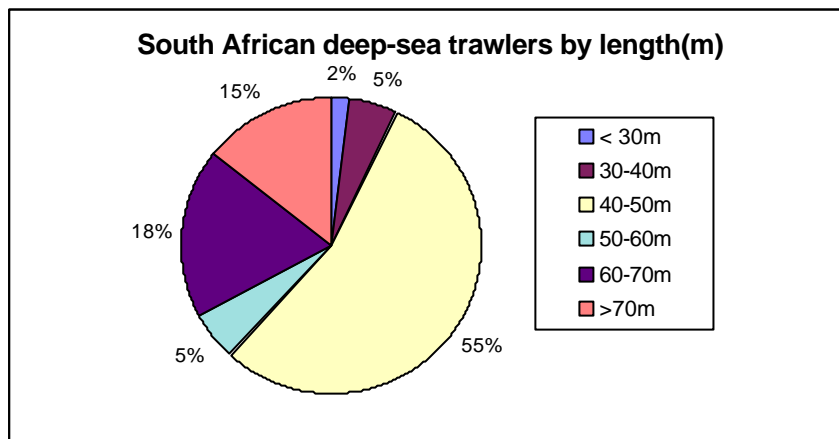


Figure 4. The breakdown of size (length, m.) of the South African deep-sea trawler fleet.

The total fixed investment in 1997 for the trawling sector for vessels, equipment, machinery, buildings, vehicles, etc. is estimated at R273 million, with a replacement value estimated at R1022 million (Anon 1998, Table 3). There are 58 land-based factories which were processing fish landed by the trawl fishery (SADSTIA/SECIFA 1994).

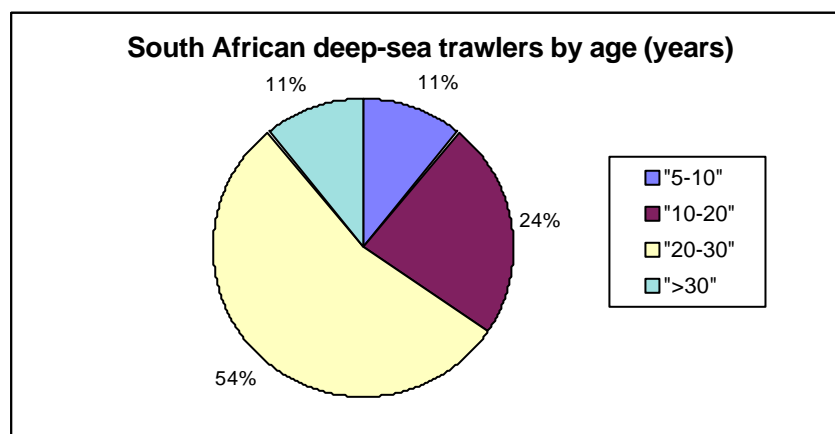


Figure 5. The breakdown of age (years) of the South African deep-sea trawler fleet.

Table 3. The total investment for 1997 in each division of the trawl hake sector of the deep-sea hake fishery in South Africa. The “book” value (Rands) and replacement value (Rands) are provided. The contribution by each company was not provided in Anon (1998).

<i>Sector</i>	<i>“Book” value (Rands)</i>	<i>Replacement value (Rands)</i>
<u>Catching Division</u>		
Vessels (91)	101 126 113	512 000 000
Equipment and buildings	18 037 414	24 873 556
<u>Processing Division</u>		
Machinery and Equipment	57 504 847	201 020 000
Buildings	37 011 628	130 498 000
<u>Storage Division</u>		
Building and Equipment	27 730 000	63 163 521
<u>Distribution Division</u>		
Vehicles and Equipment	7 310 969	28 746 000
<u>Other</u>		
Admin. Equipment	2 000 625	5 447 000
Buildings	22 067 000	54 631 127
Other assets	323 293	1 800 000
TOTAL INVESTMENT	273 111 909	1 022 179 204

1.2b Range of fishing and other physical boundaries

The local trawl fishery was initially based at Cape Town, but later (in the 1960s) also became established at the port of Saldanha. The local fishery has traditionally confined its activities to the fishing grounds around Cape Town and to a lesser extent off the southern coast of South Africa. Effort is now directed on the “trawl grounds”. Most of the trawl grounds off the west coast run north-south along the 200m isobath and are referred to as the “banks”. Typically harbours have a breakwater and a jetty with fishing vessels having dockside access for off loading the catch.

A limiting factor is mooring space and new-entrants have argued the established companies have monopolized on harbour space and facilities at the major harbours. Harbour facilities large enough for trawlers and/or longliners, exist at Port Elizabeth, Mossel Bay, Hermanus, Gansbaai, Hout Bay, Cape Town, Saldanha, St Helena, Veldrift-Laaipek, Lamberts-Bay and Port Nollorth. The wet-fish vessels are also limited in range in that they have to return to place their catch in freezers or on fresh ice before it deteriorates. The fish are landed on ice and transported immediately or stored in freezer facilities in the factories. Typically, wetfish vessels remain out of port for 6 days (historically three weeks), whereas freezer vessels remain out for two months (historically three months). The shorter period for the wetfish vessels has been driven by market demand for high quality fresh fish. Wetfish vessels typically land 50 tons whereas freezer vessels process fillets on board, typically processing a catch of 500 tons in 40 days. Based on the gear and the fishing vessels used, and the mechanized processing, this sector can be classified as “industrial”, although, this term is not used as a formal categorization such as the term “commercial” in South Africa.

1.2c Administrative and legal boundaries

Operators in the hake fishery require boat licences as well as a permits in order to exploit hake. Boat licences are issued and refer to the magisterial district the port is located in. Most of the deep-sea trawl fleet are moored at Cape Town and Saldanha Bay and are licensed within their respective registration areas. However, this does not provide a clear indication of the distribution of fishing effort as there is considerable movement between regions. All permit holders are required under law to submit catch returns, and CPUE data for the region they fish.

Another boundary (legal) are rights to fish. It has been argued that there is extensive “concentration” in the hake industry. It is thus important to consider who “holds” access to the hake resources off South Africa. When individual quotas were introduced in 1979, 95 percent of the quota went to three companies, Irwin and Johnson Limited, Almalgamated Fisheries Limited (now Atlantic Trawling Limited which is presently part of Sea Harvest Corporation Limited), and Sea Harvest Corporation Limited. These three firms at that stage were involved extensively in the “white-fish” industry, had fleets of

trawlers and processing plants and distribution networks. Table 4 shows the breakdown in the allocation of quota in 1996 for each of the fisheries including hake. Seventy-one percent of the hake quota was held by the two major quota holders in 1996, both of which are public listed companies. The vertical integration in the industry is extensive with the large companies, catching, processing as well as marketing the fish, operating cold storage and distribution networks for fish products and other perishable foods, as well as diversifying into frozen food production.

Table 4. Number of quota holders in the major fisheries sectors in South Africa and the percentage of quota held by the top 2-5 quota holders in each fishery in 1996. Table adapted from Cochrane and Payne (1998). Total number of quota holders shows all quotas in all different sectors. Statistics for the major quota holders refer to the sum of quotas held by the parent company in each case.

Resource	Total number of quota holders	Number of major quota holders	% Quota held by major holders
Hake	53	2	71
Pilchard (directed + bait)	56	4	71
Anchovy (reduction)	17	5	78
West Coast Rock Lobster*	103	5	60
South Coast Rock Lobster	8	4	94
Abalone	16~	5	91
Linefish§	3223	N/A	N/A

*1995/96 season

~1995/1996 season, increases from 6 in 1994/95.

§Not regulated by quota: number given is the sum of A and B licences, plus licences for tuna and squid.

These companies are sometimes referred to as “Big Business” by people who are opposed to the so-called “concentration” in the industry. Proponents of change in the industry, particularly those who argue that they have been discriminated against in the past, believe they have strong basis for their requests that there should be considerable re-distribution in the industry. However, Table 4 which represents the situation in 1996 does not reflect the more recent change that is occurring in the hake fishery and the industry. Figure 6 shows the relationships of the number of quota holders and percentage held by the two major quota holders over the last twenty years. There has been a proliferation of new quota holders since 1994. Correspondingly, the percentage share (to the two major companies) has shown a decline, although the change is more rapid in the last four years. The share held by the largest two companies has been reduced to 63.5% of the total hake TAC.

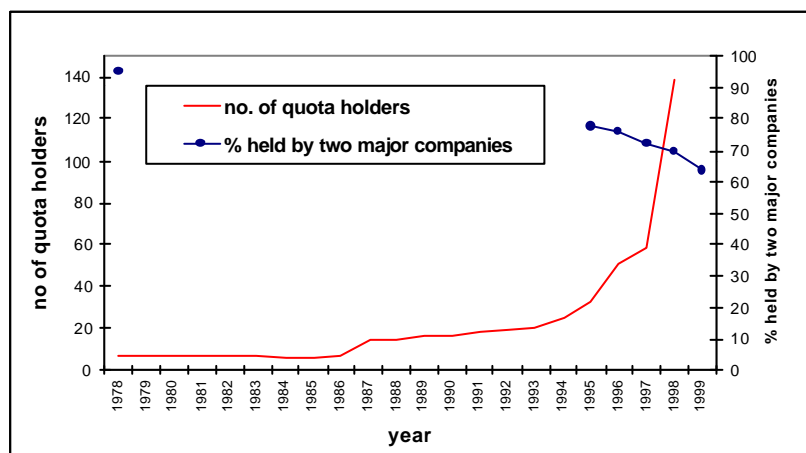


Figure 6. The relationships of number of quota holders and percentage held by the top two major companies over the last twenty years (Data from Stuttford 1983, 1991, 1993, 1996 and 1997).

