

**CASE STUDIES ON THE SOCIO-ECONOMIC CHARACTERISTICS AND LIFESTYLES OF SUBSISTENCE AND INFORMAL FISHERS IN SOUTH AFRICA**G. M. BRANCH<sup>1</sup>, J. MAY<sup>2</sup>, B. ROBERTS<sup>2</sup>, E. RUSSELL<sup>3</sup> and B. M. CLARK<sup>1</sup>

To develop a management strategy for informal fishers, a necessary first step is information about the nature of these fishers, their numbers and their socio-economic status. To accomplish this, a survey of socio-economic conditions and use of marine resources was undertaken in 1999 at 20 localities where fishing occurs around the coast of South Africa, concentrating on subsistence or small- to micro-scale artisanal commercial fishers. In each locality, 16–31 “fisher households” were surveyed by questionnaires, focus-group discussions and interviews with key informants. Demographic analyses revealed a low level of migrancy (~5%), an average of 5.3 persons per household and a mean age of 27. Only ~20% of fishers were women and ~15% were children. Poverty was prevalent: unemployment averaged 40.3% (much higher than the national norm of 29.3%). Mean adult equivalent income per month spanned R193–R735 among regions, and was not correlated with size of settlement. Education levels were low, only ~33% of people >20 years old having completed primary school. Migrancy was highest in rural areas (but still much less than the national norm), intermediate in towns and least in metropolitan areas. Household size, participation of women and poverty all followed similar trends. Comparing regions, the East Coast and the province of KwaZulu-Natal had higher migrancy rates, larger household sizes, greater poverty, and greater participation by women in fishing, than on the South and West coasts. Household expenditure on food was ~R450 per month on the South-East and KwaZulu-Natal coasts and ~R750 on the West Coast, and exceeded 60% of income (a measure of “food security”) in about half the households surveyed. Harvested resources were sold, consumed or used as bait. In all regions, the two most frequently harvested resources were fish (mostly sold, predominantly fished by men) and intertidal rocky-shore invertebrates (largely consumed, and involving women to a greater degree). On the West Coast, rock lobster *Jasus lalandii* was the third-most important resource, but on the South and KwaZulu-Natal coasts this species was replaced by estuarine invertebrates. Abalone *Haliotis midae*, oysters, sandy-beach invertebrates and kelp or seaweeds made up the balance. Diversity of harvested resources increased west to east, following biogeographic trends. The resources could be divided into those of high value (rock lobsters, abalone and, to a lesser extent, fish) and those of lower value (such as limpets, mussels and bait organisms). It is argued that high-value resources are best used to create micro- and small-scale commercial enterprises that can serve to uplift poor fishers. Low-value resources constitute subsistence resources, for which preferential rights should be established for subsistence fishers, including development of exclusive-use zones where necessary. Emerging characteristics of fishing communities that were helpful in defining subsistence fishers in the South African context were poverty, harvest for self-use (whether by consumption or sale to meet basic needs of food security), use of low-technology gear, and concentration of effort on or from shores or in estuaries. At least portions of the catches of all resources are sold, and the majority of equipment is purchased, so any definition of subsistence fishers cannot exclude those who sell part of their catch or do not use hand-made equipment. Some success was evident with co-management, encouraging further exploration of this style of management for subsistence fishers.

Key words: informal fishers, socio-economics of fishers, subsistence fishers

The Marine Living Resources Act was promulgated in South Africa in 1998 (Anon. 1998). The Act provides for the protection of the marine ecosystem and the sustainable use of living marine resources. It also addresses the issue of equitable access to marine living resources. More specifically, and for the first time, it gives legal recognition to subsistence fishers. Recognition is, however, only the first step towards implementing effective management for subsistence fishers. Before this can happen, there needs to be an under-

standing of what constitutes a subsistence fisher, how many there are, where they operate, what resources they harvest, and the uses to which they put the resources. Recognizing such information as a prerequisite, the Chief Director of Marine and Coastal Management (MCM) of the Department of Environmental Affairs and Tourism initiated a Subsistence Fishers Task Group (SFTG) to investigate subsistence fisheries and to provide information that would guide management of the sector. The SFTG in turn commissioned two

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phases of research to gather data on the current status of subsistence fisheries. The first of these was a broad-brush national survey grounded on the knowledge of experts, authorities, community leaders and fishers. This revealed that there are about 147 fishing communities, an estimated 28 338 fisher households and 29 233 individuals involved in activities that could be construed as "subsistence fishing" in South Africa, although they span a continuum from those harvesting for food to those undertaking micro- or small-scale commercial activities (Clark *et al.* 2002).

The second phase was a more detailed socio-economic study. It concentrated on a representative subset of the communities identified in the first phase, and employed questionnaires, personal interviews and focus-group studies to delve more deeply into the socio-economic profiles of fisher households and the nature of resources harvested by them. It also documented the perceptions of fishers about the status of resources and fisheries management – a topic dealt with in a separate paper (Hauck *et al.* 2002). Both information-gathering phases on the programme made no attempt to predefine "subsistence fishers". Rather, their goal was to gather data and consult with fishers so that a defensible and acceptable definition could later be developed (Branch *et al.* 2002). The communities surveyed were diverse but consisted of those who harvest largely for personal consumption and were unquestionably "subsistence", as well as those with a clear commercial intent, but specifically excluded members of large-scale industrial fisheries. The general term "informal fishers" is loosely used to describe them, and covers people whose activities were not previously recognized by law, but harvested marine resources as a livelihood. The intent of the Marine Living Resources Act, and the policy that preceded it, made it clear that recognition in the Act of subsistence fishers was meant to protect the rights of poor people who rely on marine resources to sustain themselves, and this framed the type of people who were targeted in this research. The injunction from the then Minister of Environmental Affairs and Tourism stating that subsistence fisheries should cater for the needs of "the poorest of the poor" set an important tenor to the work of the SFTG, and poverty levels among fishing households were thus a central issue.

The challenge was (and still remains) to establish ways of (a) protecting the rights of subsistence fishers and their traditional harvesting; (b) determining the resources most appropriate for their use; (c) assessing which resources are better reserved for commercial use, and (d) deciding which of the latter resources can be used as a contribution to uplifting poor subsistence fishers by granting them access to small-scale com-

mmercial enterprises. Clearly none of these will be attainable without also developing practical means of management and control that will ensure sustainable use of the resources.

This paper has three foci: (1) the demography of fishing communities, (2) their income and poverty levels and (3) the species harvested and how they are used. It is one of a series of papers, including an outline of the terms of reference of the SFTG and the processes followed to achieve these (Harris *et al.* 2002a), the nature of the fishing communities and their perceptions about fisheries management (this paper, Clark *et al.* 2002, Hauck *et al.* 2002), derivation of a definition for subsistence fishers (Branch *et al.* 2002), an analysis of the suitability of different resources for subsistence harvesting (Cockcroft *et al.* 2002), and an outline of the overall recommendations of the SFTG (Harris *et al.* 2002b).

The paper documents the socio-economic circumstances and activities of 20 South African fishing communities that include harvesters who fall under the umbrella of "subsistence fishers" and their ilk. The information provided was one of the inputs into developing recommendations to address the basic needs of subsistence users and ensure wise use and management of the resources upon which they depend.

## MATERIAL AND METHODS

The approach adopted for this investigation was a "case-study" or ethnographic one, which provides a description of the socio-economic characteristics, resource-use and harvesting techniques employed by fisher groups in different areas of the South African coast. The surveys spanned a two-month period from July to September 1999. Three principle sources of information were used: (1) a household questionnaire yielding quantitative data, (2) focus-group discussions guided by a set of questions and (3) interviews with key informants.

### Sampling localities

Localities chosen for surveys were drawn from the pool of fishing settlements identified by Clark *et al.* (2002). Three factors were identified in the first survey as having an important role in defining the behaviour of fishers – their geographic location (biogeographic and political provinces), the type of settlement in which they reside and the types of fishing habitat available

