

Moving subsistence fisheries to commercial fisheries in South Africa

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ABSTRACT

Subsistence fishers in South Africa were formally recognised as a special fisheries sector in 1998 by the Marine Living Resource Act (MLRA). Political changes in the country i.e. the end of the white dominated regime apartheid, added both urgency and expectations of broadened access. Approximately 28 000 people are identified as subsistence fishers in South Africa, with a further 175 398 people in total directly depending on marine resources to meet the basic requirements for living. These fishers are generally poor and do not make enough profit from their fishing activities to improve their lifestyles. Since the MLRA, reasonable progress has been made in South Africa towards legalizing subsistence fishers. However, the task of developing clear guidelines or mechanisms for the formation of commercial fisheries as an alternative to subsistence fisheries has not been considered. Many of these subsistence fishers are pushing towards commercialisation because most feel hampered by the trade restrictions that are imposed on them by the law and routinely violate these restrictions anyway. Thus, it has become quite urgent to seek a solution to the subsistence fishers problem and, in particular, determine whether they should be allowed to become commercial fishers or not. However, with the persistent problem of marine resources and other considerations of social interdependence, it does not make much sense to consider the problem of subsistence fishers in isolation. Whether or not they should be allowed to become commercial should be based on consideration. This project attempts to identify potential fisheries that should be considered to commercial fisheries. However, it recommends that these resources not be moved to the commercial sector by removing them from subsistence fisher people rather, empowering these fishers to operate the management of these resources under a combination of property rights of TURF's (territorial user rights of fishing) and community quotas.

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1 INTRODUCTION

The history of subsistence fisheries in Southern Africa extends back at least 100 000 years (Voight 1975, Thackery 1988). In recent decades a large number of people has subsisted on marine resources in South Africa, and the impact on biotic communities has been well documented (Branch *et al.* 2002). Intertidal and shallow-water resources, upon which many subsistence fishers depend, are particularly susceptible to overfishing because of their accessibility. Unfettered open access leads inevitably to the “tragedy of the commons” (Hardin 1968) or as Aristotle expressed it: “that which is common to the greatest number has the least care bestowed upon it” (Machan 2002).

In 1994, the Minister responsible for Environmental Affairs and Tourism launched a process leading to the development of a new Fisheries Policy for South Africa. Political changes in the country, i.e. the end of the white dominated apartheid regime made broadened access expected and the changes urgent (Lewis 1988, Cochrane 1995, Hutton *et al.* 1997, Martin and Nielsen 1997). The development of the new policy was guided by the Fisheries Policy Development Committee, leading to the publication of a White Paper for public comment (van der Elst *et al.* 1997). The final outcome of this process was the Marine Living Resources Act (MLRA) (South Africa 1998). This was founded on a policy of sustainable resource use, equitable access to resources and stability of the industry. As with previous legislation, the MLRA distinguished between recreational and commercial fishers. In addition, and for the first time in legislation for South African fisheries, it recognized subsistence fishers as a distinct group.

To give substance to the part of MLRA that dealt with subsistence fishers, Marine and Coastal Management (MCM), the national agency managing marine resources, appointed a Subsistence Fisheries Task Group (SFTG) to advise on the management of subsistence fishers. Its abbreviated terms of reference were to:

- Define subsistence fishers;
- Identify coastal zones appropriate for their use;
- Provide recommendations on the proportions of individual stocks that should be allocated to the various fisheries subgroups or segments;
- Identify protocols to involve local communities and relevant authorities in the fisheries management process;
- Recommend models for the implementation of management, monitoring, enforcement, training and research and;
- Develop guidelines and mechanisms for the formation of fisheries subgroups or segments as an alternative to subsistence harvesting for food. (Branch *et al.* 2002a, Clark *et al.* 2002, Cockroft *et al.* 2002, Harris *et al.* 2002a, Harris *et al.* 2002b, Hauck *et al.* 2002).

Since the inception of the SFTG, noteworthy achievements have been made. However, despite these positive developments, there are several gaps between policy statements, broad legal provisions and practical implementation (Njobe *et al.* 1999). The sixth task of

the SFTG, to develop clear guidelines or mechanisms for the formation of commercial fisheries as an alternative to subsistence fisheries, remains to be done.

Few countries anywhere in the world have established legislation specifically for the management of subsistence harvesters. Alaska and Canada stand out as exceptions and the fact that Alaska has established an entire Division to deal with subsistence activities within its Department of Fish and Game testifies to the importance of the sector (Fall 1990; Berkes 1990). The literature survey for the topic of discussion was extensive and no recorded papers that deal in particular with the transition of subsistence fishing to commercial fishing were found. The closest reference found to the topic of this paper was written by author Inge Tvedten in 1990: The difficult transition from subsistence to commercial fishing: the case of Bijagos of Guinea Bissau and published through the journal of Maritime Anthropological Studies. Reference is made to other literature that is relevant to the thinking behind the subject. This study is the first of its kind to attempt to tackle the issue of moving subsistence fishing to commercial fishing.

Subsistence fishers in South Africa rely on marine resources to provide their means of livelihood. These fishers are generally poor and do not make enough profit from their fishing activities to accumulate human and physical capital. Further, many of these subsistence fishers are pushing towards commercialisation because most feel hampered by the trade restrictions that are imposed on them by the law and routinely violate these restrictions anyway. Thus, it has become quite urgent to seek a solution to the subsistence fishers problem and, in particular, determine whether they should be allowed to become commercial fishers or not. However, due to the persistent problem of marine resource utilization and other considerations of social interdependence, it obviously does not make much sense to consider the problem of subsistence fishers in isolation. Whether or not they should be allowed to become commercial should be based on wider considerations. This study deals with these questions, more precisely the study will attempt to:

1. Identify the conditions necessary for moving subsistence fishing to commercial fishing.
2. Develop, on that basis, criteria to determine when a subsistence fishery is ready to move to commercial fisheries.
3. Identify subsistence fisheries in South Africa that could possibly move to commercial fisheries.
4. Propose an approach as to how to move subsistence fisheries in South Africa to commercial fisheries.

2 BACKGROUND

In this section a brief background information on the South African economy, fisheries and the subsistence fisheries segment will be provided.

2.1 South Africa and her economy

South Africa is a middle-income, developing country with an abundant supply of natural resources, relatively well-developed financial, communications, energy and transport sectors and infrastructure supporting efficient distribution of goods to major urban centre throughout the region (Glazewski 2000). However, economic growth has not been strong enough to cut into the 30% unemployment and daunting economic problems inherited from the apartheid era, especially the problems of poverty and lack of economic empowerment among the disadvantaged groups. Approximately 50% of South African households are classified as poor (earn less than R352 per month) (May 2000). Other major social problems are crime, corruption and HIV/AIDS.

The total population for South Africa recorded in 2001 by the Central Statistical Services of South Africa was 44 million inhabitants (CSS-SA 2001). There are 11 official languages in South Africa. These include Afrikaans, English, isiNdebele, isiXhosa, isiZulu, Sepedi, Sotho, Setswana, Siswati, Tshivenda and Xitsonga, besides several dialects. There are several tribes in South Africa distinct by language and location. (These include the Pedi (live in the northern province of South Africa, in Sekhukhune land), Sotho (Setswana and Sepedi speaking people), Tswana (their language is called Sechuana), Venda (live in Thohoyandou), Xhosa (predominantly live in “homelands” in the former Transkei and Ciskei), Khoisan (Khoisan people is the name of both the Hottentotts and the Bushmen. Hottentotts call themselves Khoi and Bushmen call themselves San) and the Zulu tribes (a large number of Zulus live in the province KwaZulu-Natal)). All tribes have a hierarchy of clan and local chiefs. Approximately 30 million people out of 44 million belong to tribes in South Africa. Similarly, along the coast there exists a variety of cultural groups some with a strong tribal component. The nature and characteristics of each tribe are different. Therefore, what might work in terms of management of fisheries resources in one area might not work in another. The South African government is aware of traditional and cultural practices and power structures in South Africa and recognizes the sensitivity surrounding this issue. (Anon. 1999).

Coastal areas provide important economic benefits to the people of South Africa. It is estimated that the direct benefits obtained from coastal goods and services amount to R168 billion each year (DEA&T 2001a) while indirect benefits contribute a further R134 billion annually. Main economic coastal activities are the fishing industry, tourism, mining and shipping (DEA&T 2001a):

- The fishing industry is worth R2.4 billion (contributing 0.5% to South Africa's GDP) and employs 27 000 people directly while secondary industries such as fish processing, transporting of fish products and boat building employ a further 60 000;

- Coastal tourism is estimated to generate R13.5 billion for the economy every year;
- South Africa's ports and harbours provide links to world economies and markets and the shipping industry transports R140 billion worth of cargo which generates R4.2 billion in revenue per year.

2.2 South African Marine Resources



Figure 1: South Africa's coast

The South African coastline is approximately 3 000 km from the Orange River in the west, on the border with Namibia, to Ponta do Ouro in the east on the Mozambican border (Figure 1) (Sowman 1993). South Africa has two oceans along its coast, the Atlantic Ocean on the west and the Indian Ocean on the east.

While South Africa's east coast is influenced by the warm, nutrient-poor Agulhas Current which flows southward from tropical latitudes off Mozambique and Madagascar, the west coast is bathed in the cold waters of the Benguela Current System. Productivity on the west coast is exceptionally high, fuelled by the upwelling of nutrients from deep waters (DEA&T 2001b). The rich nutrients encourage the growth of dense phytoplankton blooms, which support schools of pelagic fish, such as anchovy and pilchards. These in turn are the food for larger economically important fish and colonies of sea birds and seals. The intertidal life includes dense stands of limpets, mussels and Cape reef worms. Some of these resources such as certain species of fish and kelp are already harvested in large quantities but the potential of others is still to be realized. By contrast the warm waters of the east coast support much less quantity but higher diversity of marine species

(DEA&T 2001a). More than 11 000 marine species have been recorded around South Africa, 5% of the total number of marine species worldwide (DEA&T, 2001a). Approximately 17% of South African species are endemic (Payne and Cochrane 1995). It is clear that South Africa boasts a rich biodiversity of species, communities, and ecosystems.

Thirty percent of the population of South Africa lives within 60 km of the coast (Glazewski 2000). As of 1998, the coastal population was approximately 12 million people (over 25% of the national population) (CSS-SA 2001). The diverse environmental characteristics and conditions found along the coast, largely due to the influence of the Indian and Atlantic and Southern Oceans have influenced human settlement patterns and land use activities in the coastal zone. In addition, in South Africa, poverty is a major cause of pressure on coastal marine resources. The nature of this pressure needs to be understood in order to devise a plan for sustainable development. The abolition of restrictive apartheid policies that previously denied the majority of South Africans access to certain areas, resources and facilities on the coast is a contributing factor to the increased pressure in the coastal zone region (Sowman 1993). In South Africa more people have been attracted to the east and south coasts due to the warm water and moist climate and as a result, development and population pressure are more evident there than on the arid west coast with its cold water and dry climate (DEA&T 2001a).

Development in the major coastal towns and cities has been rapid. However, many coastal regions have not benefited from such economic growth, either due to their rural location, restrictive governing institutional frameworks, or due to the unequal distribution of benefits. In fact, small towns and rural areas make up 90% of the population in the coastal area but contribute only 10% to economic growth (Glavovic 2000). The coastal region is therefore experiencing not only increasing growth but also increasing levels of poverty and inequality (Sowman 1993). Importantly, increasing poverty levels along the coast inflict huge pressure on coastal and marine resources.

2.3 The fishing sectors of South Africa

It is useful to distinguish the fishing sectors by means of characteristics such as the main use of resource, income level, needs met by resources, locality of harvest, who does the harvesting, gear used, origin of the fishery and value of the resource (Table 1).

Table 1: Characteristics of Subsistence, Artisanal and Commercial Fishing in South Africa, (SFTG unpublished report 2000).

Characteristics	Subsistence	Artisanal	Commercial
Main use of resource	Consumption	Sale and consumption	Sell for profit
Income Level	Poor; no full-time income, or income low	Poor to moderate; no full-time	Not poor; income full-time and above average
Needs met by resources	Resources part of basic food requirements	Resources give income to supply food security	Resources yield income sufficient for most needs
Locality of harvest and use of resource	In shore or in estuaries Resource used locally	In shore or in estuaries Resource used locally	Operate anywhere. Use not only local; can be international
Who does the harvesting?	Personal harvest of the resource	Personal harvest. No employment of staff	Employ staff to fish and process catch, or operate as cooperatives
Gear	Low-technology gear	Low-technology gear	Often high-technology expensive gear and processing
Origin of fishery	Community-based cultural practice of long standing	Community-based cultural practice of long standing	Not based on long-standing cultures or traditions
Value of resources	Low cash value	Low cash value	Resources abundant or have high cash value

The characteristics of artisanal and subsistence fishing sectors in South Africa overlap (Table 1). These two fishing sectors differ mainly in how the catches are used; subsistence fishers use their catch as a source of food whereas artisanal fishers use their catch primarily for sale and secondarily for consumption. Nonetheless, due to the overlap between subsistence fishing and artisanal fishing, managers proposed that the two fishing sectors be merged and covered by one definition.