1.3 Characteristics of the market

Before the end of the 1970's the market for hake products was poor and efforts by the industry to increase earnings from the export of high quality products has meant that hake now has greater value. About two-thirds of the demersal catch is landed fresh and processed in extensive shore-based facilities. The balance of the catch is processed at sea into marketable products aboard factory ships. The trawling industry supplies the majority of fresh and frozen seafood consumed in South Africa. About one-third of the fresh and frozen catch is exported. The white-fish industry has also developed an extensive international market with the development of high value products. The industry has always had the aim of a "better" utilization of the catch, quality improvement and the goal of processing more hake into value-added products. Originally, hake was labeled as "stockfish" and prior to the marketing of the product internationally, the Chamber of Mines which was responsible for catering for its workers, was the largest single consumer, purchasing hake as a cheap source of protein.

"Supermarkets" changed the retail business in South Africa, freezing and processing technology advanced and national perishable food distribution networks developed. Consumers in South Africa now have a choice from a wide selection of natural and processed hake, fillets, steak, loins, portions and sticks, breaded, battered, and sauced products (Kramer 1997). The range of products has expanded such that at least 60 varieties compete on the shelves and different brands compete fiercely for market share.

Nationally, the major fishing companies, such as Irwin and Johnson Ltd. (I&J) play a dominant role as they have established markets and a network of contacts. These large companies have facilities for storage, processing and marketing. The fish are marketed countrywide and are transported by road or rail. Relative to the other fish products on the local market hake are of average value. Exported prime quality hake had a selling price of R10.42 per kg in 1996, whereas processed fish on the South African market had an average (1996) selling price of R5.99 per kg (Anon 1998). Line caught hake can sell for as much as R28 per kg on international markets depending on the exchange rate. On average in 1997 it costs the trawl sector about R2.45 per kg of hake landed (Anon 1998).

Historically about 30% of the hake was exported, however more recently about 40-50% is exported. One of the first ways of marketing hake internationally as a different product was achieved by the industry marketing the product under different names, in South Africa as *smoked haddock*, in Australia (the first international market) as *smoked cod*, in the USA "*whiting*" and "*Yankee Clipper*", and at a later stage in Spain as *Lomos y Centros de Merluca* (steaks and loins), in Italy as *Nasello* (when filleted), in France as *Merlu de Cap* and in Germany as *Seehecht* blocks (Kramer 1997). Salted dried hake are also exported to Italy has a high quality product. Overall revenue from trawling is estimated to be in the region of R7.25 million per annum (Anon 1998). The export revenue generated from selling unprocessed (fresh) and processed hake is estimated to be R327 million for trawling (Anon 1998). In addition, a considerable revenue is also generated from the bycatch species as the prices paid for some these species is greater than the price for hake (see Table 2).

The global "white-fish" market is dominated by cod, pollack, haddock and hake. Ten million tons of fish enter the global "white-fish" market each year of which 150 000 tons is landed in South Africa. There are many buyers and sellers on the global market and the frozen fish market is actually a sub-set of the global market in protein which apart from beef is dominated by chicken. Thus at the most only 1.5% of the market share is "controlled" by South Africa and therefore the industry aim for high quality and consistency of supply in order to stay competitive in the market.

1.4 Socio-economic characteristics

The socio-economic reality for all South Africans is dominated by major differences in wealth between race groups. This is due to the country's complex political history of Apartheid. These differences greatly affect the incentives for co-operation and the patterns of interaction between the stakeholders in the hake fishery. Extensive social, economic and political boundaries existed in the past and the consequences are still being felt by the people despite a new political dispensation. Most of the economic wealth now resides with a minority. Issel (*Financial Mail* - February 1995) states that fishing communities were affected negatively by the laws under the Apartheid system. He argues that this has resulted in most of the "previously disadvantaged" people seeking employment with the fishing companies. In the past, positions of power in government and business were held by the minority, whereas most of the blue collar workers in all the industries were mostly from the majority. Although this description is rather general, the same effects were evident in the fishing industry as it

is embedded in the greater political economy. In many cases, the majority were denied access to certain fishing stocks, permits, licences and/or harbours, in addition the whole political economy discriminated against their involvement in the industrial fishing industry.

The demersal (hake) and midwater trawl industry employs about 8700 people of which approximately 2800 are employed full time at sea (Table 6). Total labour costs (salaries and wages) amount to about R260 million per year which includes bonuses, commissions and remuneration (Table 7). Schutte's (1993) socio-economic assessment of thirteen "previously disadvantaged" fishing communities on the west and south coasts included many of the fishing communities hake are targeted from, including Saldanha Bay. Schutte (1993) found that the average monthly income in the Saldanha Bay fishing community (the "previously disadvantaged" community) of R1409.80 was considerably higher than the average monthly income of all the "previously disadvantaged" communities surveyed (Schutte 1993). However, this average is less than half of the mean monthly income of R2 800 for all households, that is all population groups, in South Africa.

Schutte (1993) also found that fishers complained of having no other source of income. The percentage of people who were unemployed in Saldanha Bay, was estimated to be 9.4% when Schutte (1993) completed his assessment in 1992. The socio-economic differences between the wealthy minority and the "previously disadvantaged" create a dilemma as far as redistribution is concerned. Greater access to the hake fishery via less capital intensive methods such as longlining create new opportunities for the "previously disadvantaged" to increase their socio-economic status, however as is indicated in Table 5 and 6 the companies in the hake industry employ and provide remuneration to many people, including people belonging to the "previously disadvantaged". Thus any redistribution to "previously disadvantaged" fishers and/or small and medium size enterprises have to take into account the fact that these companies employ 8700 people. The companies have argued they will be forced to lay off workers which is of major concern to organized labour.

Table 5. Number of people employed in 1991 and the economic value (1994) of the major South African fisheries. US\$1 - SA Rand 3.57 (exchange rate on 31 December 1994). Table adapted from Cochrane and Payne (1998).

Fishery	Employees (1991) Fishers/crew	Onshore – workers Processors (1991)	Wholesale value - processed. (1994) US\$ - millions
Demersal and midwater	2800	5900	201
Pelagic	1000	3700	81
Rock Lobster	2200	1600	47
Linefish, squid, tuna	6200	2000	46
Abalone	140	80	17
Other			7
TOTAL	≥ 12340	≥ 13280	397

Table 6. The total remuneration and benefits (Value in Rands) in the hake trawled sector and the number of people receiving these benefits in 1997. Table adapted from Anon (1998).

<i>Remuneration and benefits</i>	<i>Number of people</i>	<i>Value (Rands)</i>
<i>A: Salaries & Wages</i>		
<u>Catching Sector</u>		
Sea-going	1854	83 473 126
Fleet management	906	42 058 416
<u>Processing Sector</u>		
Factory workers	3826	81 497 251
<u>Distribution Sector</u>		
Employees	415	17 597 000
<u>Storage Handling</u>		
Employees	209	5 068 134
<u>Administration</u>		
Employees	282	15 180 102
<u>Marketing</u>		
Employees	56	6 226 677
<u>Other</u>		
Employees	247	8 183 008
Sub-total	7 795	259 283 714
<i>B: Employee Benefits</i>		
Pension and Provident Funds	6 697	13 804 492
Medical Assistance	4 803	4 022 764
Housing Assistance	4 559	6 493 751
Educational Support	3 921	449 000
Community Activities	-	1 733 062
Other	-	423 000
Sub-total		26 926 519
TOTAL		286 210 233
<i>C: Training and Education</i>		
Investment in training facilities		200 000
Total cost of training	6 819	6 046 546

1.5 Knowledge of the fishery, compliance, monitoring and enforcement

Within the hake industry the knowledge of the scientific process and management is extensive, especially amongst certain individuals in the industry who work for the major companies (in many cases either the managing directors or the managers of fleet deployment and control). Industry representatives attend and often present at all the major scientific conferences or at least attend the proceedings. There has also been active participation of the industry in courses on fisheries management¹. The established industry have consulted with independent scientists in order to verify government stock assessments and have acquired through extensive interaction with these scientists and government scientists a thorough knowledge of the actual assessment process (Schaefer models versus VPA analysis) and the assumptions of the modeling process (e.g. the catch per unit of effort is assumed to be proportional to biomass).

Control and enforcement was undertaken nationally by Fishery Control Officers within the Marine Control Section of the Chief Directorate: Marine and Coastal Management (CD:MCM). Marine control is being integrated into the two separate Directorates of Inshore Resources and Offshore Resources management. Historically, there was no inspection of the Deep-Sea

¹ Fisheries Management and Science (a short course for the S.A. Deep-Sea Trawling Industry, Zoology Department, University of Cape Town, 30-31 January 1991)

Hake fishery. The companies, under their permit conditions have to log and record their catches and the data is sent to the MCM (ex-Sea Fisheries). There was close co-operation with the government and the industry provided the government with catch, effort as well as bycatch data. The potential infringements in the hake fishery are overfishing of quota permits, the landing and dumping of undersize fish and the landing and dumping of bycatch when not permitted. Since trawling is an unselective method, a significant amount of bycatch is landed. Species such as monkfish and angelfish are landed in large quantities and there is little or no information about their biology (Wormsley *et al.* 1998). In the New Living Marine Resources Act the process of dumping is prohibited. Compliance is assumed to be directly correlated with legitimacy, however the chance of being prosecuted and the severity of the penalty are also factors which are important. Legitimacy in South Africa is not only dependent on the management rules (e.g. size restrictions), but legitimacy is also dependent on people being able to acknowledge and perceive that there is an equitable distribution of national resources. There is a long history in South Africa of inequitable distribution of resources and civil disobedience. Many inshore resources are overfished and are being poached. Thus, the issue of enforcement in the Deep-Sea hake fishery has to be compared with enforcement in the other fisheries, many of which are more accessible. There are only a few landing sites in the hake fishery therefore government resources are focussed on the rock lobster and abalone fisheries where extensive poaching exists. The fact that only a few quota holders existed in the hake fishery meant that monitoring both by the government and by fishers themselves was practical. The fact that new entrants are resulting in the number of quota holders greatly increasing is going to place a greater strain on the enforcement of regulations in the hake fishery.