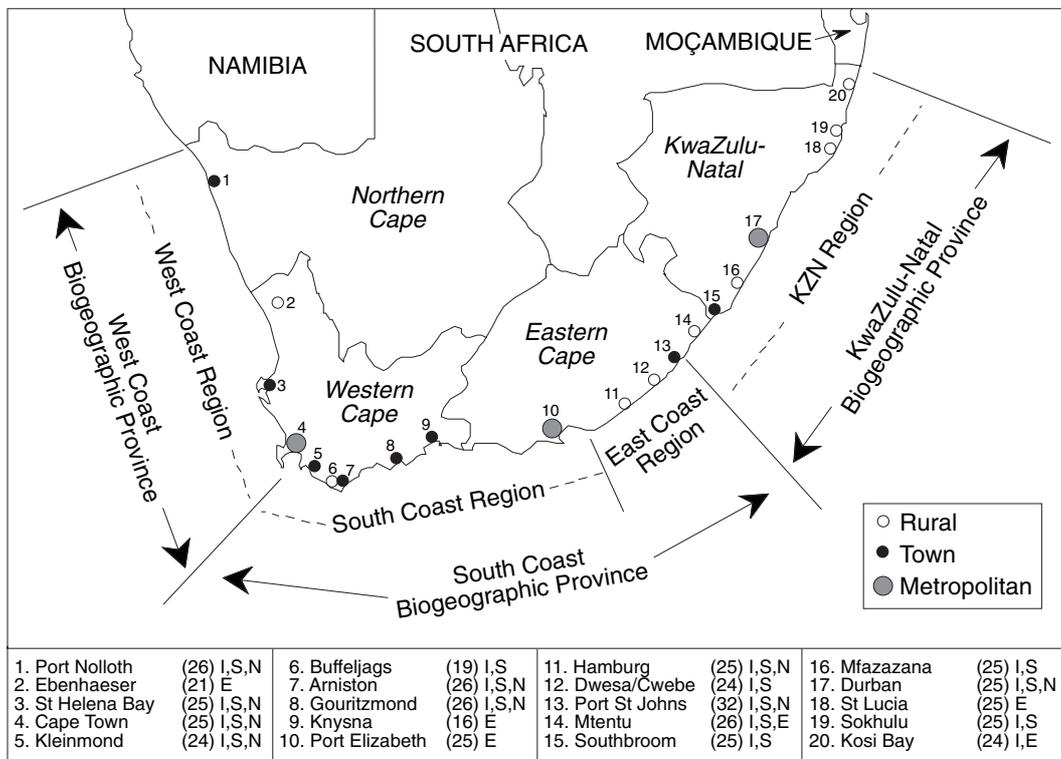


Fig. 1: Distribution of localities at which households were surveyed. The regions into which they fall and the biogeographic provinces around the coast are also indicated. Letters next to the names of each locality indicate the types of fishers (E = estuarine; I = intertidal; S = shore-based; N = nearshore). The number of households surveyed are given in parenthesis

to them. Biogeography determines the suite of species and hence types of resources available to them. Differences between political provinces determine the type of management structure and the level of enforcement in place. Settlement type influences the availability of alternative sources of income and livelihood, access to markets and many other aspects. The types of habitat available to fishers affect the kinds of resources available to them. Three biogeographic provinces are recognized in South Africa – a cool temperate West Coast province extending from the border with Namibia to Cape Point, a warm temperate South Coast province extending from Cape Point to Transkei, and a subtropical East Coast province extending from there almost to the Moçambique border (Fig. 1). The distinction between these regions is evident in most faunal groups, including intertidal invertebrates (Emanuel *et al.* 1992), marine and estuarine fish (Whitfield 1998, Turpie *et al.*

2000) and coastal birds (Hockey and Turpie 1999).

Although a probability sampling methodology is the ideal research design for any study that selects sample localities to gather baseline data for a population, in the present case there was no listing of the fisher population available at the time the programme was initiated, making it impossible to sample the communities randomly. Instead, the sample localities were purposely chosen to cover the four (political) coastal provinces of South Africa, and to span the three biogeographic provinces (Brown and Jarman 1978, Emanuel *et al.* 1992). For most of the quantitative socio-economic analyses, the coast was zoned into the four regions shown in Figure 1: the West Coast (in which 15% of the fishing communities were sampled), South Coast (32%), East Coast (22%) and KwaZulu-Natal (KZN) Coast (31%). Within each region, fishing communities (localities) were selected to ensure coverage of metro-

politan areas, towns and rural areas, and to cover the major types of fishing in each region (estuarine, intertidal rocky shores or sandy beaches, shore-based and nearshore fishing). When dealing with the resources that are harvested, the analysis was simplified to three stretches of coast corresponding to the biogeographic provinces: the West Coast, South Coast (incorporating both the South and East coasts used in the socio-economic analysis) and KwaZulu-Natal. These are referred to as "biogeographic provinces" to avoid confusion with the four "regions" used for the socio-economic analyses (Fig. 1).

The sample localities were selected by the consultants and the national coordinator of the survey in consultation with SFTG members. Figure 1 shows the 20 localities, their nature and their positions relative to the regions and political and biogeographic boundaries.

### Targeting respondents

As was the case during Phase I of the survey (Clark *et al.* 2002), the boundary between "subsistence" and "small-scale commercial fishers" was not pre-judged and a relatively broad view of "informal fishers" was employed when choosing respondents for the household surveys or focus-group discussions. This resulted in some people (16% of 857 individuals) being included in the survey who were later viewed not as subsistence fishers, but as "small-scale commercial" fishers (or "micro-enterprise" fishers). Most surveys were done in households, but in metropolitan areas many of the subsistence fishers live in large informal settlements that could not be readily entered for household visits. Consequently, fishers in those areas were accessed at the points of harvesting or where they made landfall.

### Household questionnaires

The household survey was the primary vehicle that provided a profile of "subsistence" fishers and "subsistence fisher households". The household was chosen as the unit of analysis, because it is generally the basic social and economic unit for people at a subsistence level. The term is used in the sense of "those who pool resources and share consumption" (Statistics SA 1998), although individual fishers were found operating in isolation and with no family connection, particularly in metropolitan areas. Using the household as the unit of analysis also made the data compatible with most other economic datasets, including the national census. "Resident members" of a household were defined as those who had spent 15 nights out of the previous 30 living in the surveyed homestead.

Between 16 and 31 households were surveyed per locality (see Fig. 1 for sample sizes), with a total of 488 surveys countrywide. Recognizing that this would represent a low coverage in the larger metropolitan areas, it was decided to restrict sampling to particular subareas in those cases. In Cape Town, the suburb of Ocean View was selected for the purpose; Swartkops was selected in Port Elizabeth, and in Durban the beachfront area was targeted. Surveys were only conducted in households that contained at least one person who was identified by the research team as a potential subsistence fisher. As confirmation, the respondent was further asked to self-identify whether these fishers were considered subsistence (fishing mainly for personal consumption or consumption by the family) or commercial fishers (fishing mainly to make a profit). The questionnaires were administered by eight Regional Fieldworkers, working singly at each of 2–3 localities but helped by an assistant in most cases. The fieldworkers were trained in advance and employed by the SFTG. They were appointed on the basis of their knowledge of the areas where they worked and their familiarity with the language most frequently spoken there, although in one area a Xhosa-English translator had to be recruited. Each household took approximately 3–4 hours to survey.

The questionnaire used in the household surveys covered demographic aspects including household size and composition in terms of gender, age and education levels. Poverty indicators included qualitative information about the type of building occupied, access to services for water and electric power, and food consumption, as well as quantitative measures of household income (both the level and the source) and expenditure (both level and type). The survey also investigated household deployment of labour among employment sectors and access to non-marine common property. Income that was not earned in cash, such as own-grown agricultural products, was not included.

Entry into the communities was generally via the assistance of local and traditional leadership, representative fisher bodies, or management agencies in the area, and was also based on information received from key informants during the first phase of the research (Clark *et al.* 2002).

### Focus groups

Focus-group discussions were designed primarily to investigate aspects of marine resource use and management. They were held in every locality, and were facilitated by three researchers experienced in group-processes. A set of guiding questions focusing on the use and management of marine resources was pre-

pared and used to steer discussions and to ensure coverage of all aspects under investigation. The focus-group meetings ran for 2.5–5.5 h. The target size for focus groups was 8–10 participants. In reality, the groups ranged from 7 to 28. Participants were chosen for their knowledge of, and participation in, local fisheries, with the intention of obtaining the views of “typical” local fishers. Prominent local leaders were not invited to the focus group sessions if the fieldworkers anticipated that their presence would inhibit the active participation of the other fishers. Instead, their opinions were solicited through the key-informant interviews.

### Interviews of key informants

In each community, a Regional Fieldworker interviewed 2–3 local key informants – community leaders, conservationists and others with specific insight about marine resources. A set of survey questions was designed to elicit information from the key informants, and concentrated upon management issues, providing a “reality test” of the information obtained through the household surveys and the focus-group sessions. The information gained was treated qualitatively and not directly used in any quantitative analyses, but it was used in the design of focus-group discussions, selection of participants and in the interpretation of the data collected from household surveys and focus-group meetings.

### Measuring poverty

Income was used as an indicator of poverty. Expenditure is generally a preferred indicator (Slesnick 1993), but it could not be used here because broad categories of expenditure and bands of expenditure were reported rather than actual amounts.

Calculating income *per capita* is flawed by the spurious assumption that everyone in the household earns equally and has the same needs. These problems have led to the introduction of “equivalence scales”, which consist of “a system of weights, whereby children count as some fraction of an adult ... so that effective household size ... is measured not in numbers of persons, but in numbers of adult *equivalents*. Economies of scale can be allowed for by transforming the number of adult equivalents into “effective” adult equivalents...” (Deaton 1997: p. 242).