The MLRA (1998) defines subsistence fishers as a person who regularly catches fish for personal consumption or for the consumption of his or her dependents, including one who engages from time to time in the local sale or barter of excess catch, but does not include a person who engages on a substantial scale in the sale of fish on a commercial basis.

The SFTG expanded the definition of subsistence fishers to poor people who personally harvest marine resources as a source of food or to sell them to meet the basic needs of food security; they operate on or near to the shore or in estuaries, live in close proximity to the resource, consume or sell the resources locally, use low technology gear (often as part of a long-standing community-based or cultural practice), and the kinds of resources they harvest generate only sufficient returns to meet the basic needs of food security (SFTG 2000).

So essentially South Africa's legal classification of subsistence fishers comprises two groups: (i) the "artisanal" representing those people with some commercial activities and (ii) pure "subsistence" fishers with no commercial activities. The justification for merging subsistence and artisanal groups is that managers argued that the simpler the system, the better the chances of successful management, which was supported by Clark *et al.* (2002) highlighting that between 25 and 72% of the catch is generally sold across the spectrum of subsistence and artisanal fishers. Subsistence and artisanal fishers are likely to be managed by the same process, so there is little to gain from separating them (Branch *et al.* 2002a).

For the purposes of this study this wider definition will be used in the deliberations to assess the advantages and disadvantages of moving subsistence fisheries in South Africa to commercial fisheries.

According to South African legislation, a commercial fishery in South Africa is a fishery conducted with the aim of earning money for the entrepreneur, his company and its employees (South Africa 1997). Branch *et al.* (2002a) further defined commercial fishers as fishers fishing for profit and earning an income sufficient to meet more than their basic needs of life. They may employ staff or operate as profit-sharing collective groups, focus on resources that are managed by *TAC* (total allowable catch) or *TAE* (total allowable effort) and which have high value or can be caught in large quantities, and may use capital-intensive high-technology gear and methods of processing. The commercial fishing sector is divided into two subclasses, i.e. small-scale and industrial-scale commercial fishing. The characteristics of the classes of the fishing sector are detailed in Figure 2.

Third type of fishing in South Africa is recreational fishing. Recreational fishing is defined as fishing for enjoyment, for the sport or the relaxation it offers (South Africa 1997). Recreational fishers are said to be approximately 600 000. Subsistence fishers may be included in this number but the exact figure is unknown (DEA&T 2001a). Nonetheless, while it is difficult to quantify the recreational fishing value, its contribution to the South African economy must be substantial. These fishers receive rights to fishing through licenses and there are often high disputes and conflicts arising between them and subsistence fishers. Recreational fishers often use high tech equipment such as ski-boats and engine boats, which clashes with the traditional fishing methods of subsistence fishers.

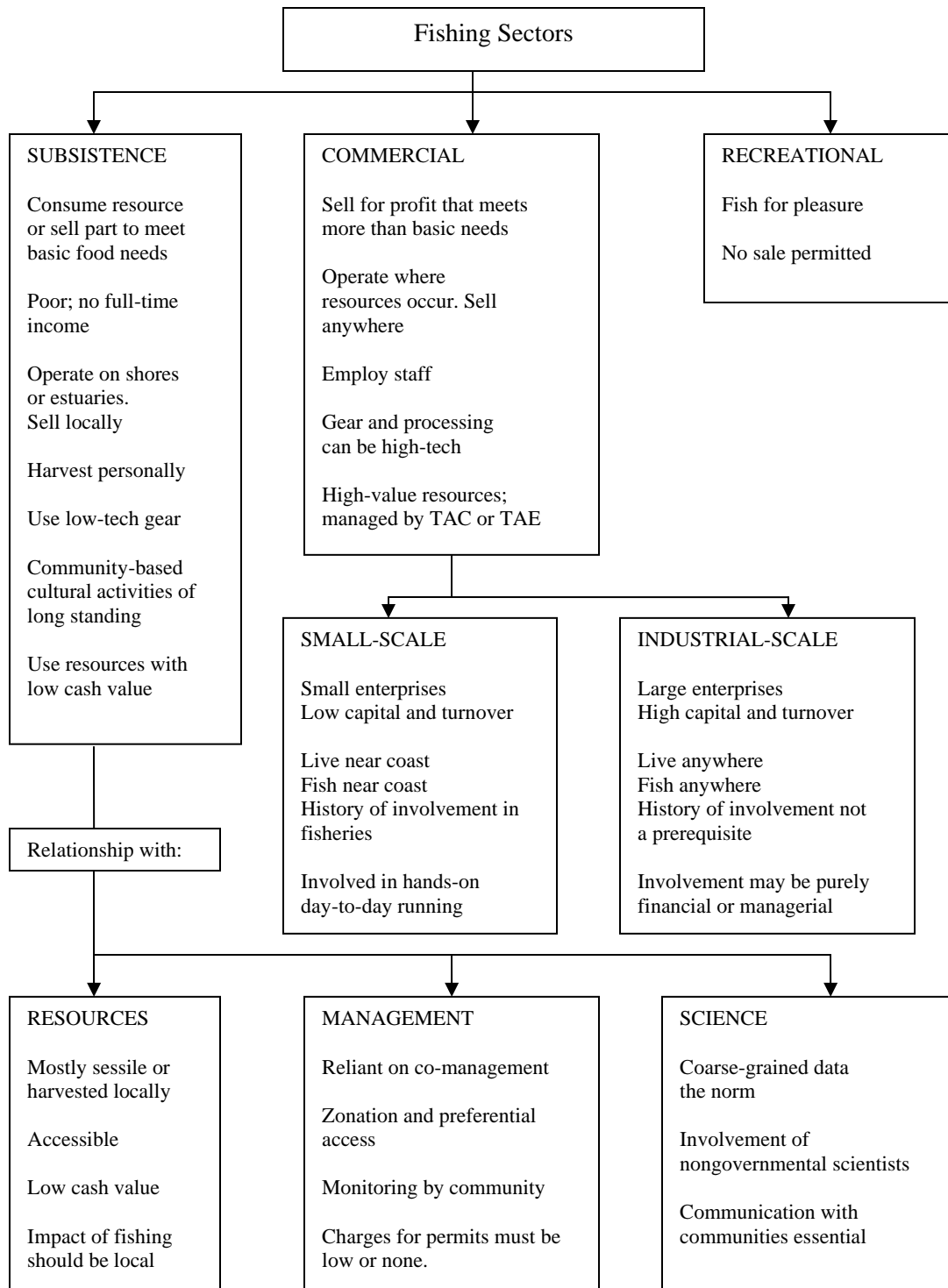


Figure 2: Synopsis of the characteristics of the fisheries sectors in South Africa: subsistence, small-scale commercial, industrial-scale commercial and recreational fisheries. The lower half of the diagram indicates the more specific relationship that exist between subsistence fishers, the nature of resources suitable for their use, and the management and research styles appropriate for their management. Branch *et al.* (2002b)

2.4 Fishing industry in South Africa

South Africa's exclusive fishing zone extends seawards from the coastline for 200 nautical miles and contains a variety of fish species. The cold waters on the western side of the country are highly productive and support large numbers of commercially important fish; including shoaling fish such as pilchard and anchovy, deep sea species such as hake, sole and kingklip, as well as stocks of rock lobster. The warm waters of the east coast support fewer fish of commercial importance, although the number of species that occur on this coast is much higher. The commercial fisheries of South Africa include (DEA&T 2002):

- The **demersal** (deep water) sector is South Africa's most valuable commercial fishery and is worth over R1.4 billion annually. The mainstay of the fishery is the two Cape hake species, *Merluccius capensis* (shallow water hake) and *Merluccius paradoxus* (deep water hake). However, as in many trawl fisheries, other species are caught either as by-catch or as targeted species. Many of these, including sole, kingklip and monkfish, are highly prized by consumers and their unit price is often greater than that of hake. There are currently 61 vessels engaged in deep-sea trawling with harvest value of approximately R750 million. The industry supports 5 790 employees.
- The **pelagic** fishery is South Africa's second most valuable fishery. Although pelagic catches far outweigh demersal catches, pelagic fish have a lower unit price, being used for canning, fishmeal and oil. Pelagic catches fluctuate from year to year and are largely dependent on environmental conditions. During 2000 and 2001 populations of pilchard and anchovy were at record levels of 447 150 tons. The pelagic industry supports approximately 7 800 employees and has 65 purse-seine vessels engaged with a total value of approximately R490 million per annum.
- South Africa's commercial **rock lobster** fishery is based on two species, one on the south coast and one on the west coast. The latter is caught inshore by traps and hoopnets deployed from small vessels and the former is a deep water species caught by means of long lines of traps set by larger vessels. Approximately 2000 tons of rock lobster are caught and marketed by South Africa every year. The rock lobster fishery is worth approximately R290 million per annum, supports approximately 4300 employees and has 303 vessels engaged with an approximate value of R200 million.
- The **squid-jigging** fishery is based in the Eastern Cape Province where between 2 000 and 10 000 metric tons of the chokka squid (*Loligo vulgaris reynaudii*) are harvested annually. This fishery supports 2500 employees and is worth approximately R240 million per annum. There are 120 vessels engaged in squid fishing with a total value of approximately R152 million.
- Catches in the **commercial line fishery** peaked at 20 000 tons in the late 1960's but has since then declined steadily. Approximately 13 000 tons of line fish species, such as yellowtail, snoek, kob and reef fish are harvested. The line fishery is worth approximately R130 million per annum. There are 56 vessels

engaged in line fishery with a value of approximately R750 million per annum, employing 900 people.

- The **commercial abalone** fishery is one of South Africa’s most valuable fisheries per unit of harvest. It is based on the south coast and approximately 500 tons of abalone are harvested every year but an escalation in illegal fishing is having a detrimental affect on the resource. The abalone industry is worth approximately R70 million per annum. There are 100 vessels engaged in abalone fishing with a value of approximately R25 million. This industry supports 950 employees.
- **Mariculture** accounts for less than one percent of South Africa’s seafood production, but a recent study in the cultivation of abalone has shown that the industry has a high growth potential. South Africa also farms oysters and mussels mostly for local markets.

The South African fisheries management system is based on a quota allocation system whereby the total allowable catch (TAC) is determined by the Minister. The Minister is the final authority on the issuing of permits and allocation of fishing rights. Rights are not transferable without authorization, therefore the property rights in fishing excludes permanence. Table 2 shows the TAC recommendations from Marine and Coastal Management in recent years.

Table 2: South Africa total allowable catches (tons) 1999-2002 for important species. (Fishing Industry Handbook 2002).

	1999	2001	2002
Hake	149 000	154 351	155 695
Sole	872	872	784
Pilchard	125 985	159 685	***
Anchovy	123 000	375 811	***
Horse Mackerel		21500	28350
West Coast Rock Lobster	1 700	1 587	1 513
South Coast Rock Lobster	377		340
Abalone	500	371	388

0 = No data available

2.4.1 Total production and trade

The total annual catch fluctuates depending on the catches of pelagic fish, in particular on those of anchovy. The total commercial catch in 1999 was approximately 572 000 metric tons at a wholesale value of approximately R2 billion. A breakdown by main industry sectors catch is given in Figures 3 and 4.

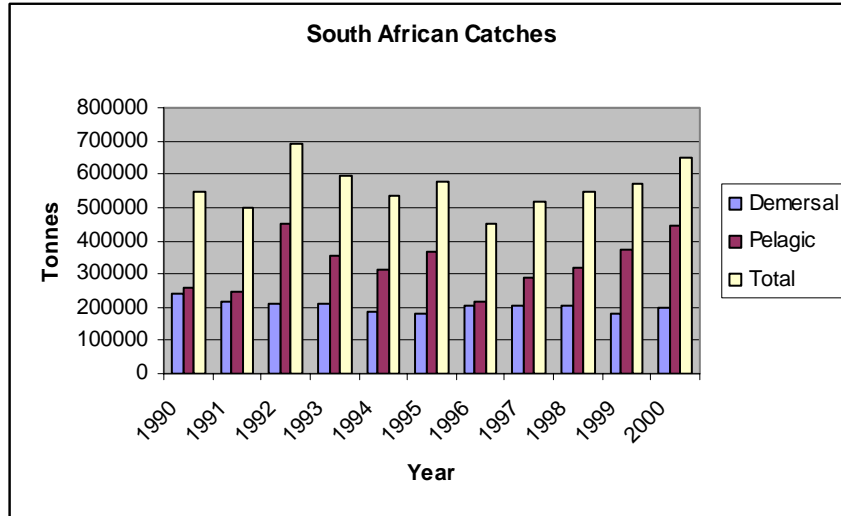


Figure 3: South African catches for demersal, pelagic and total fisheries: 1990-2000. (Fishing industry handbook 2002)

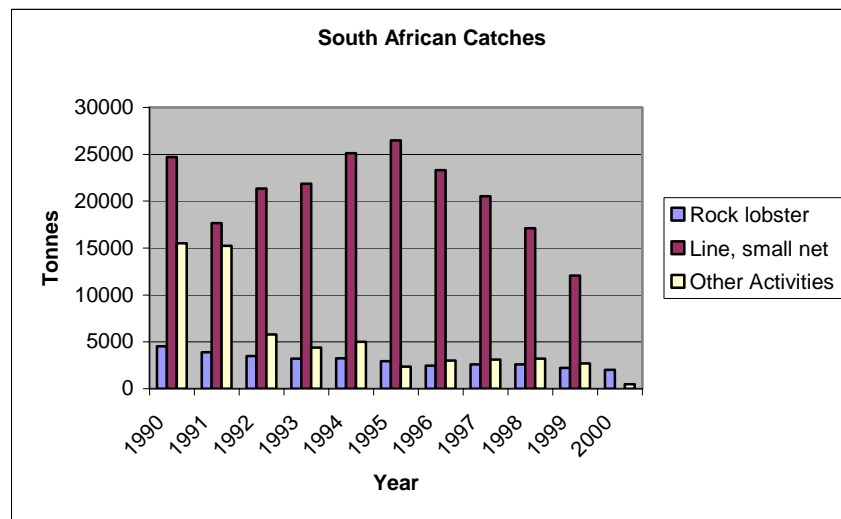


Figure 4: South African catches for rock lobster, line/small net and other (prawn, abalone, seaweed) fisheries 1990-2000 (No data available for line or small net fisheries 2000). (Fishing industry handbook 2002)

Demersal fish contributes approximately 52% of the wholesale value of total fish caught compared to 21% for pelagic fish and 25% for other marine species (DEA&T 2001a) (Figure 5). The commercially most valuable species is hake while the highest species by volume are the pelagics (anchovy and pilchard) (Figure 6).