1.6 Decision-making arrangements and fisheries management policy in South Africa

The framework used in the study (ICLARM and IFM 1998), divides rules into three categories (operational, collective and constitutional). In the new South Africa the constitutional rules were drawn up by a government of national unity (circa. 1994-1996), and as such take effect through government policy and the statutory laws. Collective choice rules are made by the minister responsible for fisheries management. In addition, the minister makes use of various state bodies and agencies which, through the minister are responsible for the day-today implementation of policies (the operational rules). Various officials within state run agencies are in effect delegated some authority by the minister for certain collective choice rules. At another level each fishing unit follows certain operation rules based on the conditions of the permit to fish (obtained from the government). The rules on harvesting rights relate to size of fish, area that can be fished and type of gear (trawl verses longline). The management of the hake fishery is the responsibility of the Department of Environmental Affairs and Tourism (DEA&T). Within the DEA&T, Marine and Coastal Management (MCM, ex Sea Fisheries) is responsible for the assessment of fish stocks. A Directorate: Offshore Resources within the (MCM) is responsible for biological research and the compilation of effort and catch data for the hake fishery.

At the height of Apartheid (circa 1980s), the Diemont Commission (Diemont *et al.* 1986) recommended that control of fishing industry should be a central government responsibility. The Sea Fisheries Act of 1988 (No 12) was introduced in 1989. The Act granted extensive discretionary powers to the Minister, who was then responsible for appointing a Sea Fisheries Advisory Committee (SFAC) and a Quota Board. The SFAC had nine members appointed by the minister not as representative of organisations, but in personal capacities based on expertise to contribute towards the functions of the committee. The Minister could recognise and industrial group or interest body in a branch of the fishing industry and these groups had the power to furnish information and advice to the advisory committee or the Minister. Table 7 lists the interest groups and industrial bodies that were recognized under the Act. This recognition resulted in organisations such as the South African Deep-sea Trawling Industry Association playing an active role in the management of the deep-sea hake fishery.

Table 7. A list of the interest groups and industrial bodies that were recognized under the Sea Fisheries Act of 1988, as of 23rd October 1992 (Source: Government Gazette No. 4967).

<u>Interests Groups</u>	<u>Principle Fishery</u>
South African Marine Linefish Management Association	Linefish
False Bay Trek Fishermen's Association	Treknet fishing
Mariculture Association of Southern Africa	Mariculture
<u>Industrial Bodies</u>	
South African Deep-sea Trawling Industry Association	Hake demersal trawl fishery
Abalone Sea Management Committee	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
South African Marine Linefish Management Association	Linefish

The Quota Board became operative in October 1990 and heralded a new era in the allocation of access rights in sea fisheries (Stander 1995). The Board exerted control over access rights in the hake, sole, pilchard (including bait), anchovy, West coast rock lobster, South coast rock lobster, abalone and horse mackerel (midwater trawl) sectors making many decisions (from 1990 to 1994) which were highly controversial.

Following the first democratic elections in April 1994, a Fisheries Policy Development Committee (FPDC) was set up by the Minister of Environmental Affairs and Tourism in April 1995. The policy development process has been extensively reviewed by Hersoug (1996), Martin and Raakjær Nielsen (1997) and Cochrane and Payne (1998). The Fisheries Policy development process came to an end in June 1996 and the FPDC submitted a draft fisheries policy to the Minister of Environmental Affairs and Tourism. An independent representative panel were tasked to investigate options for access rights and their suggestions were included and incorporated into the draft fisheries policy. The resultant document was published as a White Paper in June 1997 and was used to produce the Marine Living Resources Bill which became the new Act after its passage through Parliament. The White Paper included clauses which stressed the governments willingness to facilitate consultation between government and industry associations, but only if they are self-generative and self-supported.

The Portfolio Committee on Environmental Affairs and Tourism was responsible for modifying the Living Marine Resources Bill² and getting it passed by Parliament. The new Living Marine Resources Act came into operation in September 1998. The basic premise of this act stems from the National Constitution, that is correcting imbalances of the past government with be undertaken within the bounds of sustainable utilization. In Chapter 2 of the Constitution it reads that “sustainable utilization shall be the overall objective, while promoting justifiable social and economic development”. The overall aims of the principles in the Constitution are to address the imbalances of the past. As far as governance is concerned within Chapter 4.5 there are resources which are concurrently managed by both national and provincial legislation however the management of living marine resources is clearly national. The Act itself it begins with a list of Principles by which Ministerial discretion is constrained. One principle which is clearly different from those appearing in previous acts is Principle J: “The Minister and any organ of state shall in exercising any power under this Act, have regard to the following objectives and principles:...(j) the need to restructure the fishing industry to address historical imbalances and to achieve equity within all branches of the fishing industry”. Two “new” institutions are created under the Act. That being the Consultatory Advisory Forum (CAF) which has the function of advising the Minister on issues relating to TACs and the Fisheries Transformation Council (FTC) which has the function of over-seeing the leasing of quotas to “previously disadvantaged” fishers (see Figure 7). The FTC in effect are responsible for allocation to small and medium size new-entrants and fishers that belong to the “previously disadvantaged” group, whereas the Minister allocates out rights to larger interests, and the established industry.

There are now three steps to the process of acquiring rights to a quota:

- 1) The establishment of a right (Section 18). This right is established by the Minister and is similar to the “Right of Exploitation” in the previous Act (Sea Fisheries Act of 1988). It is not clear from the clauses as to who will acquire the right and what the procedure will be and the assumption is that this will become clear when the policy is implemented.
- 2) The establishment of a TAC (Section 14(1)). A fundamental difference from the previous Act and of great concern to some is the fact that no mention is made of the establishment of the TAC within scientific bounds. Mention is also made of a “Allowable Commercial Catch” which is assumed to be a subset of the TAC. When setting the TAC, the Minister acts on the advice of the CAF, which is similar to the previous act where he/she acted on advice of the SFAC. The most critical difference with the new Act however, is the fact that, if there is an increase in the TAC the Minister decides solely who the beneficiaries shall be.
- 3) The setting and allocation of quotas. Quotas are allocated as “portions” of the TAC by the Minister to applicants. It is not clear whether the term “portions” refers to a “proportion” and thus a particular quota is allocated as a percentage of the TAC or whether it refers to the basic recognition that all quotas are portions of the overall TAC but are allocated as set amounts. The implications of either one of the above interpretations are fundamental in terms of the resultant consequences on the industry and the dynamics of quota allocations and changes in the TAC.

As before, the Minister may recognise any industrial group or interest body in a branch of the fishing industry and these groups will have the power to furnish information and advice to the CAF. The Regulations³ based on the Act came into affect

² Marine Living Resources Bill (As introduced) 1997. Republic of South Africa. Minister of Environmental Affairs and Tourism. B 94-97.

³ Regulations of the Marine Living Resources Act, No 18 of 1998. Government Gazette No 19205 of 2nd September 1998. Republic of South Africa, Government Printer, Pretoria.

on the 1st of November 1998.