Following May *et al.* (1995) and Woolard and Barberton (1998), the equivalence scale used here assumes that children younger than 15 have half the income-

generating ability of an adult, and small economies of scale are allowed for in the following equation:

$$\text{Adult equivalent income} = \frac{\text{Total household income}}{(\text{number adults} + 0.5 \text{ number children})^{0.9}}$$

### Selection of poverty lines

Two poverty cut-off points or poverty lines were specified. The households were ranked according to their adult equivalent income and divided into five quintiles, ranging from the poorest to the wealthiest 20%. The poorest 40% of households among those sampled in all localities (the lower 40<sup>th</sup> percentile) were defined as “poor” and the poorest 20% of households (lower 20<sup>th</sup> percentile) were classed as “ultra-poor” (following the principle adopted by World Bank 1995 and Klasen 1997). It must be emphasized that these are *relative* measures that are useful for comparing poverty among different sectors in a given data-set: among, say, regions or types of settlement. They do not allow assessment in an absolute sense.

### Constraints and limitations

The most important constraint facing the quantitative analysis was the impossibility of employing a probability sampling methodology. As a result, the analyses are indicative, not predictive. Statistical analyses that assume probability sampling were therefore not employed. Although this did limit the type of analysis that was possible, the data do constitute a “purposive sample” (Robson 1993) and are still adequate to portray the characteristics of the fisher population.

## RESULTS

### Demographic profiles

The household questionnaires yielded demographic profiles of fishers that allow comparisons among regions and different types of settlements. Of the 488 households sampled, 44.1% were rural, 40.4% located in small towns and the remaining 15.5% in metropolitan areas (Fig. 1).

In terms of residency among fisher households, there was relative stability. Only 5.1% of the total sample population were categorized as non-resident, substantially lower than the norm detected in the national census (Statistics SA 1998). Slightly higher rates of resi-

Table I: Social and gender profiles of informal fisher communities, categorized in terms of regions around the coast and in relation to urban zone. Residency status reflects the percentage of people remaining at the abode for at least 15 of the previous 30 days

Parameter	Residency status (%)	Mean number of people per household	Gender of fishers (% male)
<i>By region</i>			
West Coast	99.0	4.2	100.0
South Coast	97.2	3.5	85.5
East Coast	89.4	6.7	59.7
KwaZulu-Natal	96.4	6.6	72.2
<i>By urban zone</i>			
Metropolitan	98.4	4.1	82.8
Town	97.4	3.9	87.3
Rural	92.9	7.0	66.5

dependency existed on the West and South coasts (97–99%) than on the East and KZN coasts (89–96%; Table I), the differences being statistically significant ( $4 \times 2$  contingency analysis,  $\chi^2 = 118.2$ ,  $df = 3$ ,  $p < 0.001$ ). Table I reveals greater migrancy among rural areas (7.1%) than in towns (2.6%) and metropolitan areas (1.6%), and the differences were statistically significant ( $3 \times 2$  contingency analysis,  $\chi^2 = 51.7$ ,  $df = 2$ ,  $p < 0.001$ ). When the data were broken down by gender, migrancy was almost identical for men and women (data not shown;  $\chi^2$  analyses,  $p > 0.05$ ).

The average size of the 488 households surveyed was 5.3 persons when all household members were included (resident and non-resident), and 5.0 persons when considering resident members only. All subsequent mentions of household size refer to resident members only. Mean household size was greater on the East and KZN coasts relative to the South and West coasts (Table I). It was also greater in rural areas than towns or metropolitan areas (Table I), which partly explains why household size was higher on the East and KZN coasts, where rural settlements prevail. Similar patterns of household size were observed in the 1996 national census (Statistics SA 1998).

Pooling the information for all 20 localities sampled, the status of 4 549 people was recorded. Of these, 33.7% (859 individuals) were listed as fishers. On the basis of self-classification, 724 were subsistence fishers and 135 commercial fishers. Males made up 51.4% and females 48.6% of the total population sampled, only marginally different from the proportion of 52% females recorded in the 1996 national census (Statistics SA 1998;  $2 \times 2$  contingency analysis,  $\chi^2 = 2.1$ ;  $df = 1$ ;  $p > 0.05$ ).

Considering the gender of fishers alone, however, the picture is one of a male-dominated activity, irre-

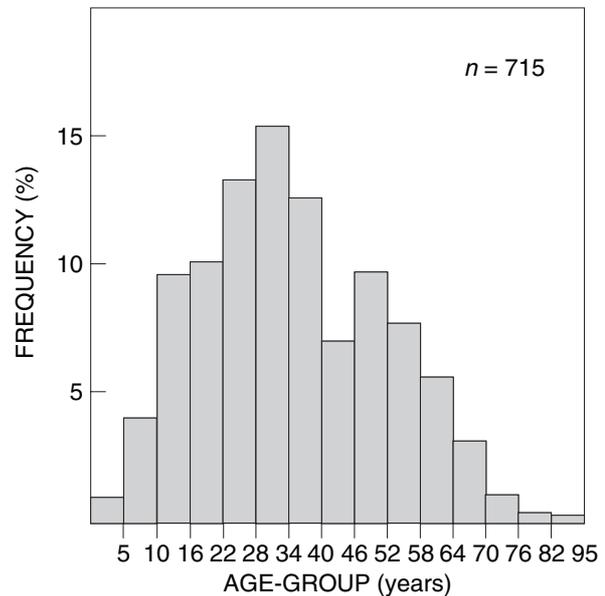


Fig. 2: Age structure of fishers, derived from pooled data for all 20 localities

spective of the region or settlement type. The largest percentages of female fishers were recorded on the East and KZN coasts (Table I). Women made up close to one-third of the fishers in rural areas, but only 12.7% and 17.2% in towns and metropolitan areas respectively (Table I).

The average age for members of fisher households was 27 years, with only subtle differences (spanning 26–30) evident between genders, different regions and different settlement types. Of greater interest is the age structure for fishers specifically (Fig. 2). Most fell in the range 22–40 years old, but about 15% were children (defined here as <18 years old) and a fair proportion were still actively involved in fishing at a relatively old age – one diehard was 97!

People terming themselves subsistence fishers tended to be more youthful than were those classing themselves as commercial fishers. Of the former, 50% were younger than 29 years old; for the latter, 35 years old. More importantly, among subsistence fishers there appeared to be a greater reliance on child labour, with children making up about 15% of the fisher population, whereas the figure was only 3% for commercial fishers.

Calculations were made of the demographic dependency ratio (the ratio between “dependants” younger than 15 and older than 64, and “economically active” members 15–64 years old). This showed that fisher households along the East Coast had a substantially

larger proportion of dependants (0.66) than in the other three regions (0.42–0.48). Rural areas also had a higher dependency ratio (0.57) than towns and metropolitan areas (0.45 and 0.37 respectively).

**Education**

The educational level of the sample population was relatively low (Fig. 3). Almost two-thirds of the individuals aged 20 and above had either no schooling or some primary schooling only; 9.2% had completed their primary education and approximately 25% had some secondary schooling. Only a select few had remained in the education system long enough to have matriculated (completed secondary schooling), and virtually none had any form of tertiary education. The most discernible distinction between the four regions was that both the East and KZN coasts had a larger contingent with no formal education. Unexpectedly though, those coasts had higher percentages with “some secondary schooling” than elsewhere.

In towns, metropolitan and rural areas alike, the majority of people (44–59%) had some primary schooling. Rural fisher households had a substantially higher percentage with “no schooling” (20%) than those in other settlement types (6–7%). Considering fishers more specifically, the educational profile did not differ to any significant extent from that for the sample population as a whole.

The central message, though, is that the level of education in fisher communities is very low and must be a major contributing factor to poverty.

**Main economic activities**

Averaging the data for fisher households over the whole country, it is evident that unemployment was high (Fig. 4). Among resident members aged 15 to 64 (i.e. the sector expected to be economically active), 40.3% were unemployed, and only some 10% had regular employment. Another 8% of the sample population were casually employed, 3% self-employed and 9% were seasonal workers or involved in some form of share-harvesting. Approximately 17% were engaged in formal education.