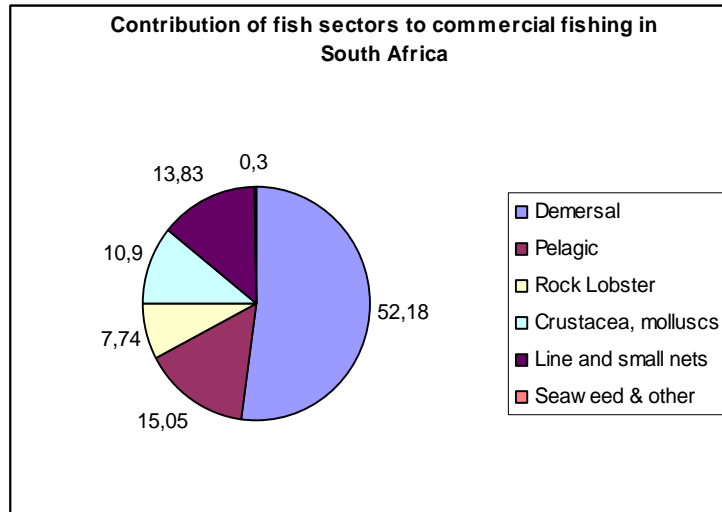


Figure 5: Contribution of fish sectors to commercial fishing in South Africa (DEA&T 2001a)

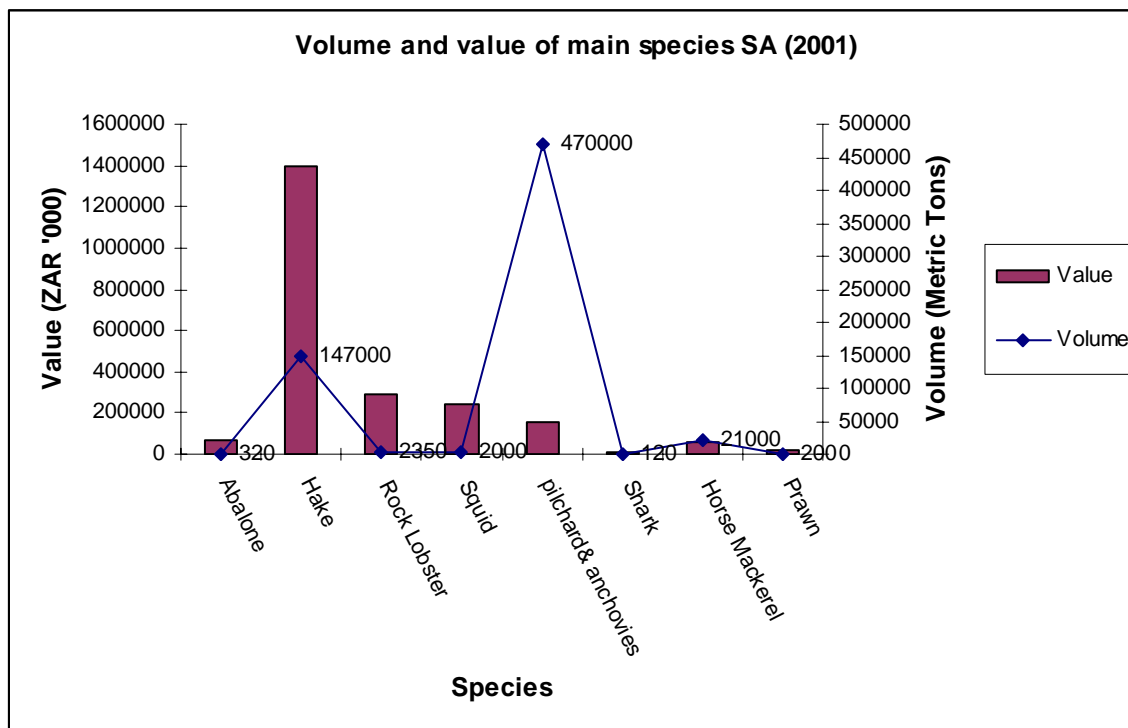


Figure 6: Volume and value of main species production in South Africa 2001 (Extrapolated most recent data from: Fishing Industry Handbook 2002, DEAT 2002)

The bulk of the fisheries production is consumed domestically, although the average *per capita* consumption of fish products in South Africa is relatively low compared to that of other fishing nations (Sjoholt 1998). The last available survey that took place was in 1996 and it showed a total fish consumption of 4,6 kg per capita in South Africa. The sector is,

however, also characterized by its substantial level of international trade, resulting in a significant net contribution to foreign exchange (Figure 7). The main export countries for seafood of South Africa in order of highest volume and revenue accrued in 2001 was Spain, Italy, USA, Australia, France, Portugal, United Kingdom (Fishing Industry Handbook 2002). South Africa competes on the same hake markets with countries such as Argentina, Namibia, and Chile. South Africa has seen a huge increase of export in volume during 1999-2001, probably due to the increase in the pelagic catch (Figure 7). Table 3 gives an overview of the people that are employed in the various sectors of the South African fishing industry.

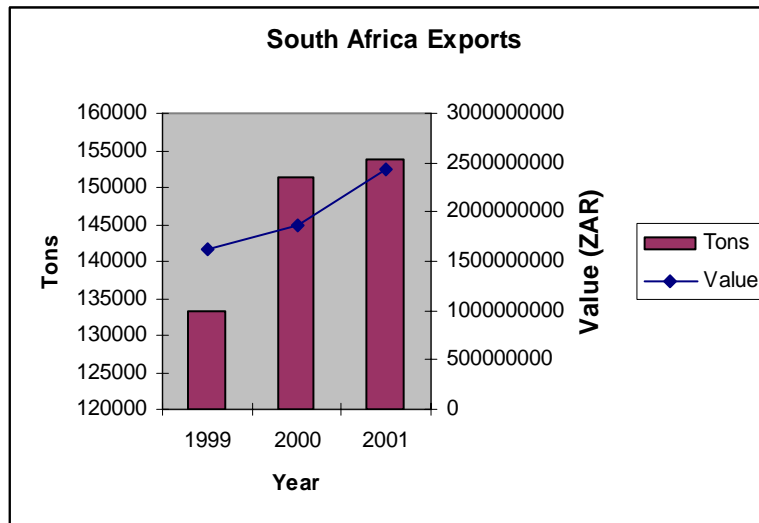


Figure 7: Total seafood exports from South Africa, 1999-2001. (Fishing Industry Handbook 2002)

Table 3: Estimated employment in the fishing industry in South Africa (DEA&T 2002)

Primary sector (including aquaculture)	27 000 (approximately)
Secondary sector (includes an estimate of artisanal, subsistence and semi-commercial fishers)	100 000 (approximately)
There are an estimated 600 000 recreational fishers	

2.5 Subsistence fishers, fishing areas, resource use and activities along the South African coast

A nationwide survey undertaken by the SFTG in 2000 provided an estimation of subsistence fishers and their activities along the South African coast. Numerous other studies have been undertaken on subsistence fishing activity but all have focused on relatively small areas, mostly along the east coast (Clark *et al.* 2002) or on the West Coast (Sowman *et al.* 1997). Current understanding of subsistence fishing in South Africa is based largely on this research.

The coastline of South Africa was divided into eight regions and the boundaries of each region defined (Figure 8 and Appendix 1):

Region A	Namibia border to Olifants River
Region B	Olifants River up to and including Hout Bay
Region C	Hout Bay to the Breede River
Region D	Breede River to the western boundary of Tsitsikamma National Park
Region E	The western boundary of Tsitsikamma National Park to Kei river
Region F	Kei River to Mtamvuna River
Region G	Mtamvuna River to Umvoti River
Region H	Umvoti River to Moçambique

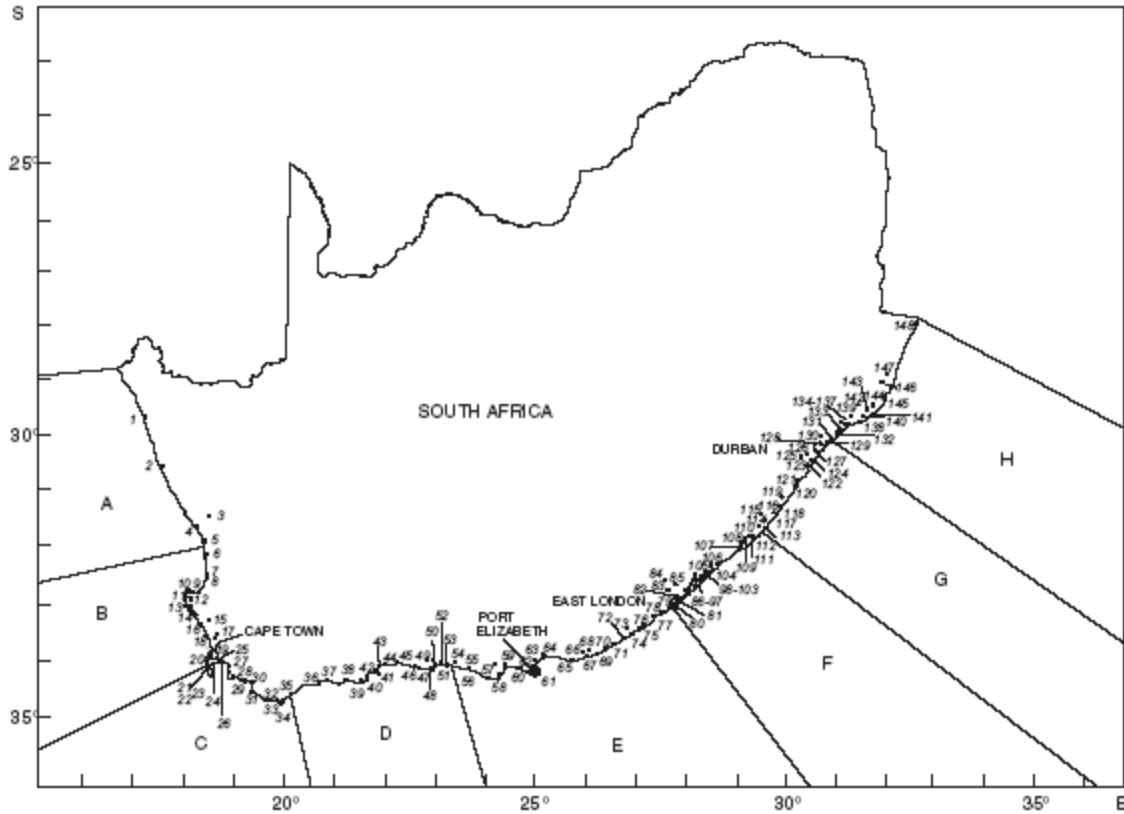


Figure 8: Map showing eight regions (A-H) and the locations of subsistence fishing communities in South Africa (SFTG 2000)

The estimated total number of subsistence/artisanal fisher households in the country, calculated from the number of households in each identified community, amounted to 28 338 (Clark *et al.* 2002) with an estimated 170 028 people relying on subsistence activity, assuming 6 persons per household (Table 4).