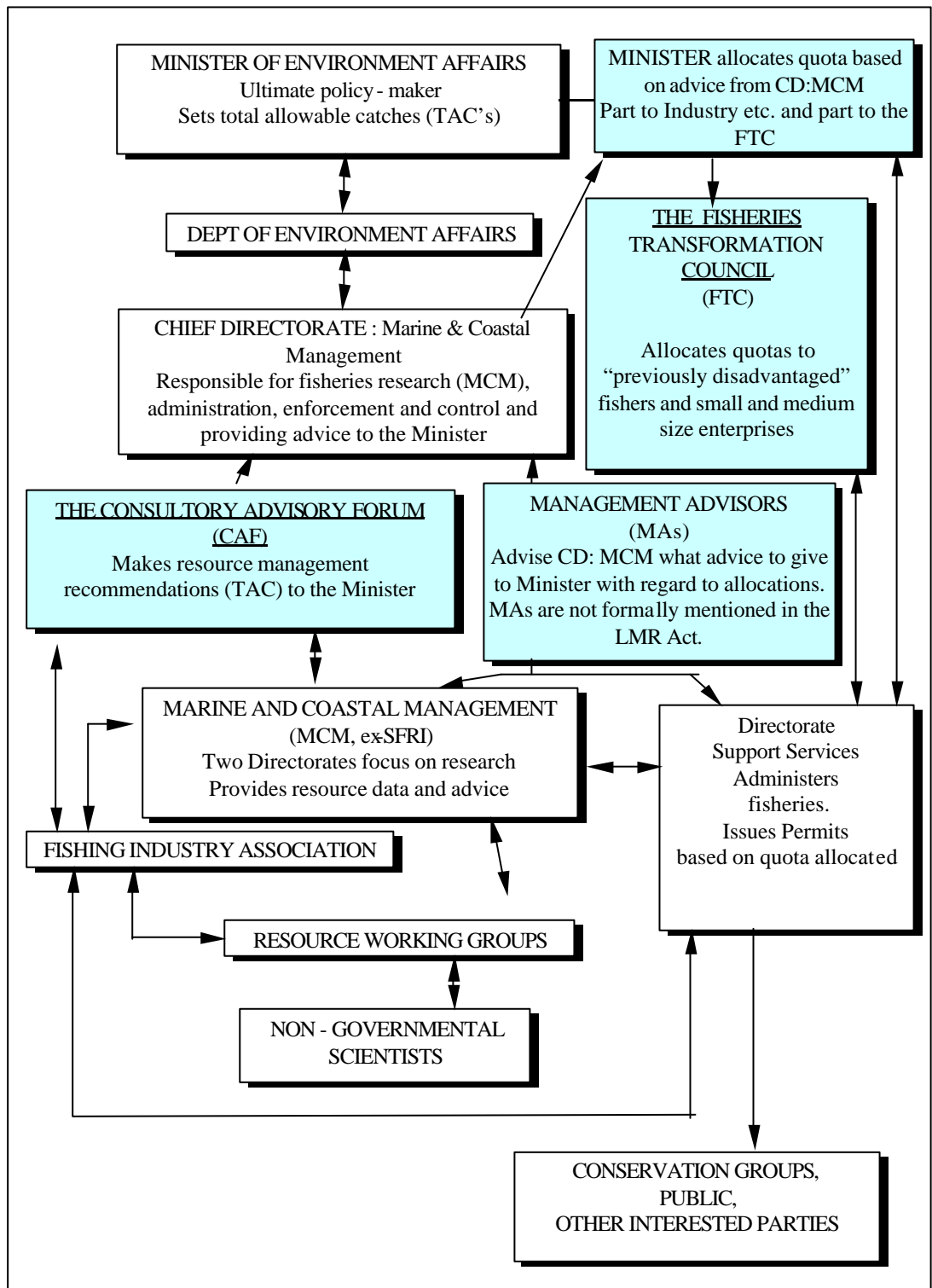


Figure 7. Organigram of structures created under the Living Marine Resources Act, 1998 to manage the fisheries resources of South Africa.

1.7 National Management Associations and Committees

1.7.a South African Deep-sea Trawling Industry Association (SADSTIA)

The South African Deep-sea Trawling Industry Association (SADSTIA) was formally constituted in 1979. The main original members at that stage were Irwin and Johnson Limited, Almalgamated Fisheries Limited (now Atlantic Trawling Limited which is presently part of Sea Harvest Corporation Limited) and Sea Harvest Corporation Limited. Other members included Marine Products, Fernpar and Viking Fishing. More recently, Radaco Sea Products, Surmon Fishing and New South Africa Enterprises have become members of SADSTIA. The Constitution of SADSTIA defines membership in terms of companies who operate deep-sea vessels, that is membership is based on size and tonnage of the vessels. Further, in terms of SADSTIA's constitution, the chairman is nominated from the two largest companies in the Association. Thus, the only means by which individual fishers can have input into the government decision-making process is by indirect involvement through company representatives at SADSTIA. User participation, although indirect, is thus dependent upon the role that SADSTIA plays in the management of the hake fishery.

In the past, recommendations made at SADSTIA meetings were sent to the Sea Fisheries Advisory Committee (SFAC). The SFAC were then mandated to provide final advice to the Minister with regard to these recommendations. It is assumed that the Consultative Advisory Forum (CAF) will play a similar role to the ex-SFAC and receive submissions from SADSTIA and interact with the Association in a similar fashion as the SFAC did in the past. In 1997, out of the 151 700 ton TAC, SADSTIA received 84.95% of the quota as a group, thus representing the main industrial body in the South Africa hake fishery in terms of the percentage access members have to the hake resource. As a collective, SADSTIA are more effective in communicating with the government. Typically, a government department will request that an individual or company be represented by an association which represents a legitimate constituency. An association will act as a collective to increase its share of a resource to the benefit of all its members or in the case of SADSTIA request that rights be allocated by set criteria and their rights to the resource be secure so that they can operate without uncertainty.

1.7.b The South African Deep-Sea Resource Management Committee

The close co-operation between the established industry and the government (in this case Sea Fisheries) was facilitated by the involvement of South Africa in ICSEAF. The dual representation of South Africa by both government officials and industry in countries such as Namibia and Iberia resulted in a situation where year after year the meetings would be attended by the same people. This fostered greater understanding and trust. Both industry and government were both in favour of reducing foreign effort in South African waters, thus a joint effort existed which created a common purpose. In 1978, the high cost of fuel due to the OPEC crisis, that is the unfavourable economic situation, drove the process. The low CPUE was not conducive to a healthy industry and the stock was in need of renewal after the extreme fishing pressure exerted by the foreign fishing fleets in the 1970's. At that stage only five companies were involved in the industry and extensive government-industry interaction took place through the Deep Sea Resource Management Committee.

The government and industry have met twice year over the last 16 years to discuss the rebuilding of the hake stock. The first meetings were held in 1982. The process began when accusations were made that certain companies were lining their trawl nets. The industry tabled length-frequency data to indicate that these accusations were not valid. Six companies were part of the process at that stage and the government-industry meetings were not meant to be forum for discussions with regard to access. Both the government and the industry were concerned about declining trends in the CPUE, and more specifically how effort was being measured. This led to a request in 1983 by the industry for a lower TAC. Further on in the process, $F_{0.1}$ and $F_{0.2}$ fishing strategies were chosen as conservative means to rebuild the stock (fishing effort strategies that would result in increases in yield of 10% and 20% of the rate of increase of yield at very low fishing mortalities, respectively). These were long term decisions and at that stage the industry were concerned with access, as they wanted to receive the benefits of their conservative approach to management. Bross (1986) highlighted the benefits for the industry of such arrangements. He claims they were valuable for sector decision making and ideal interfaces for policy, commerce and science (Bross 1986). Within the bounds of the committee, the industry was thus able to commit to a policy of re-growth for the hake stocks. As the productivity of the resource increased it was predicted that the CPUE would increase (reducing fishing costs) and in addition the TAC would increase. The industry were thus able to agree and promote re-growth of the stock based on the assumption made by all the parties (government and industry) that the industry would benefit from an increase in the TAC in the longer term.

Local decision-making in terms of resource management is limited, as under the past Sea Fishery Act of 1988 and the New Living Marine Resources Act, management of marine resources in South Africa is the responsibility of central government. Greater participation of local users in management is dependent on an organisation representing their interests, as any co-management agreements would have to be fostered between some organisation and the government. Essentially, the Deep Sea Resource Management Committee forms the basis of a formal successful co-management arrangement between the government and industry which has existed for 16 years. This government–industry institutional arrangement went further than consultation, but fell short of complete joint co-management as the government reserved the right to make the final decision on all issues, however within the classification provided by Sen and Raakjær Nielsen (1996) it can be ranked on the border between “consultative” and “cooperative”.

1.7.c Association of Small Hake Quota Industries (ASHQI)

The formation of ASHQI in early 1996, was facilitated by developments in the fisheries policy development process during the same time period and the addition of new entrants to the hake fishery as quota holders. The objective of the ASHQI was to increase the bargaining power of the group in the policy development process, as issues with regard to access were being discussed. The Association during this time period had 13 members. The objectives of the Association are to promote the interests of quota holders with less than 2000 tons, make representations to Sea Fisheries on all aspects of small hake quota holders and create a forum for discussion of matters relating to resource management, state of the stocks, quality control and scientific research. The objectives of the Association are to also liaise with the South Africa Deep Sea Trawling Industry Association on matters of mutual interest. The ASHQI now (1999) has 36 members and an executive committee. A number of key issues have been highlighted by the ASHQI over the last few years. The key issues relate to access and longline regulations.

The total quota held by all the members was equal to 11655.7 tons in 1997. This amount represents 8.2% of the TAC for 1997. More specifically, the association makes use of collective action in order to push the government to allocate more of the TAC to longlining. The Association aims to increase the wealth for vessels under 50 tons and as mentioned includes members with quota under 2000 tons. In 1998, the Association negotiated for a quota of 4500 tons to be longlined. The average total size of quota held by members of this association is about 376 tons, whereas they argue that they need at least 1500 tons before they can trawl. The Association is also attempting to negotiate security of tenure for its members, since over the last 5 years the initial members have not had security of tenure and the risk of investment in the fishery is high. Essentially, the incentive for the small hake quota holders to cooperate is to try and force the new government to redress the inequities of the past as many of its members have been “previously disadvantaged”. The future formal role of ASHQI is uncertain as it has only recently been established and the implementation strategies of the new fisheries policy are still ongoing. However, it has the potential to play a critical role in facilitating user participation in the management of marine resources, in that it represents new participants.

2 The Restructuring of the Hake Fishery

Without doubt, it can be stated that the issue of access to South Africa's living marine resources has become a politically sensitive topic and is widely debated (see Hirshorn 1995, Blankley and Siegfried 1992, Informal Sector 1995, Strutt 1999). The government's rationale for re-distribution is based on the skewed distribution of resources among the population groups. Clearly one possible equitable route to follow would be that new-entrants enter the fishery by buying quotas which could be made freely transferable. However, based on the inequities in the past one has to question whether this is a realistic option for re-distribution. In the changing South African socio-political context, two fundamental incompatible objectives need to be urgently achieved: (i) redistribution, to satisfy socio-political aspirations and (ii) the necessary security for future investment and maintenance of the fishing industry (Glazewski pers comm.). Unless there is certainty about future rights to fish and guarantees that these will not be unjustifiably interfered with, the present and new stakeholders will be inclined to act in a manner detrimental to the industry at large. Some form of re-distribution is required as the TAC has not increased although the number of people requesting access to the resource (applicants) has increased significantly over the last 7 years (Figure 8).