There were marked contrasts among regions. Unemployment on the West and South coasts was noticeably lower than on the East and KZN coasts, where an estimated 50% or more of the economically active age group (15–64) defined themselves as unemployed. The West and South coasts also had higher percentages in regular and casual employment than the other two regions. Seasonal employment also featured more

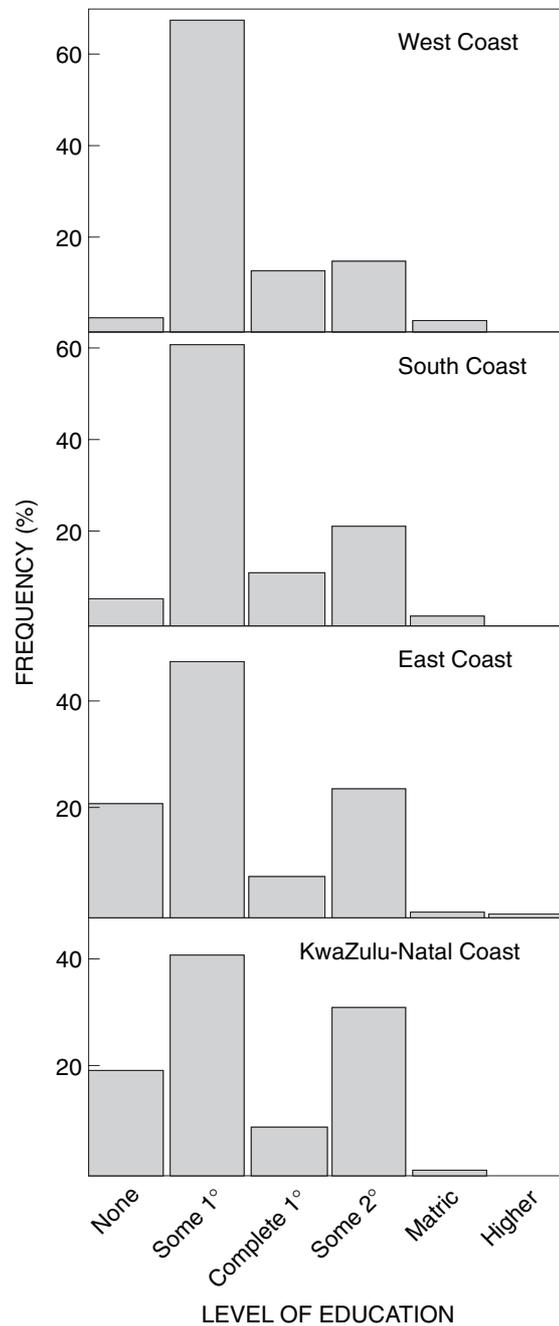


Fig. 3: Proportional levels of education enjoyed by members of fisher households aged 20 years or more, subdivided by geographic region. 1° = primary school; 2° = secondary (high) school; Matric = completion of high-school education; Higher = some form of tertiary education at a university or technical college

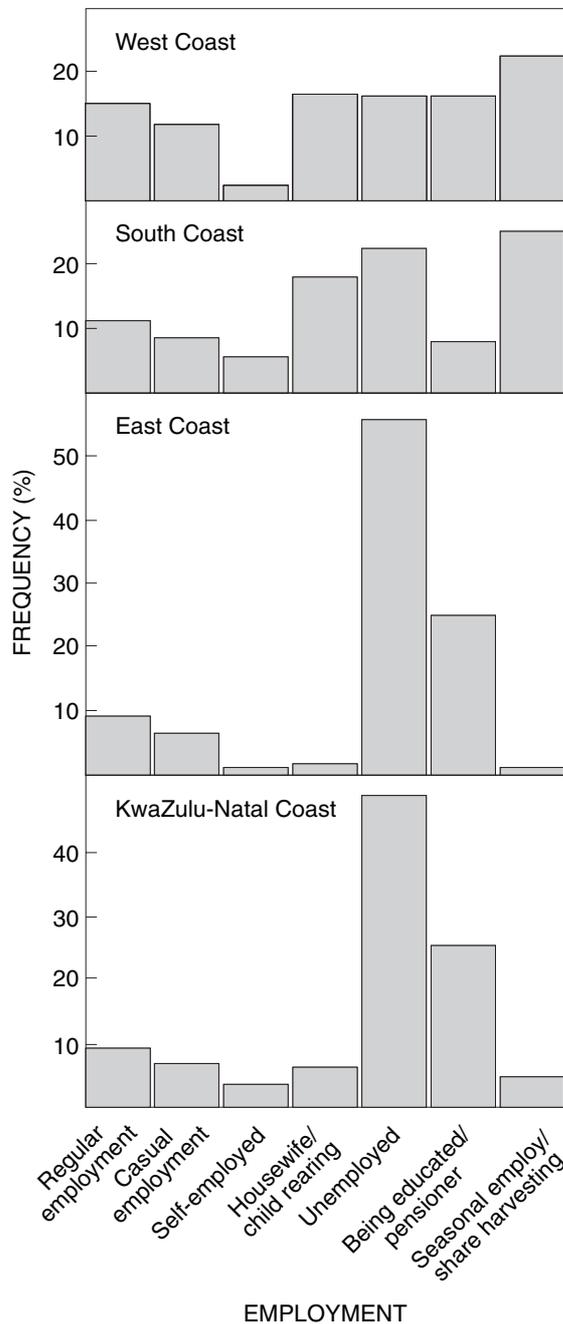


Fig. 4: Main economic activities of resident members of fisher households in the “economically active” age-group of 15–64, subdivided by geographic region. Pensioners and those receiving education are combined, as are those with seasonal employment or involved in share harvesting

obviously on the West and South coasts. This can be linked to the seasonality of resource availability and the existence of closed seasons for some commercial species, which concentrates employment by the fishing industry in the open season. On the East and KZN coasts, more people in the economically active age-group were occupied with formal education than on the South and West coasts.

Unemployment rates among residents were much higher in rural areas (averaging 52%) than in towns (26%) and metropolitan areas (24%), an expression of the limited economic opportunities in rural areas, particularly in the former apartheid-inspired “homelands” (areas designated for the exclusive use of black people).

### Poverty profiles

Only about half the fisher households had at least one occupant with waged employment (Table II). This is a relatively crude measure, but it does alert one to the fact that poverty was rife among these households. A more quantitative figure is the mean adult equivalent income per month (Table II). This averaged R455 (at the time of the survey R1 = US\$0.15), tangible evidence of poverty among fisher households. There was, however, substantial variability among localities, some of which warrants specific mention. There was no significant correlation between the size of a settlement and mean adult equivalent income (Fig. 5;  $r = 0.28, p > 0.05$ ), although metropolitan areas (average R712 per month) did have higher incomes than towns (R596) or rural areas (R237). Cape Town had a rate of R567 per month – surprisingly low for a metropolitan area. Durban, the second-biggest metropolis, had almost double the rate: R930 per month. Arniston, a relatively small town that has benefited from the redistribution of quotas and from the establishment of a co-management system (Hutton and Pitcher 1998), had by far the highest mean adult equivalent income: R1 927 per month. Exceptional poverty was evident at St Lucia and Mtentu in KZN, where incomes <R100 per month were recorded. The most clear-cut trend was that mean incomes were substantially lower on the East and KZN coasts (R193 and R364 respectively) than on the West and South coasts (R425 and R735 respectively). This reflects the predominance of commercial species on the West and South coasts, and also mirrors a rise in the proportion of (self-identified) commercial fishers on the South Coast in particular.

A third measure of poverty is “food insecurity”, defined as the proportion of households in which

Table II: Economic profiles of informal fisher communities, categorized in terms of regions around the coast and in relation to urban zone. Households with waged employment indicate those in which at least one member of the household was engaged in waged employment. The mean adult equivalent income is the income generated per household per adult equivalent (see Methods for full definition). Food insecurity reflects the proportion of households for which >60% of annual income is spent on food. The classifications of "poor" and "ultra-poor" are relative measures of poverty within the communities surveyed, describing what percentages of households fall in the lowest 40% and lowest 20% of all communities that were surveyed. *N* is the number of households surveyed

Area	Households with waged employment (%)	Mean adult equivalent income per month (R ± SD)	Food insecurity (%)	% falling in 40 <sup>th</sup> percentile: "poor"	% falling in 20 <sup>th</sup> percentile: "ultra-poor"	Sample size (N)
<i>By region</i>						
West Coast	43.1	425 ± 154	43.1	18.1	5.6	71
South Coast	56.3	735 ± 510	48.7	28.1	16.2	159
East Coast	193 ± 84	77.6	57.0	34.6	106	
KwaZulu-Natal	47.3	356 ± 251	45.9	49.32	19.6	148
<i>By urban zone</i>						
Metropolitan	62.7	712 ± 550	45.3	25.3	16.0	74
Town	48.5	596 ± 235	50.0	27.3	13.1	196
Rural	48.1	237 ± 92	59.4	55.6	27.1	214

>60% of annual income is spent on food. There were high incidences of food insecurity on the East Coast (77%) and in rural situations (59%; Table II). These results need to be placed in the context of how much money households spend on food. In these absolute terms, households on the West Coast had the highest mean and modal rates of expenditure (Fig. 6). The lowest rates were on the South Coast, where more than 50% of households spent <R200 per month on food (equivalent to a dinner for three at a good restaurant, to provide perspective). (Unpublished data in Russell *et al.* 2000 provide a similar breakdown of other expenditure: household services; clothing, appliances or vehicle purchases; repaying loans, hire-purchase and store accounts, but these are not reported here).

A final measure is the percentage of poor and ultra-poor households, which varied substantially among localities and regions. The poverty rates were particularly pronounced among fisher households situated along the East and KZN coasts, 49–57% of households falling into the "poor" category in the lower 40<sup>th</sup> percentile. Individual localities with high levels of poverty were Mtentu in KZN (with 62% of households falling in the "ultra-poor" category), St Lucia in KZN (52%) and Port St Johns in Transkei on the East Coast (31%).

About 29% of households interviewed on the South Coast were "poor", which was half the poverty rate of the East Coast and about 60% of that in KZN. Localities on the West Coast exhibited the lowest relative poverty, only 18% being "poor" and 6% "ultra-poor". This regional pattern was similar to the incidence of poverty documented at the provincial level in 1993 during a

nationwide survey (Klasen 1997). In that instance, the Eastern Cape (equivalent to the eastern part of the South Coast combined with the East Coast), along with the Northern Province (the northern part of the West Coast), had the highest poverty rates, >75% of the population living in impoverishment. KZN also had relatively high poverty rates, whereas the Western Cape (the southern West Coast and much of the South Coast) had a far lower incidence.