Table 4: Breakdown of the number of communities and number of households and subsistence fishers identified in eight regions along the South African coast (SFTG 2000)

Region	Number of communities identified			Number of households	Number of subsistence fishers	Estimated no. of dependents
	U	R	Total			
A	1	4	5	458	411	2 748
B	4	12	16	643	675	3 858
C	7	6	13	1 272	1 352	7 632
D	10	8	18	1 424	1 269	8 544
E	12	14	26	1 452	1 031	8 712
F	0	33	33	4 239	4 830	25 434
G	7	10	17	18 399	16 811	110 394
H	1	18	19	1 346	1 959	8 076
Total	42	105	147	29 233	28 338	170 028

U = Urban; R = Rural

Geographically there are shifts in the type of fishing that takes place. Subsistence fishers harvest includes an array of different species of wide different unit values viz, rocky-intertidal vertebrates, sandy beach invertebrates, estuarine invertebrates, seaweed and fish from intertidal, immediate subtidal or nearshore areas in marine or estuarine environments (Figure 9). The main subsistence species harvested are mussels, octopus, rock lobster, sand and mud prawns, limpets, redbait, the alikreukel or giant periwinkle, worms and abalone (Branch *et al.* 2002a). Of particular importance to the topic of subsistence fisheries are the inshore resources such as rock lobster and abalone, which are accessible and can be harvested without recourse to high-technology, capital intensive equipment, but yield high financial returns. Rock lobster (*Jasus lalandii* and *Panulirus homarus*), abalone (*Haliotis midae*) and oysters (particularly *Striostrea margaritacea*) are classified as high value resources. Such species are not usually consumed by the fishers themselves (Cockroft *et al.* 2002). There is a high controversy surrounding these high value resources that are harvested by subsistence fishers. Abalone and rock lobster are heavily exploited or overexploited and poaching is rife (Hauck and Sweijd 1999). Previous attempts to create subsistence rights for these species were not a success, mainly because appropriate systems of management and monitoring were not developed and no market supply-lines or support structures were established. Nonetheless, although considered high value resources, abalone and rock lobster were allocated to ‘subsistence’ resources in 2001. These allocations were part of a pilot study to assess the feasibility of granting high value rights to subsistence fishers (Appendix 2). On the western and southwestern coasts the number of people involved in subsistence fishing is relatively small, and many of them focus on resources that yield high-cash returns, particularly abalone and rock lobster. These species are at present still harvested by subsistence fishers either legally or illegally and are sold at a low price because of limited allocations, seasonal availability, markets, lack of infrastructure and the added pressure of the law that prohibits subsistence fishers from selling their catch beyond 20 km of the coast (South Africa 1998). The eastern coasts are characterized by great poverty, low education, limited access to facilities (health), high unemployment levels and lack of infrastructure that makes the reliance on accessible marine resources higher.

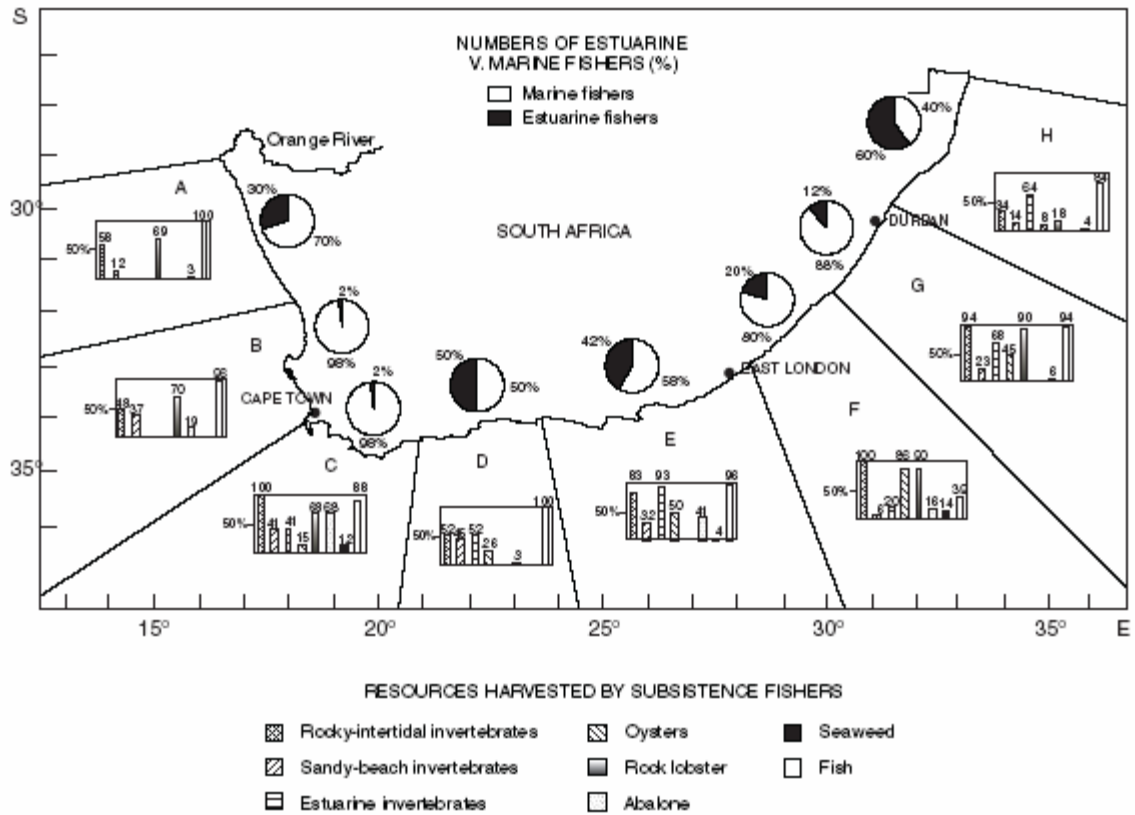


Figure 9: Indications of the proportions of marine and estuarine fishers, and importance of the various resources to subsistence fishers in each of the eight regions (SFTG 2000).

3 TECHNIQUES TO JUDGE WHETHER SUBSISTENCE FISHERIES ARE READY FOR COMMERCIALIZATION

Relatively little literature is found on the topic of moving subsistence fisheries to commercial fisheries. Commercialisation inherently draws the reality that while certain communities are ready for the transition, others are not prepared for it. This is very realistic given the high variation of culture, education levels and infrastructural differences that occur along the South African coast. Another added disadvantage is that the more isolated the communities are from support structures, the more difficult it is for people to access jobs or towns. A group of fishers are ready for commercialisation when there are good odds that they will benefit from it. If the term commercialisation is regarded as being the gateway or accessibility to trade by removing some restrictions, then the odds are probably at an improvement and cannot be less than operating at a subsistence level without it.

For this project to outline possible criteria that could be used to judge whether subsistence fishers are ready for commercialization it is necessary to revisit a few basic definitions: a subsistence fisher is a fisher that fishes for own consumption. A subsistence fishing community is a group of such fishers and associated activities (inputs, outputs, processors, traders, gear-makers, bakers etc.). Commercial fishers sell their catch for a profit and commercialization is converting subsistence activities into commercial activities.

3.1 How does this fit with the South African reality?

It helps to visualize the situations of fishing as lying on a continuum from pure subsistence fishers to pure commercial fishers. The South African reality is that there are few pure subsistence fishers as most trade to a certain extent. The law limits their trading to 20 km of the port or landing place. South African subsistence fishers are not entirely at the end of the subsistence scale (Figure 10). In South Africa the legal classification of subsistence fishers ranges from pure subsistence fishers to semi-commercial fishers. They are generally poor and are generally close to the pure subsistence fisher end of the scale. The administrative problem is whether or not to lift the 20 km restriction. In Europe most of the fishers are commercial but only a few are pure commercial fishers. Most are found to the far right hand side of continuum (Figure 10). (Hauck *et al* 2002).

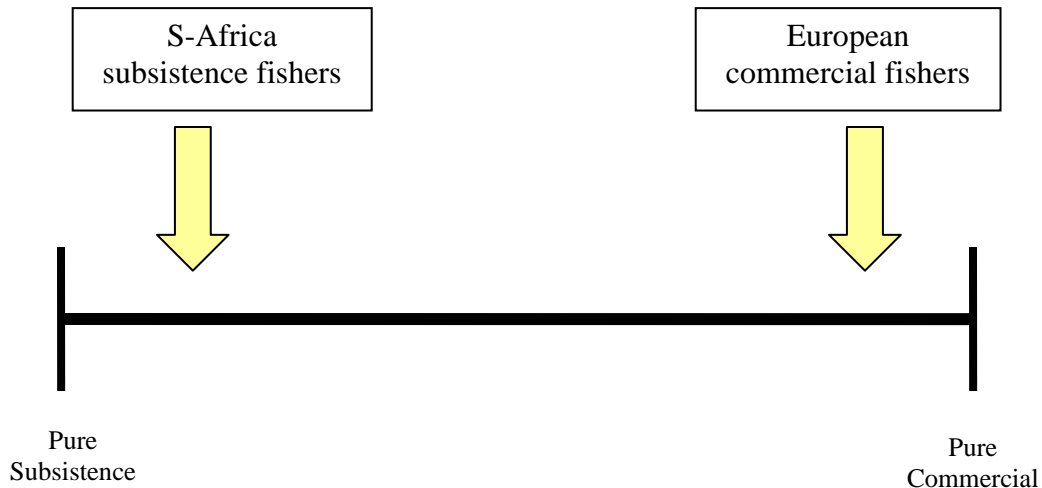


Figure 10: Subsistence to commercial fishing continuum.

Many South African subsistence fishers seek to break the legal constraint. This is an indication that subsistence fishers want to move to commercialization. The main administrative question is therefore, whether to allow commercialization. Commercialization in this regard implies increased access to trade.

The objective for encouraging commercialization is to maximise welfare. Therefore, if the intent is to increase welfare for the people in South Africa the GDP should count and generally anything that increases a country's GDP is good. Commercialisation increases the GDP by expanding what is known in economics as production consumption possibilities. To substantiate this theory a few basic economic concepts needs explanation. In this case an aggregate measure of GDP is referred to, keeping in mind that factors such as environmental damage (e.g. pollution) and distribution are constant for the purposes at hand. In addition, if commercialisation increases efficiency, there is a strong recommendation to adopt it, but commercialisation almost always does exactly this (unless prices are truly false or distorted or if the resource misuse increases).

The basic theory of welfare is that individuals have a utility which is a state of well-being. In a society individual utilities may have a positive or negative impact on the welfare of the society. Maximization of social welfare in an economy can be divided among consumers in various ways. Each such allocation generates a utility for each individual. Social welfare is assumed to be a strictly increasing function of each of these utilities. It follows that any allocation that maximises social welfare must necessarily lie on the boundary of the utility possibility frontier. Therefore social welfare may be taken to depend positively on individual utilities.

3.2 When will commercialization increase welfare?

3.2.1 Production Possibility Sets.

The Production Possibility Set (PPS) defines production possibilities (*Layard and Walters 1978*). This PPS is defined by a curve and production can occur at any point in or on the boundaries of this curve (Figure 11). The Production Possibility Frontier (PPF) represents the upper boundary of the production possibility set. If two goods are desirable one would never want to produce anywhere but at the frontier, so as to maximize the production opportunities. Technological progress, better production methods etc. expand the PPS and moves the PPF outwards in the direction of the arrow (Figure 11). Good economic management seeks to produce on the PPF and to expand PPS at the maximum rate (maximum economic growth).

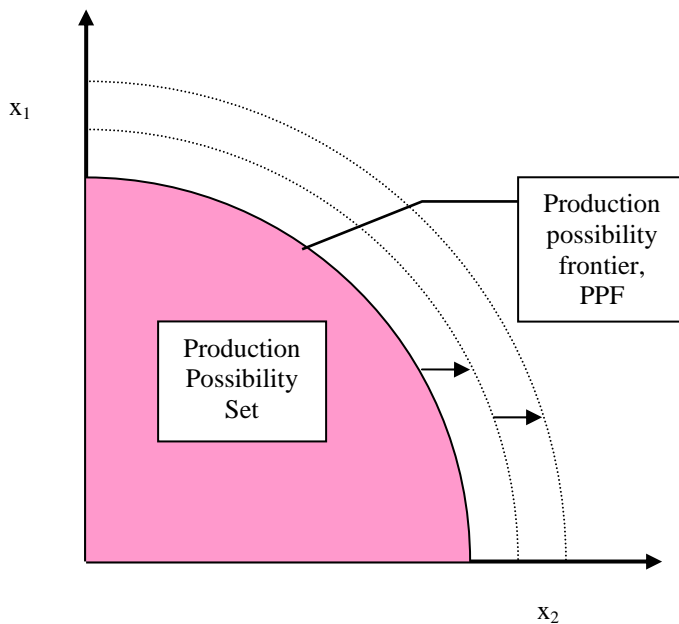


Figure 11: Production possibilities

3.2.2 Indifference Curves

Indifference curves are loci of constant utility. Utility increases with both goods. Good management attempts to maximize utility i.e. reach the highest utility curve (Figure 12). Figure 12 further illustrates that improvement of utility is in the direction of the arrow (Varian 1984).