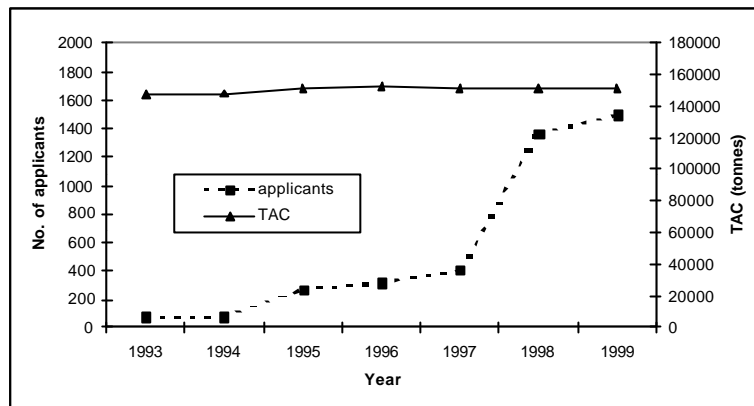


Figure 8. The deep-sea hake TAC over the last 7 years and the number of applicants for access to the resource during the same time period.

A major controversy in the hake fishery and industry is the issue of paper quotas. Typically, new entrants have been given “small” amounts of quota (<400 tons). The *amount per entrant* is decreasing as the number of applicants increases exponentially (Figure 9). For example in 1996, the thirteen new entrants received 343 tons each. The government allocates out to all successful applicants an equal amount, thus as the number of entrants increases, the share to each one, decreases significantly. If one assumes that >1000 tons is the viable amount for a trawling operation, the new entrants would have to pool resources, which would lead to ineffective business management and loss of autonomy. However, an amount of 343 tons was worth R651 700 in 1998, if sold to one of the established companies. Thus paper quotas are seen by many to be free cash handouts and new entrants make large amounts of money with-out investing in the fishery if they sell. The paper quota holders are paid in cash for the quota. Applicants are thus operating in a “jackpot” process as the rewards for receiving the windfall gains from acquiring new access rights are very high.

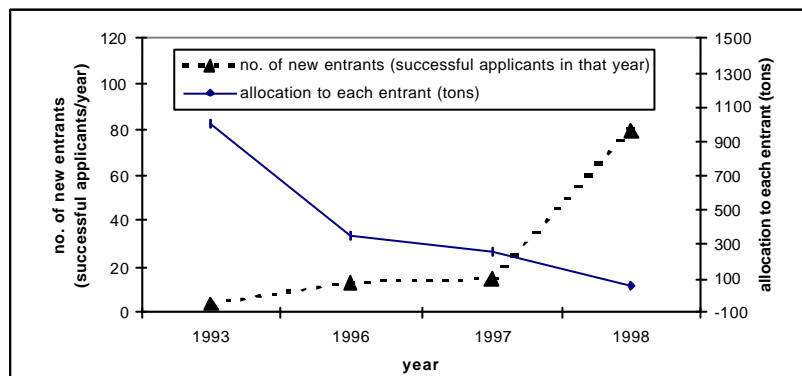


Figure 9. The inverse relationship between “number of new entrants” and “allocation to each entrant (tons)” in 1993, 1996, 1997 and 1998 reflecting the fact that as the number of successful applicants increases their individual share has decreased rapidly. The total amount for allocated in each year, that is 1993, 1996, 1997 and 1998 was 4000, 4463, 3773 and 4400 tons, respectively.

At the other end of the scale, the small hake quota holders argue they are “forced to sell” as they can not control the market (i.e. do not have brand names) and they can not afford the user fees. The paper quota holders also argue that joint venture operations are difficult to negotiate in terms of agreements, as they only have small amounts of quota to bargain with. The small quota holders typically claim, that they would ideally like to set up businesses, create job opportunities and help alleviate unemployment themselves. One means of new entrants gaining access to actual fishing and harvesting is use longline gear instead of trawl gear (which requires a large investment in trawlers, trawl gear and processing equipment). In 1993, a co-operative Longline Experiment was set up which involved a joint strategy between tuna and squid fishers, the established industry and government in order to evaluate the bio-economic value of longlining verses trawling. Officially the department (DEA&T) has attempted to contain the overall longline quota to a small percentage of the overall TAC, the main reasons being resource considerations (sustainability) and information concerns.

The industry has undertaken to re-structure either via the established of joint ventures with smaller previously disadvantaged firms, and/or promoted the investment of black empowerment groups and/or initiated share schemes with employees. This has occurred in all the fisheries with different experiences. However, share schemes have been viewed as not sufficient by many (Hersoug and Holm 1999), as the percentage ownership by the employees has been in the region of ten percent of the overall value of the company. Similarly, the joint-venture agreements between large and small must be validated in terms of fairness of the terms agreed too. Within the Living Marine Resources Act, redistribution is mentioned explicitly, however companies have taken to transform the industry (restructure) by changing the shareholding profile of companies. This results in a transformation of the industry, but at the same time potentially provides greater security of tenure to access rights. Hersoug and Holm (1999) question whether there has been sufficient redistribution to meet the needs of those requesting entry to the fisheries. The government's objectives for redistribution are that minimum disruption occurs in the existing industry, and that there be the promotion of small and medium size interests who had previously had no access to the resource, as well as the promotion of competition (which is necessary for all industries) and the social advancement of "previously disadvantaged" groups through increasing opportunities for them to take part in fishing.

3 INCENTIVES TO COOPERATE AND PATTERNS OF INTERACTION

3.1 The fishing industry and the Government (DEA&T)

The incentives for fishing companies to cooperate with the new government vary depending on the characteristics of the particular user group. Fishing firms are involved in an economic activity and will more likely invest time and resources in co-management arrangements if it is to their benefit. With the expulsion of foreigners from South African waters in the late 1970's, the industry had reason to co-operate with the government as closely as possible so that local resources were not allocated to other foreign interests under licence agreements. Indeed, there was extensive interaction between the government and user groups (South African Deep-Sea Resource Management Committee). The government's role in the process was in the creation of regulations, monitoring and enforcement. In the past government-industry institutional arrangements were extensive as is evident from the review of national management associations and committees (section 1.7).

The established industry argue that their participation has been significantly threatened in the last few years, especially with the abolishment of the SFAC and the formation of the Consultative Advisory Forum, mainly due to the fact that the established hake industry has no direct representatives on the CAF. The transformation to a new act in South Africa and the questioning of rights has impacted on the previous government-industry co-operative management arrangements that existed in many forms prior to 1994. Industry-Sea Fisheries (INSEF) typically met once a quarter, that is SADSTIA met with government officials to discuss management. Apart from issues of representation, there is a direct correlation between security of tenure (rights to fish) and the investment industry will make in facilitating co-operative management arrangements between themselves and government.

Table 8 shows the relationship between "rights to fish a resource" and "user-participation in management" (co-management). The industry will invest resources into a co-management process to a greater degree when security of tenure is guaranteed. An investment in co-operative management assumes the industry will align itself in favour of the longer term objectives of sustainable management. In accepting longer term objectives, short terms gains are forsaken by the industry with the acceptance that longer term gains will accrue to them. However during periods of uncertainty, when rights to fish are threatened, the industry will invest in attempting to negotiate security of tenure and any process which involves long term management goals, that is co-management arrangements are irrelevant to the real concerns of the industry which is to maintain access the raw material which their industry is based on.

Table 8. The relationship between “rights to fish a resource” and “user-participation in management” during two critical time periods in the history of South African fisheries management policy. Security of tenure facilitates participation in co-management as participants can only justify committing to binding agreements promoting sustainable management, if security of tenure results in them receiving the benefits.

Attribute	Apartheid years Circa - before 1994	Transition Period Post-1998, Act implemented
<i>Rights to fish a resource</i>	<ul style="list-style-type: none"> • Rights to fish, i.e. quotas for companies negotiated on catch histories • Alienation of the majority through socio-political and economic system • Participants follow strict legal process - apply for rights through legal representatives 	<ul style="list-style-type: none"> • Rights to resource questioned • Threats of litigation by established industry if rights to fish are re-distributed • New group of participants as government processes applicants and makes allocations • Formation of associations of new quota holders • Black investment firms buy into established companies, reflecting both need and political reality.
<i>User-participation in management</i>	<ul style="list-style-type: none"> • Close relationship between industry and government due to joint attendance at ICSEAF meetings in the 1970's • Formal arrangement (Deep-Sea Resource Management Committee) initiated by organized industry (the South African Deep-Sea Trawling Industry Association) • Clear objectives and <i>modus operandii</i> • Number of participants small - government personnel work close with industry through structures such as the SFAC and INSEF 	<ul style="list-style-type: none"> • Policy creates new bodies (SFAC becomes CAF) • Previous long-term formal and informal relationships are threatened • Changes in state department structures and positions change (Minister and senior officials) • Minister opens door to previously alienated parties (marginalized fishing community) • Adversarial relationship between government and established quota holders • “Rights to resource” issues & adverse climate result in government-industry interactions to do with management not “functioning” as efficient as before • Informal relationships between government and new quota holders develop, but no formal relationships are agreed too.