Poverty was also unevenly distributed among different types of settlement (Table II). Almost double the percentage of households in rural areas fell into the lower 40<sup>th</sup> percentile (55.6%) or 20<sup>th</sup> percentile (27.1%) than was the case in towns and metropolitan localities (25–27% for the 40<sup>th</sup> percentile; 13–16% for the 20<sup>th</sup> percentile).

Large households with many dependants tended to be disproportionately represented among the "poor" and "ultra-poor" fisher households. "Ultra-poor" households had a mean size of 7.3, and "poor" households 6.6, whereas "non-poor" ones that fell above the 40<sup>th</sup> percentile had 4.4.

Contrary to what one might expect, female-headed fisher households were under-represented among the poor (16.9%) and male-headed households over-represented (43.3%;  $\chi^2 = 32.1$ ,  $df = 1$ ,  $p < 0.001$ ). There were no striking differences in the mean ages of people experiencing different levels of poverty.

The extent to which households are provided with services such as drinking water and electricity is an indirect measure of poverty. Some 79% of "non-poor" households had access to piped water in some form, and only 14% used streams, rivers or dams to supply

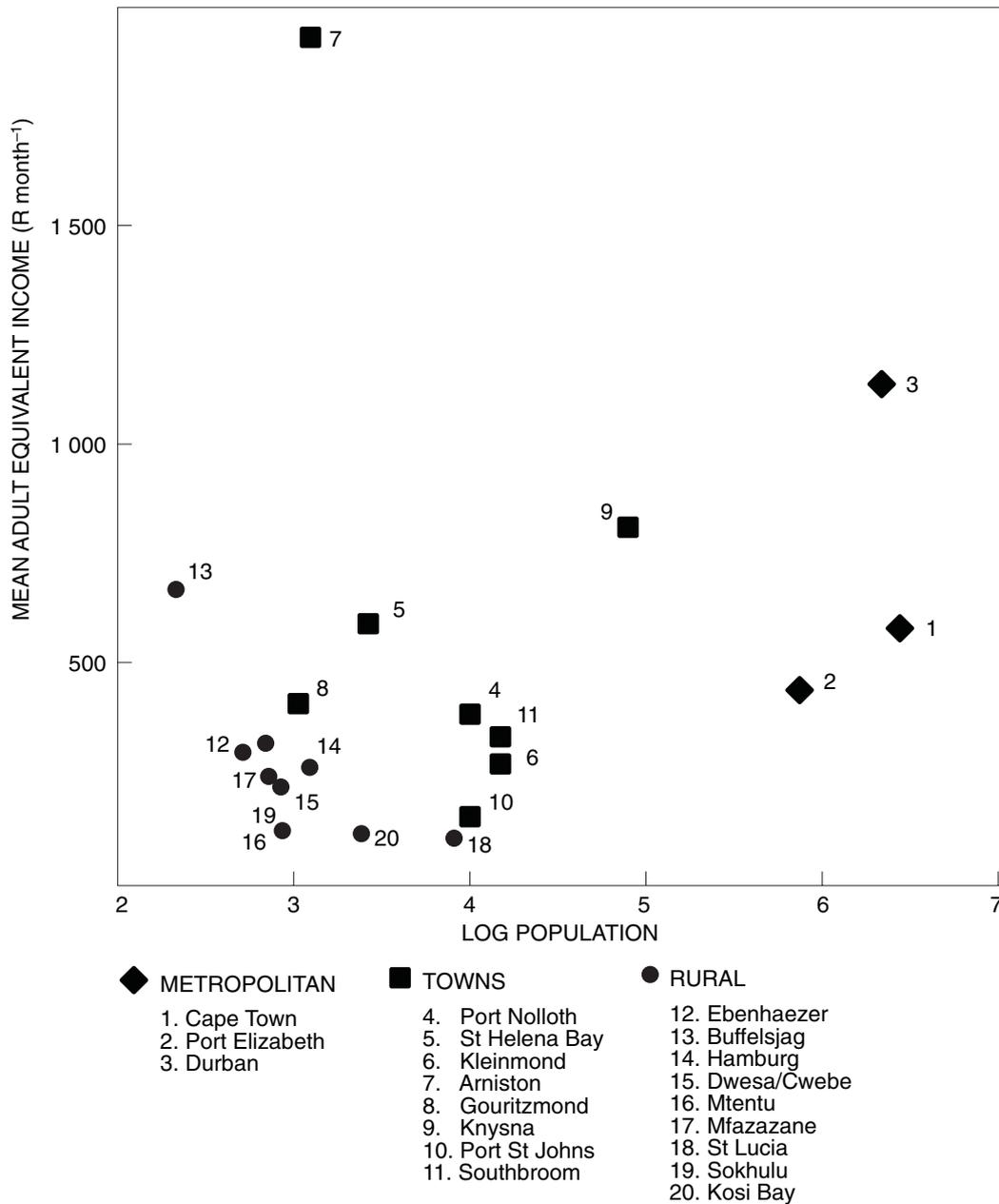


Fig. 5: Mean adult equivalent income of fisher households per month, plotted against the log of estimated total population size of each of the localities surveyed. The relationship is not significant ( $r = 0.28, p > 0.05$ )

drinking water. By contrast, only 50% of the poor households had piped water, and 44% obtained their drinking water from rivers, streams or dams. Access to an electricity supply closely follows the national

trend in that most impoverished households have yet to be connected to the national grid. Among fisher households, 62% of “poor” households were not connected to an electricity supply. Even among the “non-

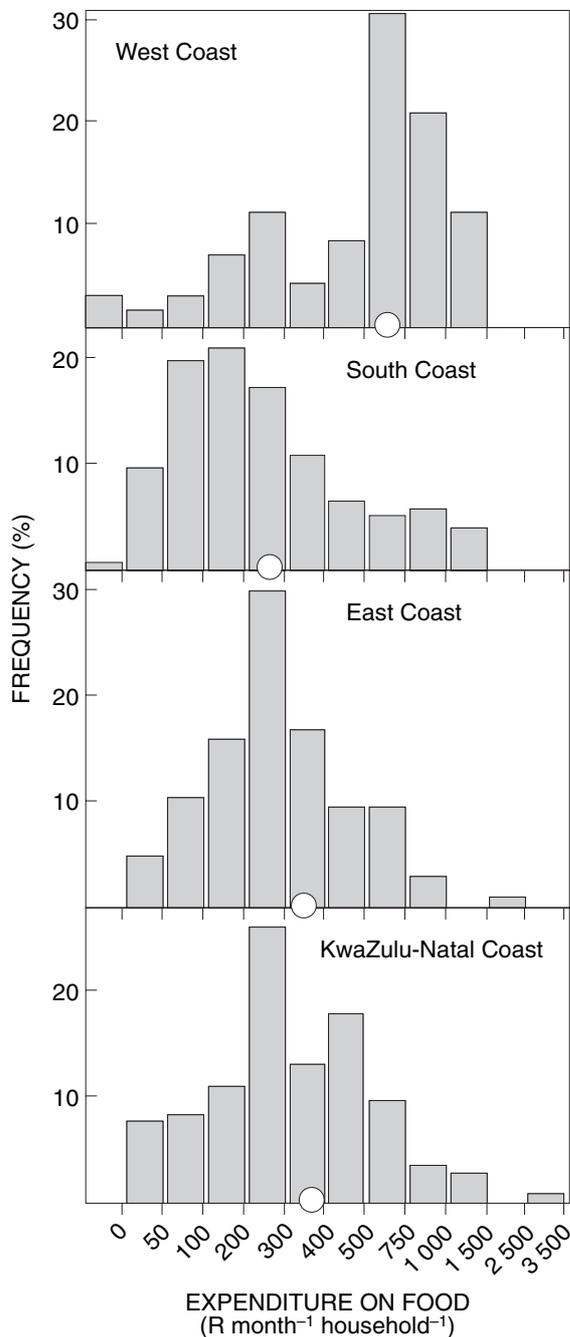


Fig. 6: Frequency of expenditure by fisher households on food in the four coastal regions, expressed in South African Rands (R) per month per fisher household (R1 = US\$0.15 at the time of the survey). Circles indicate mean values

poor’ fisher households, 38% did not have electricity.

The use of natural water supplies can be regarded as a common property resource. Other such natural resources used by fisher households were thatching, mud, clay, wood and poles for the construction of self-made houses. On the West and South coasts, 20–30% of households made use of such materials to build houses. On the East and KZN coasts, 80% did so. Common property resources associated with the land and sea are an important and often overlooked asset to the poor (von Braun 1989, Cousins 1999).

### Profiles of income-generating activities

Rural households engage in a wide range of activities to generate a livelihood to achieve food security (cf. Maxwell and Smith 1992, Ardington and Lund 1996). That was true of all fishing households, whether they were in rural, town or metropolitan areas. The survey identified a number of non-fishing activities from which fisher households generated a cash income. These included wage labour, self-employment and claims from the state.