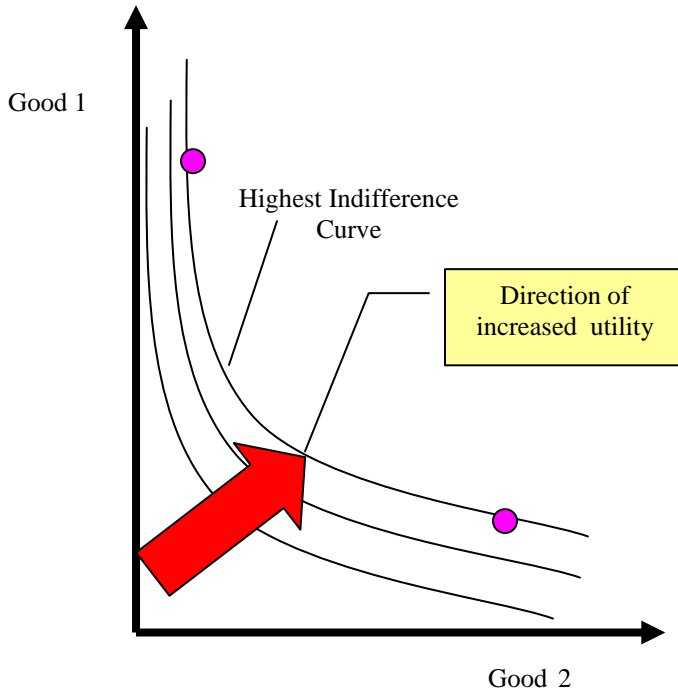


Figure 12: Indifference Curves

If two goods are desirable one would never want to produce anywhere but at the frontier, so as to maximize the production opportunities. To maximise utility you would want to be on any point on the production possibility frontier, not below it. Therefore, if two goods are desirable the maximum outcome given will be at the production possibility frontier. To determine the optimal point one needs to know what people like, what their preferences are and how much they like it. The highest social indifference curve for a society would be the one that is given for the production possibility set. The indifference curve would touch the production possibility frontier at the optimal point (OP) (Figure 13).

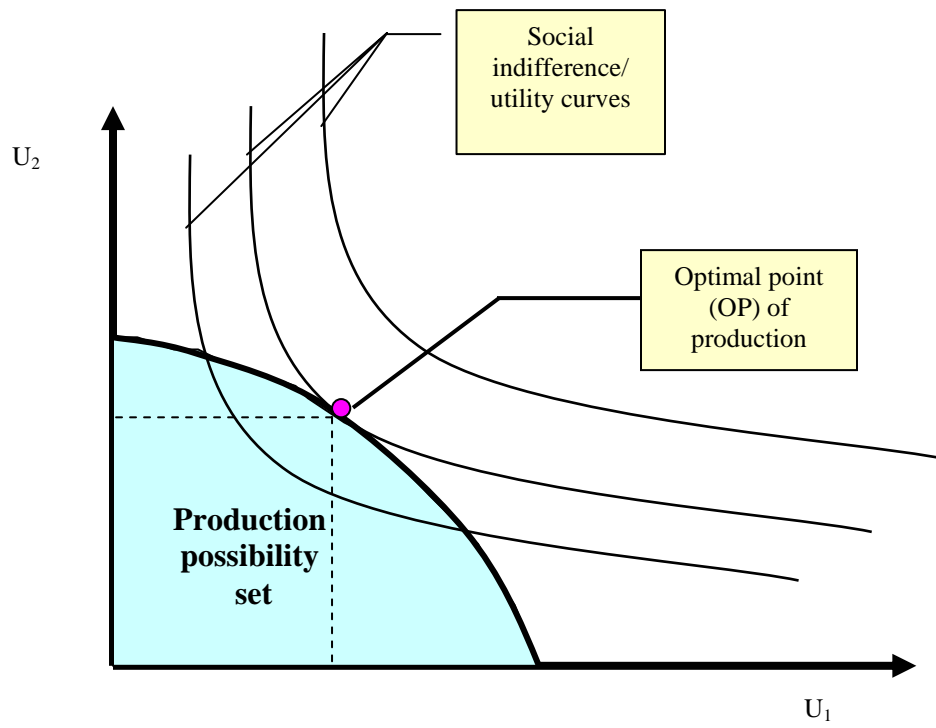


Figure 13: Indifference curves and production possibility sets (Varian 1984)

3.2.3 Trading lines

The trading line enables the exchange or trade of one good for another. One can trade on any point on this line for a combination of two or more goods. For example, x_0 & y_0 traded for x_1 & y_1 (figure trade line). Further if you want more of good y and less of good x you would have to give up some of x and therefore you would trade combination (x_0, y_0) for combination (x_1, y_1) (Figure 14). The lower the slope the more expensive good x is.

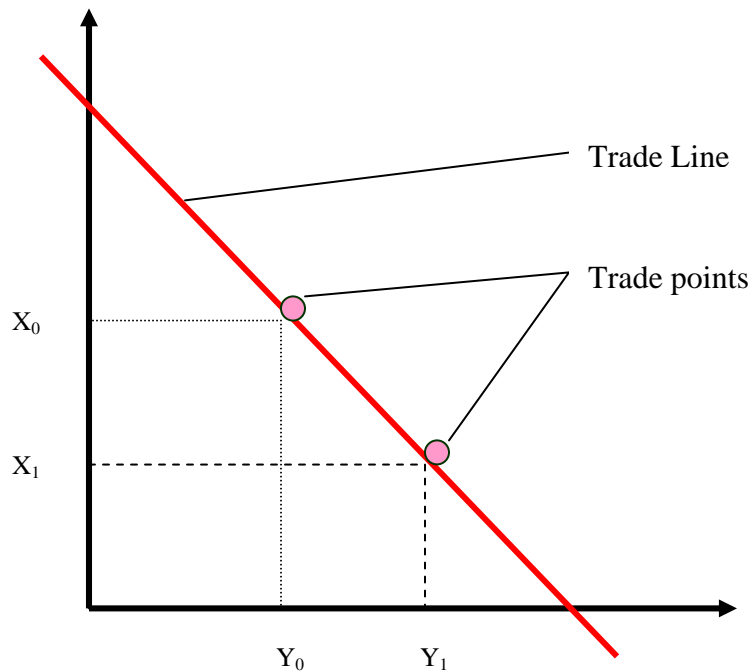


Figure 14: Trading line

3.3 How commercialization increases welfare?

Every society has a PPS that is limited by a PPF in nature and technology. Indifference curves are used to measure people's preferences and it increases in the direction of the arrow i.e. the highest indifference curve is above. Utilities remain constant, it is the indifference curve that increases (Figure 12). If one is not allowed to trade you have to consume all that you produce. The indifference curve would touch the production possibility frontier at the optimal point (OP). This is the best position at which to operate, if all that the people consume is what they produce. Therefore, at this point (OP): Production = Consumption = Pure subsistence fishing with no trading (Figure 15). When a trade line is brought in a combination of two goods could be traded along this line and there is an increase in the consumption possibility set (CPS) (Figure 15). You would want to produce now at a higher point than previously without trade (specialising in fish) but can now consume at a higher indifference curve than before. The arrow shows the movement to a higher indifference curve from IC1 to IC2 (Figure 15). This increase from the first indifference curve to a higher indifference curve is the benefits from trading.

Further, the new production point and consumption point shows that you no longer have to consume all that you produce. So if you are consuming the area of fish at the new consumption point and producing the fish at a new production point you would be able to trade or sell the difference of the area $x_p - x_c$ for the area $y_p - y_c$ of other goods. Thus we see that there are clear benefits from trade.

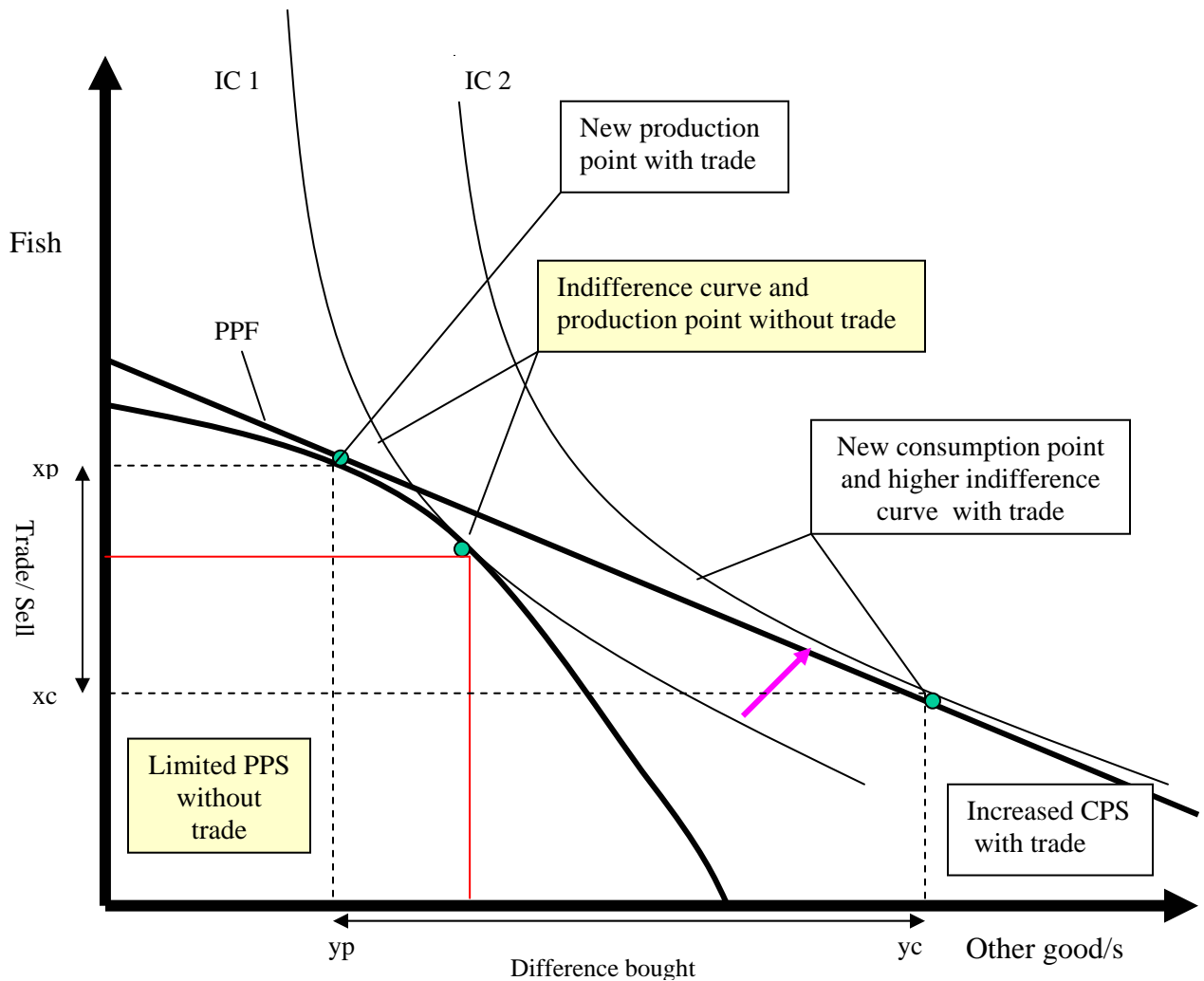


Figure 15: Utility gains from trade (Layard and Walters 1978)

In summary, commercialization means the ability to trade. The possibility of trade means that the consumption possibility set expands (one does not have to consume what one produces). This generally increases utility and hence welfare. So, according to the basic theory of trade in economics, commercialization increases welfare (Layard and Walters, 1978).

3.4 The trading model applied to subsistence fishers

Since subsistence fishers are not allowed to sell their catches outside 20 km from the port of landing, they are faced with a market barrier very much like the one countries sometimes meet in international trade. As a result, provided the restriction is binding, they will have to accept lower prices for their catches than would otherwise be the case. With restricted trade more fish is needed to exchange with other goods and thus a lower price of fish. With a steeper trade line (unrestricted trade) less fish is needed for more of the other goods, i. e. higher price of fish (Figure 16).

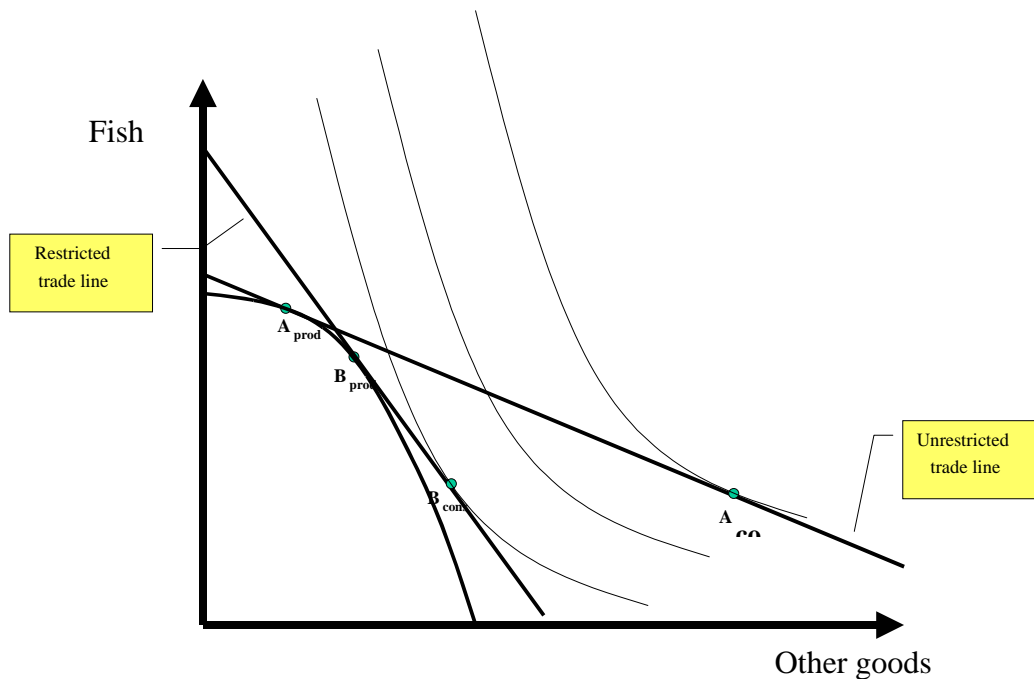


Figure 16: Subsistence fisher gains from trade

As can be seen from the diagram, unrestricted trade leads to increased specialization in fish production (A_{prod} instead of B_{prod}) and, more importantly, consumption at A_{cons} which corresponds to a much higher utility level than the restricted trade consumption level, B_{cons} (Figure 16). This result shows that subsistence fishers would in general benefit, *ceteris paribus*, from reduced limitation on their trading possibilities, i.e. commercialisation. This result is not surprising. It corresponds almost exactly to the traditional trade liberalisation argument in economic theory.