Recent additions to the number of quota holders has resulted in a situation where the number of quota holders has increased by an order of magnitude. Whereas before the government had to form a relationship with one group (i.e. the established companies), it now has to form relationships with both the established industry and the new quota holders, in addition to all the other stakeholders in all the other fisheries (e.g. pelagic, rock lobster, abalone, squid, linefish).

3.2 Fishers, Stakeholders and the Government

Recently, the government began to actively pursue a consultation process with individual fishers and previously disadvantaged sectors, in order to develop the new fisheries management policy, and even then only representatives were involved. The objectives of the new government are to increase user participation in management and allow for greater access to fishing opportunities to those who have been disadvantaged in the past (ANC 1994). “Stakeholders” within the hake fishery can be placed into three broad categories: the established industry, small hake quota holders (principally the new entrants), and rejected applicants. These three groups have major differences in their interests and influence. However, when identifying stakeholders, these broad categories do not provide a complete view of the diversity of interests groups within the hake fishery. Competition exists between the sectors in the hake fishery for the same stocks and many disincentives for co-operation exist between user-groups.

Non-cooperation is common because of the unequal relationships in economic wealth between fishers in different user groups and the alternative interests they have for exploiting resources. Thus, the responsible management body of the hake fishery, not only has to avoid over-exploitation of the stocks, but it also has to find common ground with regard to other objectives within a myriad of diverse interests. Differences in attitudes are very diverse when comparing the established industry and the new entrants. The heterogeneity stems from differences in experience (advantaged vs. disadvantaged) as well as differences in population groups. Table 9 presents the fundamental differences between the two dominant stakeholders, the established industry and the new entrants. There is a large difference in the average size of quota in each of these stakeholder

groups, as well as differences in harvesting technique (trawling versus longlining). What is very distinct, is the clear division of these stakeholders into two associations. The established industry predominantly support the past structures, but argue they are somewhat alienated from the new structures set up under the new Act. The new entrants are opposed to the past structures and the current allocation proportions to the quota holders. In comparison, the new entrants which were “previously disadvantaged” show overwhelming support for the new structures. The new entrants which can not be classified as “previously disadvantaged” are not generally supportive of the new structures.

Table 9. The differences between the established industry and “new entrants” for certain key factors such as size of quota, harvesting techniques, operations, affiliations, risk, knowledge, support for previous and new structures and involvement in management (n = number interviewed).

<u>Factor</u>	<u>Established Industry</u> <u>(n=5)</u>	<u>New Entrants</u> <u>(n=7)</u>
1. Average size of quota:	22816 tons	369 tons
2. Harvesting technique:	Trawling	Paper quota or longlining (1 trawling)
3. Land operations:	Processing plant - large factories Export and supply local market	Export
4. Membership:	SADSTIA	ASHQI
5. Level of risk - new investment:	Medium to high	High
6. Knowledge of management and science:	Very high as industry members interact with scientists from the government plus others who independently verify government assessments	Medium
7. Support for previous structures: Sea Fisheries Advisory Committee	Yes	No - little representation
Quota Board	Yes	Allegations of corruption
8. Support for new structures: Consultative Advisory Forum	Not represented as before	Yes (n= 4 out of 7)*.
Fisheries Transformation Council	No benefits for this sector	Yes (n= 4 out of 7)*.
9. Support for current allocation proportions	Yes	No
10. Support management rules	Yes	Yes
11. Involved in management	Extensive consultation and co-operation	Consultation

*Support from the 4 “new-entrants” belonging to the previously disadvantaged group.

Irrespective of the scale of involvement, management systems which involve co-management can only be established by formalizing arrangements defining the hierarchical organizational structure and responsibilities of all parties in the process (Lane and Stephenson 1995). In such a complex fishery, such as the hake fishery, the participation of user groups is limited largely by the characteristics of the system, in that there are now many participants and their numbers are increasing. For the hake fishery, the most important recommendation that can be made is that the ASHQI should represent the problems experienced by small hake quota holders by being formally incorporated into the process as an integral part of the new fisheries management system. Alternatively, ASHQI could potentially be integrated formally within national management associations such as SADSTIA. This would however require changes to SADSTIA’s constitution. Although there have been partial interactions between ASHQI and SADSTIA, the commercial sector representatives (members of SADSTIA) have indicated that the members of both have conflicting interests and thus there is no way to bring the parties together.

In order to assess whether the government has achieved its aims with broader representation one has to consider the balance of interests in terms of appointments to the newly appointed Consultative Advisory Forum. In the past hake industry participants had direct representation on the SFAC, whereas now they are indirectly represented at CAF meetings, which

is of serious concern to the companies. Other parties, for example small and medium size enterprises play a larger role, reflecting the government's will to include all parties. The relationship between the established industry and the government has become more adversarial in the last few years with the industry threatening to take the minister to court on many occasions. The hake catch is shared by users ranging from small rural fishing communities to large commercial interests in coastal urban substructures. A central authority may be the only organisation that can represent all the diverse interests at a national scale. This does not exclude extensive user participation, but one should not lose sight of the fact that the extensive scale of these common pool resources, and the large number of participants, places a limit on the possible institutional arrangements for greater user involvement.

3.3. The "fishing communities", worker's unions and the industry

In terms of co-management arrangements between the government and third parties, the concept of a "fishing community" as a decision-making body or individual fishing unit able to have access to quota or control over its members, is problematic. The actual "fishing communities" are embedded within urban sub-structures and the greater political economy. Individuals, private firms and public listed companies operate as fishing units, employing labour and investing capital into a fishery that is both vertically and horizontally integrated. As far as fishing units are concerned, within the framework analysis, hake fish regulations which have to be obeyed are size limits and quota allocations. These are referred to as operational rules (see ICLARM and IFM 1998). A problem which is a unique challenge in South Africa is to convince each fishing unit that many of the operational rules protecting hake stocks are legitimate, despite the fact that they were created under a previous government where the constitutional rules were inequitable for the majority of the population and where previously collective rules were made by a minority. However, the main decision-maker in larger companies is the fleet manager or managing director who is aware of the above mentioned complexities and is responsible for making sure that the company obeys the regulations. New entrants are also obligated to obey the regulations and under the regulations of the New Living Marine Resources Act face prosecution if infringements are made to the rules.

The main unions representing fish-workers and processors is the Food and Allied Workers' Union (FAWU), as well as the Trawler and Linfishermen's Union. The unions which represented "labour", represented the workers during the fisheries policy development process and aligned themselves with industry as there was concern that redistribution would result in job losses. In fact the role of workers is so important in South Africa that negotiations between workers, unions, industry and government take place at a myriad of levels in South Africa and the process is ongoing. Negotiations and interactions between companies and workers are facilitated by union representatives through shop stewards.

4 OUTCOMES

4.1 Efficiency

4.1.1a Economic efficiency in the fishery

Generally, commercial fishing is prone to an exceptional degree of uncertainty, to the extent that it is often declared the most risky of all economic activities (Bross 1986). The industry has argued that anything that adds to risk is discouraged. High risk, has meant that certain fishing companies have a poor record of reinvesting profits into upgrading capital assets such as fishing vessels. In spite of high profitability, the average age of the fleet is older than the recommended retirement age of ships and there are demands for fleet replacement (Manuel and Glazewski 1991). This would require an investment of 1 billion Rand (Penzhorn 1992). Risk should be reduced if possible and the future should be made as predictable as possible for the business investor and planner. The more capital intensive a business, the more difficult it is to bear uncertainty.

The industry has often argued that it is very difficult to plan meaningfully without being confident about what the future holds with respect to the tenure and form of fishing rights. In the past the granting of quotas on an annual basis did not grant sufficient security of tenure, however the companies accepted the risk since their relationship with the government was positive. Long term planning is a prerequisite for a rational programme of investment and market development. Certain members in the established industry claim that future investment is based, not on calculation, but on faith and hope for those companies who have held access rights to quota over the last few decades. Although, certain folk in the industry remain positive, as is indicated by comments by Kramer (1997, page 199): "*Economically, our new government has firmly bound itself*

to a policy which supports free enterprise, which encourages investment and job creation, which stimulates exports. It also accepts that if we are to be players in a global market, we have to be internationally competitive” .

4.1b Efficiency of the management process

Under any management system, compliance is likely to improve when fishers are at the very least consulted. If the system makes provision for local monitoring and enforcement, it is likely that those regulations which are considered legitimate will be enforced at a lower cost. However, as a general rule, the more participants involved in decision-making, the more the process is potentially delayed having major consequences for efficiency. Consensus can more easily be obtained with a few participants than when there are many interests groups. The past government-industry interactions were a reflection of well the private sector could work with the government as there was close extensive dialogue with a small group of participants.

Efficient management would require that shared resources, such as those in the hake fishery, be regulated through a single authority. The fact, that co-management institutional arrangements increase administrative cost for the management authority, was recognized by the government in the White Paper. This authority should be able to follow an overall plan to control all user groups and sectors. Considering the opposing interests of the user groups and sectors in the hake fishery, the commercial trawl and longline fishery, it is critical that a senior authority retain final decision-making power in order to make decisions despite competition. The present central government regulatory agencies and the structures which it has in place, the Chief Directorate: MCM (ex Sea Fisheries) and the resource working groups, provide for such an authority. The arrangements to widen participation and include users in the decision-making process, that is the formal recognition of SADSTIA and ASHQI, provide the hierarchy of institutions suggested as critical for the management of common pool resources by Ostrom (1990).