Under the generic category “wage employment” most individuals in fisher households were either labourers, fishers or in a service occupation. Almost two-thirds of the jobs identified fell in the secondary labour market, which is characterized by poor pay and little security or opportunity for improvement (May 1996). The largest single category was “labourer”. On the West, South, East and KZN coasts respectively it made up 71.7, 14.2, 48.1 and 39.5% of the wage employment among fisher households. Fishing contributed surprisingly little, except on the South Coast: the figures for the four respective coasts were 2.2, 46.3, 3.7 and 0%. This corresponds with what was found in the demographic survey: that the South Coast contains the majority of the commercial fishers. Virtually all of this fishing employment would have been attributable to the fishing industry, which supports about 20 000 employees (Branch et al. 1996). Employment in the fishing industry was most frequent in metropolitan areas (24% of the wage employment), but also occurred in towns (20%) and rural areas (12%).

Apart from wage employment, a set of activities could be identified as self-employment or micro-enterprises. Approximately 43% of fisher households were involved in self-employment and/or micro-enterprises as an income-generating activity. This was particularly pronounced in households of the West Coast, with a value of 74%. The proportion was progressively lower moving around the coast: South Coast 44.4%, East Coast 35.5% and KZN 32.4%. Opportunities seemed better in metropolitan areas (61%) than in towns (42.9%) and rural areas (36.9%).

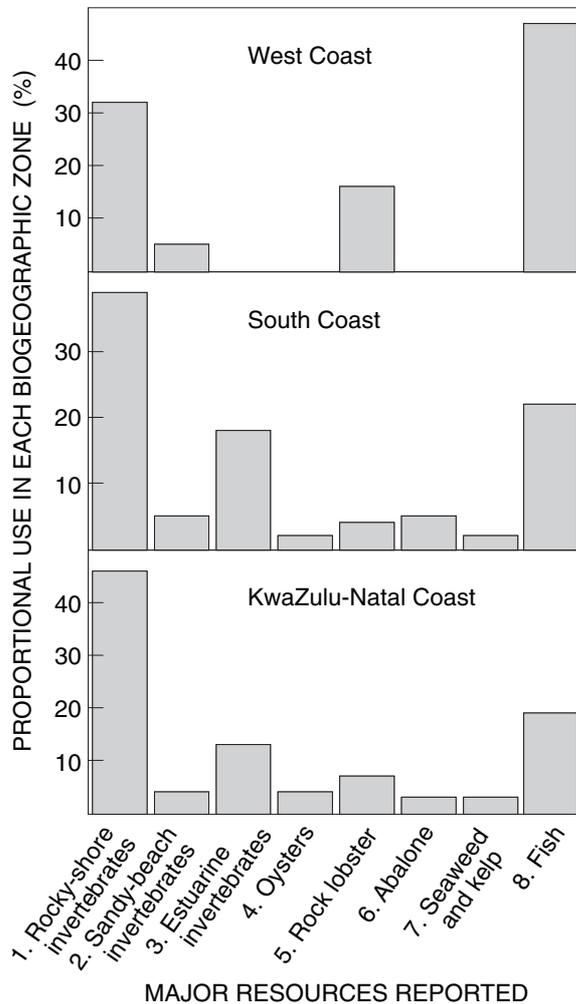


Fig. 7: Summary of the main resources harvested in the four regions around the coast. Frequencies reflect the proportion of respondents indicating that a particular group of resources is harvested at the locality where they reside. (1) Mytilid mussels, patellid limpets, chitons, redbait (a large solitary ascidian), winkles, octopus, urchins, worms. (2) Ghost crabs, mole crabs and sand mussels. (3) Sand and mudprawns, penaeid swimming prawns, pencil bait, estuarine crabs and cuttlefish. (4) Mainly the small-scale commercial species *Striostrea margaritacea* on the South Coast and non-commercial *Saccostrea cucullata* on the East and KZN coasts. (5) Inshore species, *Jasus lalandii* on the West Coast and *Panulirus homarus* in the eastern section of the South Coast and the KZN Coast. (6) *Haliotis midae* and small numbers of *H. spadicea*. (7) Commercially harvested kelps on the West Coast and commercial seaweeds such as *Onikusa (Gelidium)* spp. on the South Coast. (8) A wide range of estuarine, shore-caught, reef and nearshore species. More detailed information on taxa is given in Table II

Of these self-employment and micro-enterprise activities, “fishing and mussel harvesting” featured largely, averaging 75% and contributing 97% along the West Coast, 84% along the South Coast, 46% along the East Coast and 55% in KZN.

The relatively high contributions of fishing to self-employment and micro-enterprises at first sight seem to emphasize the importance of this sector. It must, however, be remembered that the communities were not sampled at random. Fishing households were deliberately selected because information about fishers was being sought. In this sense, the results only serve to confirm the validity of the sampling strategy.

If the focus is placed just on that sector of fishing households considered “most vulnerable” (falling into the “ultra-poor” bracket and lacking any contact with commercial fisheries), only 18% participated in any self-employment or micro-enterprises that had nothing to do with fishing. This attests to the dependency of these vulnerable fisher households upon subsistence fishing as a survivalist endeavour, without which they would not meet their food requirements.

In all three categories of settlements (towns, metropolitan, rural), fishing and mussel harvesting was undoubtedly the core activity, the participation rates being highest in towns (81.6%), followed closely by the metropolitan areas (75.8%) and then the rural areas (65.9%).

Some form of non-employment income was gained by 32% of the fisher households. This came mainly from claiming government grants, which include old-age pensions (64.4% of non-employment income) and disability grants (16.7%).

### Harvest of living marine resources

Of the 488 households surveyed, 81% reported harvesting fish, making fish the most commonly used resource. Together with fish, and in decreasing order of importance, mussels, octopus, rock lobster, sand and mudprawns, limpets, redbait (a solitary ascidian), the alikreukel or giant periwinkle, worms and abalone (known colloquially as perlemoen) were the 10 most-harvested resources (Table III). Of note is the fact that three of these “top ten” (sand and mudprawns, redbait and worms) were only harvested because they were used as bait (see below).

Figure 7 aggregates the resources into a smaller number of categories and considers differences among biogeographic provinces. The two groups of resources consistently most often harvested in all three provinces were fish and intertidal rocky-shore invertebrates. Differences among provinces were evident in most other groups. Estuarine invertebrates were virtually never reported as harvested on the West Coast, reflecting the scarcity of open estuaries there. Sand and

Table III: Numbers of households reporting harvesting of different resources. The resources are listed in ranked order of number of mentions. The percentage of household mentioning an item are provided. Sample size = 488 households

Resource	Taxa	Number of households reporting harvesting	%
Fish	Wide range of species	396	81
Mussels	<i>Mytilus galloprovincialis</i> on W. Coast <i>Perna perna</i> on South and East coasts	281	58
Octopus	Mainly <i>Octopus vulgaris</i>	210	43
Rock lobster	<i>Jasus lalandii</i> on West Coast <i>Panulirus homarus</i> on South and East coasts	172	35
Sand and mudprawns	<i>Callinassa kraussi</i> <i>Upogebia africana</i>	147	30
Limpets	Patellids <i>Cymbula</i> & <i>Scutellastra</i> spp.	135	28
Redbait	<i>Pyura stolonifera</i>	133	27
Alikreukel	<i>Turbo sarmaticus</i>	125	26
Worms	Nereids, eunicids, sabellarids, etc.	101	21
Abalone	<i>Haliotis midae</i> plus some <i>H. spadicea</i>	100	20
Periwinkles	<i>Oxystele</i> spp., <i>Turbo</i> spp., <i>Nerita</i> spp.	97	11
Sand mussels	<i>Donax serra</i> , etc. on sandy beaches	85	17
Oysters	<i>Striostrea margaritacea</i> on South Coast <i>Saccostrea cucullata</i> on East Coast	76	15
Chitons	<i>Dinoplax</i> spp. and <i>Chiton</i> spp.	60	12
Swimming prawns	<i>Penaeus</i> spp.	56	12
Squid	<i>Loligo vulgaris reynaudii</i>	45	9
Estuarine crabs	<i>Sesarma meinerti</i> , <i>Scylla serrata</i>	40	8
Sand and ghost crabs	<i>Ocyropode</i> spp.	32	7
Pencil bait	<i>Solen</i> spp.	29	6
Kelp	<i>Ecklonia maxima</i> , <i>Laminaria pallida</i>	29	6
Urchins	<i>Echinometra</i> , <i>Triploneustes</i> , etc.	26	6
Seaweed	Mainly <i>Gelidium</i> , <i>Onikusa</i>	23	5
Sea cucumber	Mainly <i>Holothuria</i> spp.	18	4
Cuttlefish	<i>Sepia</i> spp.	12	2

mudprawns (*Callinassa kraussi* and *Upogebia africana*) are harvested in West Coast estuaries and lagoons (Wynberg and Branch 1991), but would probably not have been accessible to any of the West Coast communities surveyed. Oysters are virtually absent on the West Coast. On the South Coast and parts of the East Coast the commercial *Striostrea margaritacea* was the main species of oyster harvested, but on the KZN Coast the most commonly gathered species was the non-commercial *Saccostrea cucullata*. On the West Coast the rock lobster *Jasus lalandii* features as the third most important group, but on the South and KZN coasts it is replaced by the less abundant *Panulirus homarus*. Abalone *Haliotis midae* are scarce or absent on the West Coast, but the low rate of use reported on the South Coast was unexpected. Kelp gathering was not reported on the West Coast, although it does take place (Anderson *et al.* in press).