3.5 Trade and negative externality

In the case of fisheries there is a complicating factor. This is the common property problem giving rise to what is known as externality of fishing, excessive aggregate fishing effort and reduced fish stocks. These things get worse when the price of fish rises. The impact may be represented as a contraction in the PPF (Figure 17). This negative impact of fish stocks could easily be greater than the benefits of trade, all depending on how much the PPF contracts. So, even with trade one could have less benefit than without it (Figure 17).

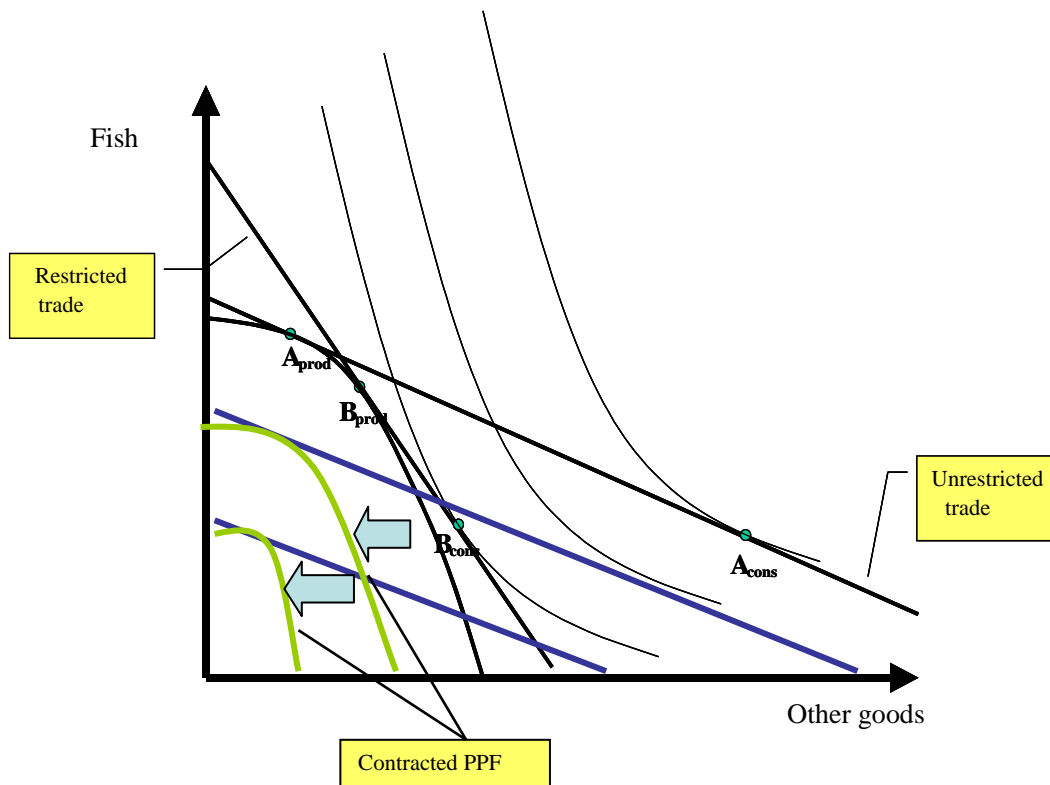


Figure 17: Trade and negative externality

To avoid this, a good fisheries management system with high quality property rights is needed. This works on the condition of *two theorems*, the *first* being that fisheries management (most likely through property rights) is necessary for increased welfare and *secondly*, if there is good fisheries management then the South African society will probably gain as a whole as more wealth will be created through trade by an increased GDP. So, the existence of a good fisheries management system guarantees that commercialisation increases welfare of subsistence fishers. There are three groups that are affected, the fishers, subsistence fishing communities and South Africa. The fishers almost always benefits and South Africa will definitely gain through trade economics.

However, there is no guarantee that the subsistence fishing communities will benefit. Who gains therefore depends on who has rights. By referring to fishing rights we imply high quality rights to the resource. It is important that the type of fishing right is of high quality because then commercialisation would increase the GDP, decrease the risk of social unrest, decrease the risk of “unfair” distribution and decrease the risk of destitution. A high quality fishing right needs to be linked to a “reasonable fishing management system” that can facilitate, manage and accommodate the right to maximum efficiency.

3.6 Fisheries management systems

The fisheries management regime is the institutional framework under which the fishing activity operates. This may be set by social custom and tradition, the government (the fisheries authority), the association of fishermen or by other means. In South Africa the fisheries management regime is set by the government. The fisheries management regime may be explicit or implicit. An appropriate fisheries management regime usually renders high profits, while an inappropriate management system renders no long term profits. There are essentially two types of fisheries management systems, biological fisheries management systems and economic fisheries management systems (Figure 18). The type of fisheries management systems are defined in Table 5.

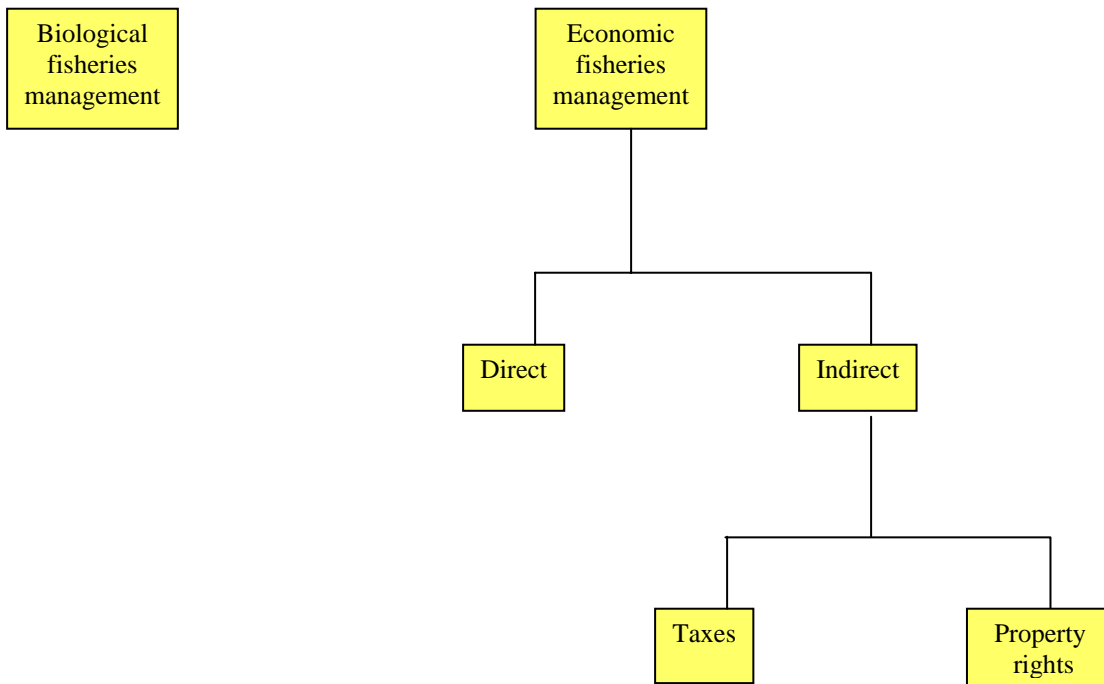


Figure 18: Fisheries management systems (Arnason 1996)

Table 5: The different types of fisheries management systems

Type of Fisheries Management System	Purpose	Methods	Common Measures	Summary
Biological Fisheries management systems	Increase the biological yield of the resource	Protect young fish, spawners and habitat	TAC, area closures, seasonal closures, gear and pollution restrictions	May conserve the resource, may increase the sustainable yield, probably generates a net economic loss.
Direct Economic Restrictions	Enhance the economic yield from the resource	Constrain fishing effort and capital	Limited fishing effort (days at sea, fishing etc.), capital restrictions (vessel size, power, shape, type, equipment), investment restrictions, gear restrictions (number size, type).	May conceivably conserve the resource, may increase catches, will most likely result in long term economic loss.
Indirect Economic Restrictions: Taxation	Obtain economic rents	Induce industry to reduce effort (in a wide sense) by making it less profitable	Variants include tax on the volume of the landings, tax on the value of the landings, tax on inputs	In practice it is virtually impossible to calculate the “correct” taxes, probably difficult to change tax on short notice when conditions change, socially unpopular, taxes are likely to entail a painful adjustment period. It is difficult to severely mismanage a taxation regime, the tax revenue should represent pure fisheries rents.
Indirect Economics restrictions: Property Rights	Obtain economic rents	Reduce or eliminate the common property externality and private incentives coincide with public objectives.	Variants include: licences, sole ownership, TURF’s, IQ’s/ ITQ’s, communal property rights	The efficiency of the regime depends on the quality of the right (the higher the quality of the property right the more efficient the fishery), the property rights have important attributes viz., security, exclusivity, permanence and transferability as applicable.

The above shows that economic fisheries management systems should be employed and that biological management systems should support it. Currently for the larger part of South Africa the main fisheries management system used is property rights under individual quotas. Subsistence fishers in South Africa do not have individual quotas but operate under fishing permits or licences.

3.7 Distribution and Efficiency

Commercialisation results in increased fishing effort and a decrease in the fish stocks, less labour and almost certainly a higher price of fish (Varian 1984). When fisheries become commercialised it would make sense that most trading and secondary processing would now be done elsewhere. In a fishing community, higher priced fish means that locally it would now not be as easily available. Distribution is a social and political issue, if sufficiently “unfair” and coupled with “unfair” radical reorganisation it can lead to social upheaval and political problems that may exceed the gains. Therefore, it is necessary to take care of distribution from the outset. Losses such as these could negatively impact the welfare or GDP. This could be avoided if the community is given rights as a whole under a co-operative agreement operating the high quality resource. This guarantees that all community members benefit through the common property. However, the weighted figure of which individuals’ gain more still holds. A group of people with property rights has a degree of common interest (Arnason 1996). The theory is that if each group member’s benefits increase with total benefits he will support the common good. It is important to draw the reality that overall gain does not imply that everyone will benefit. Even if the GDP increase the process can still lead to social unrest if the benefits are unequally distributed. This distribution must be ensured from the outset; otherwise all efforts may be for nothing.

The allocations of fishing rights to a community are collective rights to groups of harvesters, resulting in individual rights. This specific community fishing right needs to be well defined against encroachment from outsiders. This is important otherwise individual rights cannot be well defined because the overriding right on which the individual right depends is not defined. *Theorem 3*: The appropriate allocations of rights and education will achieve the desired distribution of wealth. This brings us to the criteria for distinguishing when a subsistence fishing community is ready for commercialisation.

3.8 The criteria for distinguishing when a subsistence fishing community is ready for commercialisation:

- 1) Good Fishery Management Regime (based on high quality rights with legal guarantees)
 - To guarantee an increased GDP.
- 2) “Fair” allocation of rights
 - This would be related to the aforementioned guaranteeing that most individuals benefit.
 - It based upon what people consider to be fair socially because if sufficiently “unfair” it can be destroyed.
 - Process needs to be acceptable socially, politically, economically.
- 3) Strong community or social organisation?
 - The communities are going to manage the fishery and will not do this well if they do not have strong and well organised skills.

- The people who are involved in the fisheries are to be the decision makers and this requires good organisation.
 - The community social organisation needs to at least be established locally to support those negatively effected by the change.
- 4) Good knowledge and understanding of (a) fishery and fisheries economics, (b) the implications of commercialisation and (c) the value of rights.
- This is derived from the fact that even if the community is strong and well organized but does not have the appropriate knowledge and understanding it will not be able to make good decisions regarding the rights. Therefore basic education of the environment, resource, biology, compliance and value of rights is needed. The community must have the same level of understanding as the current decision making authorities to convince them that it is capable of managing the resource efficiently.