4.2 Equity

4.2a Procedural fairness and representation

As far as equity and greater user participation is concerned, a more dynamic partnership between the government, and the main stakeholders (SADSTIA and ASHQI), could be fostered in South Africa to improve equity in representation. This could be done by taking advantage of the capabilities of interest groups, complimented by the fisheries administration and scientists, to provide enabling legislation and technical assistance. Institutional reform in the DEA&T is taking place in that affirmation action has led to new faces and relationships – the promotion of junior staff is being facilitated and they are to interact extensively with industry players in order to build relationships and make use of outside expertise. Organisations, which represent stakeholders, will have to become part of a nested hierarchy of institutions responsible for management if they are to be accommodated. Thus, their potential level of participation is not limited by a lack capacity, or inequitable practices, assuming the situation improves, but rather by the extensive scale of the common pool resources which they target. The fundamental problem is that as the number of stakeholders increases their potential or real participation decreases.

Potentially, genuine participation and partnerships between the government and the stakeholders could give way to adversarial relationships and a situation where the government responds to the party which threatens it the most. There are uncertainties with regard to the rules and implementation of the new Act, which could threaten the legitimacy of the Department (DEA&T) unless it acts sensibly. It is very difficult for the participants to obtain unanimity amongst themselves as their interests are so divergent. There is the potential for less adherence to regulations and if this becomes the case the long-term sustainability of the resource will be threatened. The deep-sea industry have no direct representation at CAF, as they did on previous bodies such as SFAC. In the future changes could be made to CAF to include direct representation by the dominant sectors in the fishing industry. However, some fear this will create a forum for sector debates rather than a forum for discussion of management decisions.

4.2b Distributive effects of the allocation process

The most critical issue which is plaguing the success of the process is what Jentoft (1989) referred to as "distributional effects". In South Africa, the central debate has not been about how to manage the resource, and what structures or institutions are needed, but who should possess a quota, permit or licence. When discussions are initiated on issues like the size limit of a particular species, the topic usually changes to access rights. There is an urgent need to resolve the issue

of allocation through conflict resolution and negotiation as these are political decisions, without technical solutions. A widely accepted system of access rights is essential to the sustainable management of marine resources in South Africa and the facilitation of co-operative management arrangements between government and industry (both established and new participants).

The onus is now on the new government to address the inequalities of the past. However, essentially bureaucratic moves have failed to be widely perceived as effectively addressing past inequities (Hersoug and Holm 1999). Often, the legitimacy of existing regulations is not recognised, and participation and consent is proving difficult to establish. There is considerable resentment of the system, user participation in management (for new participants) is still considered by many to be limited, and only a few new entrants to the fisheries have been accommodated (Hersoug and Holm 1999). However, the overall aims of the new government are to increase equity in terms of access for fishers who were “previously disadvantaged”. The new Fisheries Transformation Council has the function of over-seeing the leasing of quotas to “previously disadvantaged” fishers, whereas CAF has the function of including, those who represent new entrants interests, in the management process.

4.3. Sustainability

4.3a Stewardship of the resource

In the short term, setting management goals, based on objective biological reference points, within the framework of operational management plans (OMPs), is critical for biological sustainability. However, once these have been established the sustainable management of the hake resources will depend on the creation of equitable and efficient institutional arrangements for management. There is extreme pressure from the established fishing industry to maintain their quotas arguing that cut backs will cause economic hardship. In addition new entrants are been allowed to fish with longline gear. This could potentially threaten the biological sustainability of the resource if left unchecked. Sustainability requires a holistic management strategy which takes into account the divergent and competing interests of the various sectors and includes them in the decision-making process. Badenhorst and Payne (1998) state the critical aspect of the new government policy should be that re-distribution and empowerment take place without destabilizing the industry or causing a depletion of the hake stocks. Both these conflicting objectives need to be met.

4.3b Institutional resilience

The new policy of the government strives for fundamental restructuring of the industry to achieve fair and equitable access to the resources by those who have been denied access by the policies of the past. Political change raised unrealistic expectations that there is scope for many small operators, whereas most marine resources are harvested at maximum sustained yield or overfished (Badenhorst and Payne 1998). Benefits obtained from exploitation now have to be traded off with future gains if resources are overfished, as there is extreme pressure from new entrants for access to the resource and for longline permits, as well as access to the management process so they can represent their interests in such forums as CAF.

To design an appropriate fishery management policy and relevant legislature for the future, the co-operative participation of those who will be most directly affected by regulations is essential. One can improve the regulatory process greatly by providing the participants and companies with incentives to behave in a fashion which seems rational and which simultaneously achieves most of the objectives for an adequately protected and reasonably efficient fishery (Crutchfield 1982). The system will only work if there is a resolution of conflict and a re-direction of effort toward common interests and goals within the framework of government-industry partnerships that embody the principle of co-management. These relationships existed, however the extensive changes within all the institutions and the rapid restructuring has had an impact on these institutional arrangements. As is evident in Table 8, co-management arrangements struggle to remain legitimate and “functional” when there are major changes in the access right regime. This is expected as changes to access rights bring in new parties with different interests. The government have also undergone extensive change and departments are run by a newly instated ministers and officials under a government with a fundamentally different political agenda. It is doubtful whether any institutions have the resilience to deal with such fundamental change. More importantly, the focus now is on how new co-management arrangements and institutions will evolve to include aspects of the past institutions and aspects of the new policies of the new government.

5. FUTURE CHALLENGES: THE CO-MANAGEMENT OF THE HAKE FISHERY

Amongst other factors, the pre-1994 fisheries management system in South Africa was successful because there are few resources of commercial value in South Africa, and only a few of these are shared with neighboring countries. The decision-making process also relied on an autocratic political system which was exclusive, making law enforcement cost effective. There was homogeneity in terms of culture and both industry and government had access to the latest scientific procedures despite political isolation. The incentives for the parties to collaborate revolved around the declining CPUE trends and there was joint commitment to a rebuilding strategy based on economic rationale. From the industries perspective a low CPUE equals higher cost thus it was imperative for them to be part of a rebuilding strategy. The significant outcome was the halt to the decline in the CPUE indicating sustainable use of the hake resource. Extensive vertical and horizontal integration has occurred as large companies in the industry have invested in the catching, marketing and processing sectors as well as providing employment in all these sectors and generating foreign exchange by exporting value added products. Kramer (1997) claims that the small number of participants in the hake fishery was a significant benefit, arguing that the industry had so much at stake, with no alternative sources of raw material that they co-operated fully with scientists and administrators toward a common objective. Kramer (1997) stated that as a result there was a high degree of compliance with restrictive measures, with mesh size regulations and quota limits.

The aim of this case study was to consider outcomes in terms of efficiency, equity and sustainability within the South African Deep-Sea Hake fishery considering the fundamental changes that have taken place in the last decade. Within the new, post-1994, management regime there is greater diversity in terms of size and gear (a new longline sector) and heterogeneity of culture (all South Africans are included). In addition, the government wishes to achieve alternative management objectives (objectives which include biological, economic and social considerations), based on its mandate to restructure the industry without causing job losses. There is also greater regional participation, and management expertise. Thus, the challenge for the future is to integrate the new complex environment, that is the greater diversity, into a system which emulates the simple pre-1994 cooperative management system. The aim of this paper was to also evaluate the opportunities for the participation of stakeholders in the management process in order to create a more democratic system with greater compliance based on improved legitimacy. An important issue as far as user-participation in management is concerned, is direct representation of sector interests, in this case the deep-sea hake industry, at forums such as CAF. Different forms of representation will have to be considered by all the parties.

Extensive interaction both informally and formally existed in the past between industry and the government. However, the current re-structuring and institutional reformations that are proceeding are impacting on these arrangements. Thus, one of the major problems facing fisheries management in South Africa, especially in the hake fishery, is the issue of "access rights" and the impact that the re-structuring is having on these past institutionalized arrangements. Within the framework presented herein (see ICLARM and IFM 1998) these access rights are referred to as collective choice rules. The major issue in South Africa, is to convince stakeholders that the collective choice rules are legitimate and this seems impossible considering that the demands far exceed the resource base. In any event, any move towards greater user participation is going to be more apparent than real in the short term. This is largely due to the complex nature of the fishery, the large number of competing sectors and the current controversy over access to fishing opportunities.

Co-management arrangements can be more easily formalized when security of tenure in terms of rights to fish is not an issue. Once a stage is reached where some form of stabilization occurs in terms of who has access to the hake resource, opportunities will exist for co-management arrangements to evolve which will include parties who participated in the past co-management arrangements and parties new to the process. When redistribution has been finalized and the participants have at the very least quasi-security of tenure in terms of rights to fish, the participants (both established and new) can then concentrate on the long term management of the stock rather than the share each is to receive. The new political dispensation in South Africa is based on participatory democracy, therefore some form of user-participation in management will characterize government-industry (both established and new entrant) relationships in the future.

ACKNOWLEDGMENTS

The Institute for Fisheries Management and Coastal Community Development (IFM) and the International Centre for Living Aquatic Resources Management (ICLARM) are acknowledged for providing financial support.