A more detailed analysis of the individual fish species reported as being harvested (Fig. 8) shows that the species composition changed around the coast, and the overall diversity of harvested species increased from west to east, in keeping with biogeographic patterns (Brown and Jarman 1978, Turpie *et al.* 2000). Diversity was especially low at Ebenhaeser, where respondents reported the harvesting of harders (mullet

*Liza richardsonii*) only. This reflects the position of this community, which lies inland on the Olifants Estuary where fishers have no access to open-coast resources (Sowman *et al.* 1998). Mullet (Mugilidae) were almost universal contributors to catches around the entire coast. They form an important constituent of subsistence and small-scale commercial fisheries right around the coast (Hutchings 2001, Hutchings and Lamberth 2002) because of their abundance, in-shore distribution, wide geographic range, and because they occupy a diversity of habitats, being found in estuaries and in shallow waters on the open coast. Two other groups of fish, kob *Argyrosomus* spp. and elf *Pomatomus saltatrix*, were of ubiquitous importance within their geographic range.

#### Gender involvement and uses of resources

Figure 9 addresses two questions: the gender of fishers harvesting particular resources, and the purpose to which these resources were put (consumption as food, use as bait, or for sale). The resources fell into four clearly distinct groups. The first comprised fish, rock lobsters and abalone, all of which are collected with commercial intent, although consumption of fish by

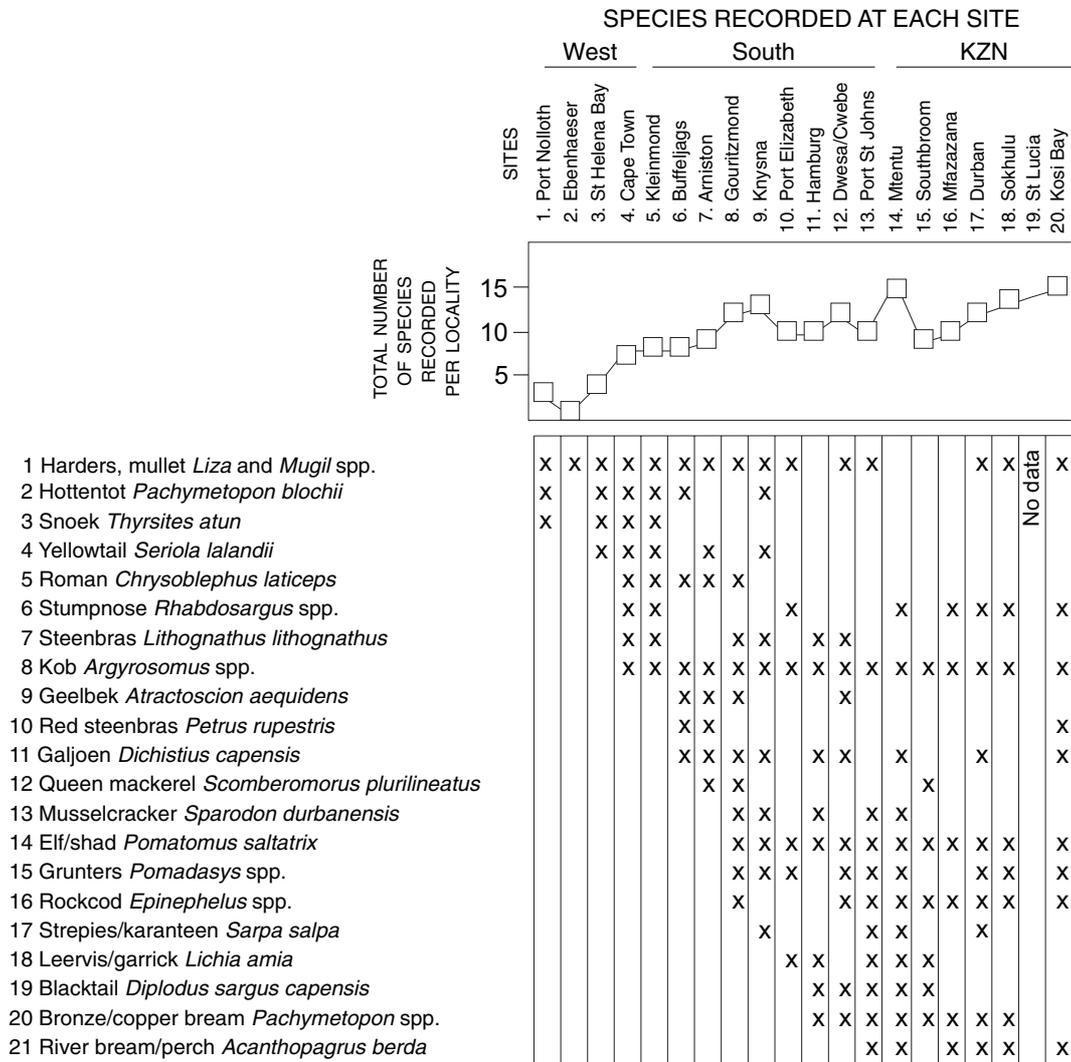


Fig. 8: Total number of fish species and a list of individual species stated as being harvested at each locality. Information derived from household questionnaires or focus-group meetings. The list excludes seven species that were each recorded at fewer than three localities

harvesters increases from west to east (Fig. 9a). Men formed by far the largest proportion of fishers for these resources, although women played a greater role along the KZN Coast. In focus-group discussions, these resources were stated to be harvested by better-off households. This has much to do with the availability of resources at particular localities, and the household or individual's access to a boat and sophisticated diving or fishing gear. The West Coast rock lobster was viewed by participants in focal groups as

being a high-value resource; virtually all catches are sold. The East Coast rock lobster is used as bait, occasionally consumed, or sold to tourists.

Kelp and seaweeds are gathered solely because they can be sold, or because people are employed to harvest them. On the South Coast, seaweed was described by focus groups as being collected by poor households, and particularly women in rural areas. On the West Coast, kelp harvesting is a male preserve.