These are the criteria that will distinguish whether communities are ready to move from subsistence fishing to commercial fishing. All the criteria need to be met to support the change from subsistence to commercial fishing. Fishing communities that are identified with a good probability of succeeding in the transition could have some conditions imposed on them, at least for the initial period, from the fishing authorities. This should be done to protect them from encroachment and also to support improvement of social welfare. One possibility could include the communities having to serve as social welfare systems through the legislative framework and the government could impose this as a prerequisite condition. This ensures security in the community where they are forced to directly invest and members benefit in a community social organization which also attributes to the common good.

Commercialization inherently draws the reality that while some subsistence fishing communities are ready for the transition others are not prepared for it. Those communities that do not meet the criteria need to be assisted towards fulfilling the requirements. It is the responsibility of the governing fishing authority to identify communities that have the potential to move to commercial fishing. The communities need to be assessed according to the criteria and where they do not meet specific requirements support should be given towards fulfilling it. When all the criteria are met implementation should be the next phase and the responsible fishing authority needs to formulate a plan to drive this process.

4 HOW TO IMPLEMENT

If the recommended criteria as outlined in section 3 of this project is approved by the responsible fishing authority in South Africa, M&CM is the next logical step towards making it a reality. The first criterion outlined is a good fishery management regime that can support the transition of subsistence fisheries to commercial fisheries. Unlike many other African countries the fishing industry is structured in South Africa in such a way that the subsistence fishing sector will not evolve into the commercial fishing sector without a conscious decision supporting the transition. A subsistence fishery in South Africa is managed separately with regulations. Further the first criterion is adamant that the property right is of high quality and well defined therefore this warrants discussion.

There are different types of property rights including licences and permits, sole ownership, territorial user rights for fishing (TURFs), individual quotas (IQ's) and community or group rights. Subsistence fishers in South Africa operate under licences and permits. The efficiency of the fishery regime depends on the quality of the property right. The higher the quality of the property right, the more efficient the fishery will be. The quality of the property rights is measured according to the following attributes (Arnason 1996):

- Quality of title (security);
- Exclusivity;
- Permanence;
- Transferability.

The recommendation of this project proposes that if subsistence fisheries are to be commercialised in South Africa it would probably function most effectively through a combination of TURF's and community quotas. These property rights are recommended as the lobster or abalone resources are in effect semi to fully sessile marine resources (meaning that they do not move around too much) and should be effectively managed under community TURF's or community quotas where areas on the coast are allocated as community property. The recommended combination of TURF's and community rights for subsistence fishing communities that are ready to move to commercial fishing will have strong security and exclusivity attributes. Further, these property right needs to be well defined as a guard against encroachment from outsiders.

De Soto (2001) is convinced that the problem surrounding property rights is that they are not well defined. De Soto notes that the poor in under-developed countries have assets, but that their real property is often owned informally, and thus cannot be used to generate capital. As a result, the crucial role of real property is simply absent in under-developed countries. He proposes the obvious solution, formalization of informal property rights and notes that acquisition of property through informal means (squatting) has a history in the United States and other developed nations. De Soto understands that formalisation will be politically difficult, but points out that both rich and poor will benefit economically. One might call it "trickle up economics." The policy implications are that such issues as structural inequalities of wealth and power, the redistribution of assets and economic opportunities and the radical restructuring of economic sectors, must be seen as central.

This project recommends that if subsistence fisheries in South Africa are moved to commercialisation that the subsistence fishers themselves manage the resource. It is important to realize that the community fishing rights do not constitute a fisheries management regime. It is merely a delegation of the authority to manage the fishery to the community. The members of the community are still faced with the fundamental problem of designing and implementing a good fisheries management regime. This is exactly the point where the fishing authority needs to act as catalysts to driving the process by means of vigorous facilitation, communication, consultation, explanation, interaction, training and capacity building programmes with subsistence fishing communities. Implementing procedures to support moving subsistence fisheries to commercial fisheries requires an active involvement and participation of a number of stakeholders and agents. These agents and stakeholders include government (national, provincial and local in South Africa), training agents and subsistence fishers. An integrated participatory process as represented in Figure 19 will ensure that the transition is accomplished successfully.

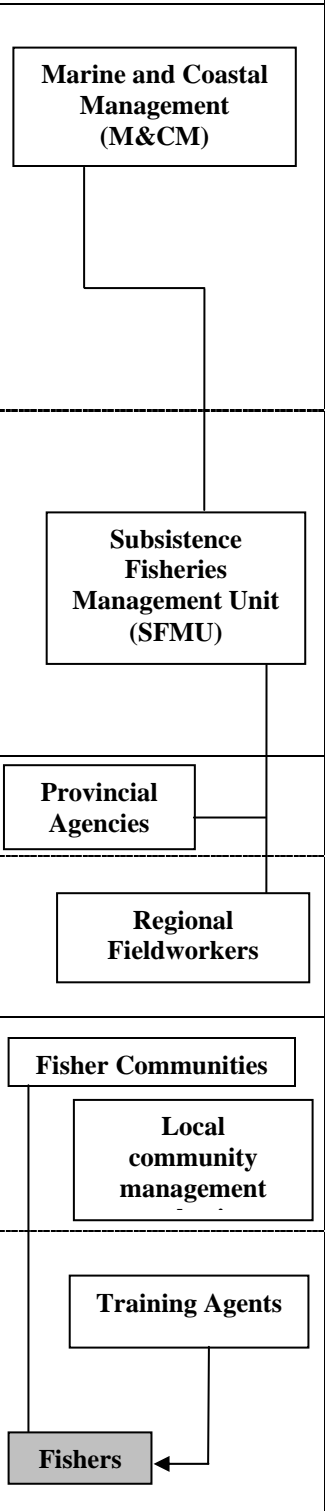
AGENTS OR STAKEHOLDERS	ROLE
 <p>Marine and Coastal Management (M&CM)</p>	<ul style="list-style-type: none"> ▪ Approve qualifying criteria for moving subsistence fisheries to commercial fisheries. ▪ Revise the fisheries management regime to accommodate the change (legal process). ▪ Develop policy. ▪ Approve the recommended communities ready for the change to commercialization as advised from the SFMU. ▪ Appoint officials necessary to manage specific communities ready for commercialization. ▪ Approve and issue the long term property rights as advised by the SFMU. ▪ Legalize process with communities.
<p>Subsistence Fisheries Management Unit (SFMU)</p>	<ul style="list-style-type: none"> ▪ Co-ordinate and manage all activities. ▪ Provide recommended criteria to upper management of MC&M. ▪ Identify subsistence fisheries in S. A. with potential to move to commercialization. ▪ Formulate a plan to support the process of moving subsistence fisheries to commercialization. This includes: budget, timeframe and recommended staff appointment. ▪ Recommend the type of property rights to be granted to subsistence fishing communities (TURF's & or community quotas). ▪ Issue community rights.
<p>Provincial Agencies</p>	<ul style="list-style-type: none"> ▪ Provide support to MCM. ▪ Appoint officials to work with communities.
<p>Regional Fieldworkers</p>	<ul style="list-style-type: none"> ▪ Co-ordinate provincial activities. ▪ Assist and report on preparatory procedures of NGOs, project staff and consultants. ▪ Facilitation and conflict resolution.
<p>Fisher Communities</p> <p>Local community management</p>	<ul style="list-style-type: none"> ▪ Agree to moving subsistence fisheries to commercialization. ▪ Support the process by co-operating with implementation agents. ▪ Enter a legal agreement with M&CM. ▪ Formation of a community trust (social welfare system).
<p>Training Agents</p> <p>Fishers</p>	<ul style="list-style-type: none"> ▪ Training targets include: fishers, local community management structures, community monitors, field management staff and regional fieldworkers. ▪ Key training needs include: Legal aspects; Basic fisheries management principles; Basic fisheries economics and business; Understanding of the environment and sustainability; Understanding of the law that protects resources and the conditions of rights; Knowledge of sanctions imposed with penalties and why;

Figure 19: Recommended procedures to implement the change from subsistence fisheries to commercial fisheries in South Africa: agents, responsibilities and actions.

The fundamental economic rationale for allocating community fishing rights is that the community is better improving the efficiency of the fisheries than the government. Increased efficiency may stem from three main sources as outlined by Arnason (2003):

- First it is possible that the community will be able to better manage the local fishery than the central authority.
- Second, it is possible that the community may be able to enforce whatever fisheries management it chooses to impose more effectively and less expensively than the central authority.
- Third, community management of fisheries represents the devolution of power from the government to a much smaller community of fishers.

The recommendation is to empower fishing communities and the best possible way to do this is through the allocation of community rights. This fishery right is more specifically a collective property right. This means that the community has the right to manage these rights within its own confines and can allocate rights to members, set rules for harvesting and enforce these rules. Further it is recommended that the fishing community be as homogenous as possible by consisting exclusively of vessel owners or individual fishing rights holders (Arnason 2003). It is of great importance that the benefits to individual members of the fisheries community be increasing functions of the aggregate benefits to the community as a whole (as demonstrated in section 3). If this is the case it is almost certain that the fishery will be as efficient as the quality of the communal property right allows. For maximum benefits the set-up for a community rights-based system must be carefully designed and the application tailored to each particular situation. Overall, this a social aim that most nations are striving towards, i.e. development initiatives for increased welfare.

5 CONCLUSION

The recommendation of this project proposes that if subsistence fisheries are to be commercialized in South Africa it would probably function most effectively through a combination of TURF's and community quotas. These property rights are recommended as the lobster or abalone resources are in effect semi to fully sessile marine resources and could effectively be managed under community TURF's or community quotas (Arnason 2004, Arnason 2003). The management system is such that it is the responsibility of the communities for managing their fisheries and not exceeding the allocations. In the case where communities exceed their allocated rights they should be sanctioned by government and it is recommended that high penalties be imposed. The importance of having good fisheries management regime is again exemplified. Economic efficiency in fishing can only be achieved by appropriate fisheries management regimes (Arnason. 2004) It is the responsibility of the fishing authority to identify subsistence fishing communities that show potential of moving to commercial fisheries and to formulate a plan of how to implement the transition. The implementation should include the participation of various stakeholders to drive the process of moving subsistence fisheries in South Africa to commercial fisheries. This project recommends that the subsistence fishers with boats participate on issues of fisheries management. Recognition is given to previous authors that are in agreement with these sentiments: The task of developing mechanisms to involve fishers in management decision-making falls in line with international and national trends to involve users in management... (Hauck, *et al.* 2002). Hara (Hara 1999) is convinced that critical to this approach is the recognition that no management scheme will work unless it enjoys the support of those whose behaviour it is intended to affect. (Jentoft 1989) furthers this argument by stating that management regimes are most effective if the resource users consider rules and regulations to be legitimate. However, people can only consider legitimacy if they are able to benefit from the resource, i.e. if they understand the value attached to the resource they will protect it and this project encourages the empowerment of individuals that are involved in the day-to-day fishing activity.

LIST OF REFERENCES

South Africa 1997. White Paper: *A Marine Fisheries Policy for South Africa*. Cape Town; Department of Environmental Affairs and Tourism: 46pp.

South Africa 1998. Marine Living Resources Act (Act No. 18 of 1998). *Government Gazette, S. Afr.* **395**(18930): 66 pp.

Arnason, R. 1996. Property rights as an organizational framework in fisheries. In B. L. Crowley (ed.). *Taking Ownership: Property Rights and Fishery Management on the Atlantic Coast*. Atlantic Institute for Market Studies. pp. 99-144.

Arnason, R. 2003. Community and Cooperative Fisheries Management: Possible Applications to Mediterranean Fisheries. In M. Spagnolo (ed.) *Conference on Fisheries Management and Multi-level Decision Systems: The Mediterranean Case*. IREPA. Salerno.

Arnason, R. 2004. Personal Communication: Professor of Fisheries Economics, University of Iceland, Reikjavik, Iceland.

Berkes, F. 1990. Native subsistence fisheries: a synthesis of harvest studies in Canada. *Arctic* **43**: 35–42.

Branch, G. M., May, J., Roberts, E. and Clark, B. M. 2002a. Case studies on the socio-economic characteristics and lifestyles of subsistence and informal fishers in South Africa. *S. Afr. J. mar. Sci.* **24**: 439-462.

Branch, G. M., Hauck, M., Siqwana-Ndulo, N. and Dye, A. H. 2002b. Defining fishers in the South African context: subsistence, artisanal and small-scale commercial sectors. *S. Afr. J. mar. Sci.* **24**: 475-487

Central Statistical Service, (CSS-SA). 2001. October Household Survey 1998: Central Statistical Service, Pretoria.

Clark, B. M., Hauck, M., Harris, J. M., Salo, K. and Russel, E. 2002. Identification of subsistence fishers, fishing areas, resource use and activities along the South African coast. *S. Afr. J. mar. Sci.* **24**: 425–437.

Cochrane, K. L. 1995. Anticipated impacts of recent political changes on fisheries management in South Africa. *Naga* **18**(1): 4–8.

Cockroft, A. C., Sauer, W. H. H., Branch, G. M., Clark, B. M., Dye, A. H. and Russell, E. 2002. Assessment of resource availability and suitability for subsistence fishers in South Africa, with a review of resource management procedures. *S. Afr. J. mar. Sci.* **24**: 489-501.

Department of Environmental Affairs and Tourism (DEA&T). 2001a. *Coastcare Fact Sheet Series: An initiative of the Department of Environmental Affairs and Tourism towards the implementation of the White Paper for Sustainable Coastal Development in South Africa*. Marine and Coastal Management: Cape Town, South Africa.