REFERENCES

- African National Congress 1994. *Fisheries Policy: working together for jobs, peace and freedom*. Draft - revised May 1994.
- Andrew, P.A. and Butterworth, D.S. 1987. Is $f_{0.1}$ an appropriate harvesting strategy for the Cape hakes? In: *The Benguela and Comparable Ecosystems*. Payne A.I.L., Gulland J.A., and K.H. Brink (Eds). *S. Afr. J. mar. Sci.* 5: 925-935.
- Anon, 1998. Final Report. Socioeconomic Investigation of the Hake-directed Longline Experiment. The Multidisciplinary Task Group (MTG), Cape Town, March 1998.
- Badenhorst, A. and A.I.L. Payne 1998. A South African marriage of politically derived expectations and scientifically determined sustainable utilization - will it succeed? Abstract only. Poster.
- Blankley, W. and W.R. Siegfried 1992. Who owns the seas fish? *S. Afr. Comml Mar. Mag.* August 1992.
- Botha, L. 1973. Migrations and spawning behaviour of the Cape hakes. *S. Afr. Shipp. News Fish. Ind. Rev.* 28(4): 62, 63, 65, 67.
- Botha, L. 1980. The biology of the Cape Hakes *Merluccius capensis* Cast and *M. paradoxus* Franca in the Cape of Good Hope area. Ph.D. thesis, University of Stellenbosch: 182pp.
- Botha, L. 1985. Occurrence and distribution of Cape hakes *Merluccius capensis* Cast and *M. paradoxus* Franca in the Cape of Good Hope area. *S. Afr. J. mar. Sci.* 3: 179-190.
- Bross, C.A.R. 1986. Stock assessment and risk in South African fisheries. In *The Benguela and Comparable Ecosystems* (Eds.), Payne A.I.L., Gulland G.A., and K.H. Brink. *S. Afr. J. mar. Sci.* 5: 919-924.
- Butterworth, D.S., Punt, A.E., Bergh, M.O., and Borchers, D.L. 1992. Assessments and Management of South African marine resources during the period of the Benguela Ecology Programme: key lessons and future directions. In: *Benguela Trophic Functioning*. Payne A.I.L., Brink K.H., Mann K.H., and Hilborn R. (Eds). *S. Afr. J. mar. Sci.* 12: 989-1004.
- Cochrane, K.L. and A.I.L., Payne 1998. Purses, people and power: Developing fisheries policy for the new South Africa. In: *Reinventing Fisheries Management Policy*. T.J. Pitcher, P.J.B. Hart and D. Pauly (eds.). Kluwer Academic Press. Pages: 73-99.
- Crawford, R.J.M., Shannon, L.V. and Pollock, D.E. 1987. The Benguela ecosystem 4. The major fish stocks and invertebrate resources. In: *Oceanography and Marine Biology. An Annual Review 25*. Barnes, M. (Ed.). Aberdeen; University Press: 353-505.
- Crutchfield, J.A. 1982. The Economics of Fisheries Management. In: *Managing Renewable Natural Resources in Developing Countries*. C.W. Howe (Ed.) Westview Press, Colorado.
- De Jongh, J. 1974. Ontwikkeling van die Seevisserye ann die Kaap Kolonie, 1890-1910. Unpublished Thesis, University of Stellenbosch, Stellenbosch, South Africa.
- Diemont, M.A., Barrie, F.G., Stoops, W.H. Ramsay, R. and E.H.B. Goldschmidt 1986. *Report of the Commission of Inquiry into the Allocation of Quotas for the Exploitation of Living Marine Resources*. Government Printer, Pretoria.
- Hersoug, B. 1996. Same procedure as last year? Same procedure as every year! – some reflections on South Africa's new fisheries policy. Presented at the International Seminar on National Marine Fisheries Policy for South Africa. 4th June, Cape Town, South Africa.
- Hersoug, B and P. Holm, 1999. Change without redistribution: an institutional perspective on South Africa's new fisheries policy. *Marine Policy* (in press).
- Hirshorn, G. 1995. Angling for more equity: but allocating quotas to small fishermen may cause problems. *Financial Mail, February 17 1995*.
- ICLARM and IFM, 1998. Analysis of co-management arrangements in fisheries and related coastal resources: A research framework. Prepared by the Coastal Resources Co-management Research Project. International Centre for Living Aquatic Resources Management (ICLARM) and the Institute for Fisheries Management and Coastal Community Development (IFM).
- Informal Fishing Sector 1995. Access Rights submission to the Technical Committee. 16th October 1995.
- Jentoft, S. 1989. Fisheries co-management: Delegating government responsibility to fishermen's organisations. *Marine Policy*, 13(2): 137-154.
- Kramer, E. 1997. How South Africa transformed hake into the most sought-after species. In: *Fishing Industry Handbook: South Africa, Namibia and Mozambique*. Stuttaford, M. (Ed.).
- Lane, D. E. and Stephenson, R. L. 1995. Matching technical measures with multiple objectives through comanagement. *International Council for the Exploration of the Sea, C.M.* 1995/S:11.
- Leslie, R.W. 1998. Final data document for west coast hake assessments. Sea Fisheries Research Institute. Working Group Document *WG/03/98/D:H:12*
- Manuel, F. and Glazewski, J. 1991. The Oceans: Our common heritage. In: *Going Green: People, politics and the environment in South Africa* (eds) J. Cock and E. Koch. Oxford University Press, Cape Town.
- Martin, R. and J. Raakjær Nielsen, 1997. Creation of a new fisheries management policy in South Africa: The development process and achievements. Pages 153-171, In: *Fisheries Co-management in Africa*. Proceedings of a Regional Workshop on Fisheries Co-management Research. 18th to 20th March 1997, Mangochi, Malawi. A.K. Normann,

- J. Raakjær Nielsen, and S. Sverdrup-Jensen (Eds.), IFM, Fisheries Co-management Research Project. Research Report No. 12.
- Muller, C.F.J. 1938. Die vroeë geskiedenis van visserye in Suid-Afrika. M.A. Thesis. University of Stellenbosch: [viii] + 252 pp.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge, England, UK: xviii - 280., illustr.
- Payne, A.I.L. 1989. Cape Hakes. In: *Oceans of Life off Southern Africa*. Vlaeberg, Cape Town. pages 136-147, Payne, A.I.L. and R.J.M. Crawford (Eds).
- Payne, A.I.L. and Punt, A.E. 1992. The biology, fishery and management of the Cape hakes *Merluccius capensis* and *M. paradoxus* off South Africa. In: *Hake: Fisheries, Products and Markets*. Alheit, J. and T. Pitcher (Eds).
- Payne, A.I.L. and R.J.M. Crawford 1989. The major fisheries and their management. In: *Oceans of Life off southern Africa*. Payne A.I.L. and Crawford R.J.M. (Eds.), pp. 51-61. Vlaeberg publishers, Cape Town.
- Penzhorn, L. 1992. The Future of the South African Demersal Fishing Industry: An Industry Perspective. Benguela Trophic Functioning Symposium. *S. Afr. J. mar. Sci.* 12: 1093-1094.
- Punt, A.E. 1991. Management procedure for Cape Hake and Baleen Whale resources. Ph.D.. Thesis. University of Cape Town, South Africa. *Rep. Benguela Ecol. Progm. S.Afr.* 23:[viii] + 689 pp.
- SADSTIA/SECIFA 1994. Policy proposals for the South African trawling industry. South African Deep-Sea Trawling Industry Association (SADSTIA) and the South East Coast Inshore Fishing Association (SECIFA). 23pp.
- Schutte, D.W. 1993. 'n Ontleding van die ontwikkelingspotensiaal van geselekteerde vissersgemeenskappe aan die Wes- en Suidkus. R.G.N. : Kaap, Suid Afrika.
- Sen, S. and J. Raakjær Nielsen, 1996. Fisheries Co-management: A Comparative Analysis. *Marine Policy*, 20(5): 405-418.
- SFRI 1993. *South African Commercial Fisheries Review* 1991, No. 1. Chief Directorate Sea Fisheries (Cape Town), Department of Environmental Affairs, Republic of South Africa. 41pp.
- SFRI 1994. *South African Commercial Fisheries Review* 1992, No. 2. Chief Directorate Sea Fisheries (Cape Town), Department of Environmental Affairs, Republic of South Africa. 45pp.
- SFRI 1995. *South African Commercial Fisheries Review* 1993, No. 3. Chief Directorate Sea Fisheries (Cape Town), Department of Environmental Affairs, Republic of South Africa. 51pp.
- Stander, G. 1995. Aspects of the development and the regulation of South Africa fisheries. In: *Review of International Experiences in Access Rights and their implications for Fisheries Management in South Africa*. Access Rights and Resource Implications Task Group (ARRITG), pages 51-72. SFRI, Cape Town, South Africa.
- Strutt, I. 1999. Transition Time. *Fishing News International* 38(5): 8-19.
- Stuttaford, M. (Ed.) 1983. *South African Fishing Industry Handbook and Buyer's Guide*. Marine Info. Services (Pty) Ltd.
- Stuttaford, M. (Ed.) 1991. *South African Fishing Industry Handbook and Buyer's Guide*. Marine Info. Services (Pty) Ltd.
- Stuttaford, M. (Ed.) 1993. *South African Fishing Industry Handbook and Buyer's Guide*. Marine Info. Services (Pty) Ltd.
- Stuttaford, M. (Ed.) 1994. *South African Fishing Industry Handbook and Buyer's Guide*. Marine Info. Services (Pty) Ltd.
- Stuttaford, M. (Ed.) 1996. *South African Fishing Industry Handbook: South Africa, Namibia and Moçambique*. 24th Edition. Marine Information cc, Stellenbosch, South Africa.
- Stuttaford, M. (Ed.) 1997. *South African Fishing Industry Handbook: South Africa, Namibia and Moçambique*. 25th Edition. Marine Information cc, Stellenbosch, South Africa.
- Wormsley, S. *et al.* 1998. Bycatch in the demersal fisheries off South Africa. Presented at the Conference on African Fish and Fisheries: Diversity and Utilisation. 13th to 19th September 1998, Grahamstown, South Africa.