Department of Environmental Affairs and Tourism (DEA&T). 2001b. *Research highlights 2000-2001, No. 10*. Marine and Coastal Management: An annual publication reporting on research of the past year together with a preview of some to be undertaken. Eds., Naidoo, A. D. and Verheye, H. M. Creda Communications: Cape Town, South Africa.

Department of Environmental Affairs and Tourism (DEA&T). 2002. *Measuring transformation in the South African fishing industry: Where have all the fish gone?* Formeset Printers: Cape Town, South Africa.

De Soto, H. 2001. *The mystery of capital*. Basic Books Publishers, USA.

Fall, J. A. 1990. The division of subsistence of the Alaska Department of Fish and Game: an overview of its research program and findings: 1980–1990. *Arctic Anthropol.* **27**(2): 68–92.

Fishing industry handbook (South Africa, Namibia and Mozambique). 2002. 30th edition, Technical editor, Jones, J. S. Cape Town, South Africa: George Warman Publications.

Glavovic, B. C. 2000. *Our Coast, Our Future: A New Approach to Coastal Management in South Africa*, Cape Town: Department of Environmental Affairs and Tourism.

Glazewski, J. 2000. *Environmental law in South Africa*. Butterworths, Durban.

Hara, M. 1999. *Fisheries co-management: a review of the theoretical basis and assumptions*. *Southern African Perspectives* (no. 77). Cape Town: Centre for Southern African Studies, School of Government: pp 32.

Hardin, G. 1968. The tragedy of the commons. *Science, N.Y.* **162**: 1243–1247.

Harris, J. M., Sowman, M., Branch, G. M., Clark, B. M., Cockroft, A. C., Coetzee, C., Dye, A. H., Hauck, M., Johnston, A., Kati-Kati, L., Maseko, Z., Sauer, W. H. H., Siqwana-Ndulo, N. and Beaumont, J. 2002a. The process of developing a management system for subsistence fisheries in South Africa: recognizing and formalizing a marginalized fishing sector in South Africa. *S. Afr. J. mar. Sci.* **24**: 405–424.

Harris, J. M., , Branch, G. M., Clark, B. M., Cockroft, A. C., Coetzee, C., Dye, A. H., Hauck, M., Johnston, A., Kati-Kati, L., Maseko, Z., Sauer, W. H. H., Siqwana-Ndulo, N. and Sowman, M. 2002b. Recommendations for the management of subsistence fishers in South Africa. *S. Afr. J. mar. Sci.* **24**: 503–523.

Hauck, M. and Sweijid, N. A. 1999. A case study of abalone poaching in South Africa and its impact on fisheries management. *ICES J. mar. Sci.* 56: 1024-1032

Hauck, M., Sowman, M., Russel, E., Clark, B. M., Harris, J. M., Venter, A., Beaumont, J. and Maseko, Z. 2002. Perceptions of subsistence and informal fishers in South Africa regarding the management of living marine resources. *S. Afr. J. mar. Sci.* 24: 463-474

Hutton, T., Cochrane, K. L. and PITCHER, T. J. 1997. Post-apartheid fisheries management policy in South Africa: the need for a change in management philosophy. In *Developing and Sustaining World Fisheries Resources: the State of Science and Management. Proceedings of the Second World Fisheries Congress, Brisbane, 1996.* Hancock, D. A., Smith, D. R., Grant, A. and J. P. Beumer (Eds). Collingwood, Australia; CSIRO Publishing: 307–314.

Jentoft, S. 1989. Fisheries co-management: delegating government responsibility to fishermen's organizations. *Mar. Policy* 13: 137-154.

Layard, R. and A. Walters. 1978. *Microeconomic Theory*. McGraw-Hill. New York

Lewis, W. 1988. Good and not-so-good Sea Fisheries Act. *S. Afr. Shipp. News Fishg Ind. Rev.* 43: pp. 33.

Machan, T. R. 2002. *The right to private property*. Library of congress cataloging-in-publication data: Stanford University, USA pp 7

Martin, R. and Nielsen, J. R. 1997. Creation of a new fisheries policy in South Africa: the development process and achievements. In *Fisheries Co-management in Africa. Proceedings from a Regional Workshop on Fisheries Co-management Research, Mangochi, Malawi, March 1997.* Normann, A. K., Nielsen J. R. and S. Sverdrup-Jensen (Eds). Institute for Fisheries Management and Coastal Community Development. Fisheries Co-management Research Project. Report No. 12: 153–171.

May, J., 2000. *Poverty and Inequality in South Africa: Meeting the Challenge*. J. May (Ed.), David Philip, Cape Town.

Njobe, K., Nomtshongwana, N. and Stowell, Y. 1999. *A strategic review of policy and practice in South Africa in promoting sustainable livelihoods for communities through the use and management of natural resources: workshop proceedings and papers*, 12 May 1999. Pretoria; World Conservation Union (IUCN): pp 94.

Payne, A. I. L. and Cochrane, K. L. 1995. *How management and science are trying to develop fisheries policy in South Africa*. Unpublished Report. Cape Town: Sea Fisheries Research Institute.

SFTG 2000. *Recommendations for Subsistence Fisheries Management in South Africa*. Subsistence Fisheries Task Group Final Report. Unpublished Report, Department of Environmental Affairs and Tourism: Marine and Coastal management. Cape Town, South Africa: pp 88.

Sjoholt, T. 1998. *The world markets for ground fish*. Globe Fish (November). United Nations. Food and Agricultural Organization (FAO). Rome: FAO.

Sowman, M. 1993. The status of coastal zone management in South Africa. *Coastal Management* **21**: 163-184.

Sowman, M., Beaumont, J., Bergh, M. O., Maharaj, G. and Salo, K. 1997 An analysis of emerging co-management arrangements for the Olifants River harder fishery, South Africa. In *Fisheries Co-management in Africa. Proceedings from a Regional Workshop on Fisheries Comanagement Research, Mangochi, Malawi, March 1997*. Normann, A. K.,

Thackery, J. F. 1988. Molluscan fauna from Klasies River, South Africa. *S. Afr. archaeol. Bull.* **43**: 27–32.

Tvedten, I. 1990. The difficult transition from subsistence to commercial fishing: the case of Bijagos of Guinea Bissau. *Maritime Anthropological Studies* 3(1): 119-130.

Van der Elst, R. P., Branch, G. M., Butterworth, D. S., Wickens, P. A. and Cochrane, K. L. 1997. How can fisheries resources be allocated . . . who owns the fish? In *Developing and Sustaining World Fisheries Resources: the State of Science and Management. Proceedings of the Second World Fisheries Congress, Brisbane, 1996*. Hancock, D. A., Smith, D. C., Grant, A. and J. P. Beumer (Eds). Collingwood, Australia; CSIRO Publishing: 307–314.

Varian, H. 1984. *Microeconomic Analysis*, (2. ed.). W.W. Norton and Company. New York.

Voight, E. 1975. Studies of marine mollusca from archaeological sites: dietary preferences, environmental reconstructions and ethnological parallels. In *Archaeozoological Studies*. Clason, A. T. (Ed.). Amsterdam; Elsevier: 87–98.

APPENDIX 1: LIST OF SUBSISTENCE-FISHING COMMUNITIES IDENTIFIED IN SOUTH AFRICA (SFTG 2000, CLARK ET AL. 2002).

The numbers correspond to those on Figure 1

Region A

1. Port Nolloth
2. Hondeklipbaai
3. Ebenhaeser
4. Papendorf
5. Doringbaai

Region B

6. Groothoekbaai
7. Lambert's Bay
8. Elandsbaai
9. Veldrif
10. St Helena
11. Paternoster
12. Vredenburg
13. Saldanha
14. Churchhaven
15. Hopefield
16. Yzerfontein
17. Mamre
18. Atlantis
19. Cape Town
20. Hout Bay

Region C

21. Oceanview
22. Kommetjie
23. Masiphumele
24. Retreat/Steenberg
25. Khayelitsha
26. Macassar
27. Gordon's Bay/Strand
28. Kleinmond
29. Hawston
30. Hermanus
31. Gansbaai
32. Buffeljags
33. Struisbaai
34. Arniston

Region D

35. Witsand
36. Pontjie
37. Still Bay
38. Gouritzmond
39. Vleesbaai

40. Mossel Bay
41. Hartenbos
42. Power Town
43. Groot Brak Rivier
44. Herolds Bay
45. Victoria Bay
46. Knysna
47. Hornlee
48. Kranshoek
49. Plettenberg Bay
50. Wittedrif
51. New Horizon
52. Bitou
53. The Craggs

Region E

54. Covie
55. Storms River
56. Jeffrey's Bay
57. Gamtoos River
58. Loerie
59. Seaview
60. Cape Recife
61. Port Elizabeth Harbour
62. Swartkops
63. Colchester/Sundays
64. Nankos
65. Bushmans/Klipfontein
66. Marselle
67. Kariega
68. Port Alfred/Kowie
69. Fish River
70. Bira
71. Keiskamma West
72. Keiskamma East
73. Chulumna
74. Kidd's Beach
75. Cove Rock
76. Fuller's Bay
77. East London
78. Gonubie
79. Kei Mouth

Region F

80. Qolora
81. Ncizele
82. Debese

83. Kobonqaba
84. Maxambeni
85. Mazeppa
86. Mkawukazi
87. Ngadla
88. Xazini
89. Mahasana
90. Kwa Bitsha
91. Nqabarana
92. Ntubeni
93. Mpume
94. Mendwana
95. Hobeni
96. Cwebe
97. Nkanya
98. Qatywa
99. Bulungulu
100. Mdikana
101. Zitulele
102. Coffee Bay
103. Madakeni
104. Ndungunyeni
105. Sikolweni
106. Mtentu
107. Skhombe
108. Mtolane
109. Mnyameni
110. Mpahlane
111. Mzamba
112. Nqeza

Region G

113. Thongasi
114. Thundesa
115. South Broom
116. Ramsgate/Mvunshini
117. Fairview
118. Mfazazane
119. Turnton
120. Ilfracome
121. Umgababa
122. Phoenix
123. Blackburn
124. Verulam
125. Desaingere
126. Tongaat
127. Shaka's Head

128. Tinley Manor
129. Grootville

Region H

130. Glenhills/Warrenton
131. Nonoti
132. Wedebe/Tugela
133. Emphublweni
134. Mantshangule
135. Macambeni
136. Thengela
137. Matikulu
138. Port Dunford/Nymbe
139. Madlankala
140. Empebeni
141. Umhlathuze Valley
142. Umhlathuze
143. Nseleni
144. Nhlabane
145. Sokhulu
146. Nkundusi
147. KwaMduka/Nibela
148. Kosi Bay

APPENDIX 2: SOUTH AFRICAN CASE STUDY – SUBSISTENCE FISHERIES IN THE EASTERN CAPE

Most of subsistence fishing activity is in the Eastern Cape province of South Africa. This province has been prioritized by the national government as needing the most attention as it is the most impoverished of all four of South Africa's provinces. This is directly as a consequence of the province being highly neglected during the apartheid system. In an effort to legalise subsistence fisheries with particular reference to the Eastern Cape according to the Marine Living Resources Act (1998) subsistence fishers were granted permits in the form of exemptions for short periods. Four areas were closely monitored as pilot studies in the Eastern Cape including Hamburg-Bira, Port St Johns, Tshani-Mankosi-Umtata Mouth, and Swartkops-Port Elizabeth and exemptions were issued for abalone, lobster, and bait respectively. Together with the governing authority of fisheries management in South Africa there has been a considerable amount of other programmers complimenting advancement of work with regard to subsistence fisheries in South Africa. In the Eastern Cape initiatives are working close with government towards co-management, training and capacity building as well as facilitating monitoring, control and surveillance in the "legal access" roll out process of subsistence fishers.

Considerable progress has been made in the development of subsistence fisheries since 1998. However, poaching of high value resources where compliance is relatively ineffective has put tremendous pressure on these resources. The potential for these fisheries to move to the commercial sector is high.

During October 2002 the fishing community of Hamburg was allocated more than five tones of abalone. The 133 exemptions were valid until May 2003 and closely monitored as a pilot project. Despite the subsistence legislative restriction of selling the resource within 20km of the coast, the community was given the opportunity to enter a contract to sell the abalone to a buyer that exported it overseas. Though this process gave the opportunity for subsistence fishers to manage the resource it did not enable the people in the community to efficiently benefit from maximum profits thereof being limited to selling the resource to a second party that in effect benefited. In this term when referring to benefiting it is important that the gains of communities such as Hamburg are in surplus to what they gained before. The gaining should now be well equipped not only to provide a means of food security for communities that have been given rights to resources but also improve the lifestyle of the community in general in other words community empowerment through collective property right allocations. This could only be attained if these people are allowed to trade outside the 20km restriction. Again the importance of education is emphasized as they will not gain from trade if they do not have the know-how thereof. The community of Hamburg is an example of a subsistence fishing community that shows potential for commercialization. These people should be allowed to manage the resource according to the suggestive mechanisms of this project, *moving subsistence fishing to commercialization*.