The second group of resources consisted of species

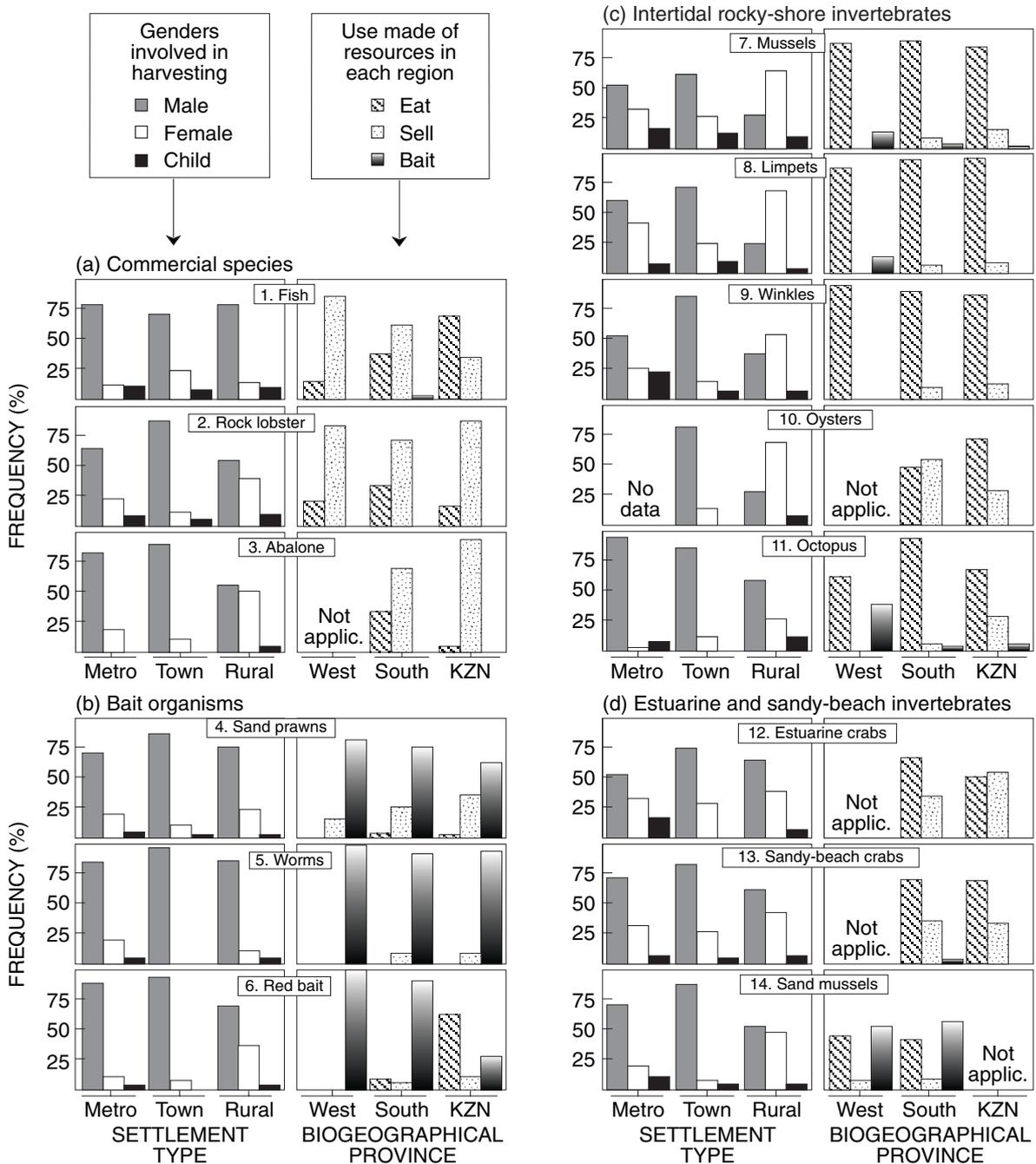


Fig. 9: Genders involved in harvesting, and uses made of resources. Resources are grouped according to whether they were (a) high-value commercial species, (b) used as bait, (c) harvested from intertidal rocky shores and used mainly for food, or (d) collected on sandy beaches and in estuaries. Data are subdivided by settlement type (left block for each resource) or by biogeographical province (right block). No data = not reported; not applic. = not applicable to that particular region. More detailed information on species included in each category appears in the caption to Figure 7

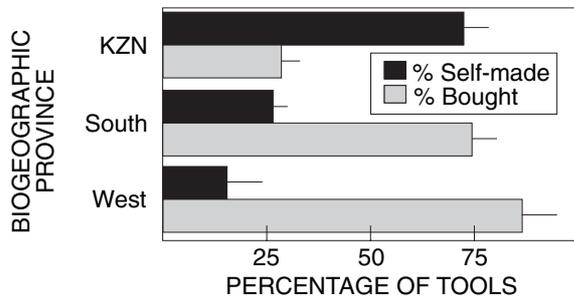


Fig. 10: Percentage of fishing gear (traps, rods, handlines, knives, hoopnets, gillnets, gaffs, screwdrivers, pangas, etc.) that was purchased versus handmade. The data are broken down into the three biogeographic provinces

used almost entirely for bait: sand and mudprawns, a range of worms and redbait. Men were again the major harvesters because they are the predominant sector involved in catching fish, and bait collection is part and parcel of this activity. Bait organisms have the potential for sale, although the household surveys show that most are currently gathered for personal use. At focus-group discussions, erratic demand for bait was stated to be one of the major factors limiting its emergence as a true commercial product. The main market outlet for this resource is recreational fishers. They operate year-round in substantial numbers only in areas in proximity to the metropolitan centres or towns. In more remote areas their presence provides a seasonal opportunity when visitors arrive during vacation periods.

The third group was made up of intertidal rocky-shore invertebrates. These were harvested almost exclusively for personal consumption by the fishers or their families (Fig. 9c). Focus-group discussions revealed that most resources in this category were regarded as basic subsistence resources and are used mainly by poorer households. Women played a much greater role in harvesting these resources, to the extent that along the KZN Coast they were in the majority in rural areas. Harvesting of octopus, however, remained largely the preserve of men, even in rural areas. Of interest is the fact that, on the South Coast, almost 50% of the oyster *Striostrea margaritacea* was gathered for consumption, although a small-scale commercial fishery exists for this species there. Similarly, octopus was consumed rather than sold, even though commercial outlets exist and the potential for small-scale commercial operations using inshore octopus has been investigated (Smith 1999, Smith and Griffiths 2002). Focus-group participants noted that octopus is a “by-

catch”, opportunistically harvested by fishers while gathering other resources. Nevertheless, 43% of respondent households reported that they harvest octopus. On the KZN Coast, octopus is targeted by inyangas (traditional healers) for medicinal purposes, although demand for octopus is reportedly not particularly high from this sector.

Estuarine and sandy-beach invertebrates constituted the final group (Fig. 9d). Crabs are harvested either for consumption or for local sale within fisher communities. Sand mussels *Donax serra* are used as food or bait. About one-third of the fishers harvesting these resources were women.

The overall picture was that there were three main reasons for harvesting: profit, food or bait. Men were nearly always the dominant players, especially with the commercial and bait organisms. Only in the case of KZN Coast rocky-shore invertebrates were they in the minority. Sex ratios differed significantly from the national norm of 52% females in every case, except rural harvesting of sand mussels. In all other instances the difference was statistically highly significant ( $\chi^2 2 \times 3$  contingency tests,  $p < 0.001$ ).

### Types of equipment

One final aspect of harvesting was that household respondents were asked to describe the equipment they used and whether they made or purchased it. Both the nature and the purchase of equipment were criteria considered for defining subsistence fishers. Non-motorized boats were used along the entire coast, including Port Nolloth (few), Ebenhaeser, Paternoster, St Helena Bay, Knysna, Durban (by seine-netters) and Kosi Bay. Use of motorized boats was reported on the West and South coasts only — at St Helena Bay, Paternoster, Cape Town (Kalk Bay), Kleinmond, Buffeljags, Waenhuiskrans (Arniston) and Gouritsmond. At Gouritsmond, the boats were clearly engaged in commercial level operations. The overall patterns of boat use conform to those described by Clark *et al.* (2002).

Almost all the equipment used to harvest resources was basic simple gear, including screwdrivers, knives and pangas, handlines, prawn-pumps, rods and reels, gaffs, hoopnets for rock lobsters on the West Coast, gillnets, seine- or trek-nets, traps and simply “hands”. (One of the more imaginative items listed as equipment was “twist/dance”, describing the gyrations of the feet used to detect buried sand mussels.) Apart from boats, the only expensive equipment named was diving gear (wet suits, SCUBA, hookah), used exclusively to collect abalone. There were regional differences in the frequency with which gear was purchased or hand-

made. On the KZN Coast, 74% was manufactured by the fishers themselves, but on the South and West coasts only 16–24% was self-manufactured (Fig. 10). These values reflect the relative poverty levels discussed above.

Many of the intertidal and bait harvesters reported using spades, pangas and other instruments that they, themselves, recognized as destructive. The main reason advanced for using these methods was problems anticipated with the law enforcement authorities. The idea was to “get in and out” of the harvesting area as fast as possible before the enforcement authorities could apprehend them. They felt that a better working relationship between harvesters and enforcement agents, through collaborative co-management efforts, would reduce destructive harvesting practices. Harvesters in the focus groups also mentioned the use of vinegar and bleach to chase worms out from beneath the mussels. They knew that this had a negative effect upon the mussels, which they were not targeting, but also recognized that using a blunt instrument to remove the mussels to get at the worms also caused immense collateral damage, as has been documented by van Herwerden (1989).

## DISCUSSION

The fishing sector in South Africa has developed a set of distinctive characteristics, many of which are attributable to a combination of biogeographic patterns of resource distribution, coupled with the implementation of previous policies grounded on the system of apartheid (Cochrane 1995, Hersoug 1998). Of particular note is the extremely uneven distribution of resources between whites and blacks (defined to include Indians, Coloureds and Africans), the latter generally having little or no access to the main commercial resources in the country’s fisheries. Another feature is the uneven regional distribution of fishing and processing possibilities. More than 95% of commercial fishing operates from the Western Cape (Hersoug 1998), largely because of the high biomass of resources associated with upwelling on the West Coast (Nelson and Hutchings 1983, Shannon 1985). The distribution of micro-enterprise forms of fishing is likely to differ from this profile, and the current study represents one of the few research endeavours in South Africa that investigates the demographic and social characteristics of the continuum of enterprises that spans subsistence to small-scale commercial fishing.

Three central themes emerge. First, biogeographic trends in the distribution of animals and seaweeds and the occurrence of particular species in particular habitats

exert a primary influence on what is available and what types of fishery develop in different regions. Second, the legacy of apartheid has stamped its mark on fishing communities, poor households having limited access to education and other services required to fulfil basic human needs, and survivalist subsistence fisheries being concentrated in the areas once designated as homelands. Third, fishing is largely a male preserve.

### What are “subsistence fishers” and “subsistence communities”?

The issue of whether there are “subsistence-fishing communities” is a complex and important one, clearly linked to the wisdom of declaring certain areas as “subsistence zones”. The appropriateness of such zones obviously depends upon the definition of two contentious elements – “subsistence” and “community”. There are towns on the West and South coasts and villages along the KZN Coast where a large proportion of community members is involved in, and dependent upon, marine harvesting. Many of these towns are known as “fishing” towns or villages and have a long history of fishing. But history, involvement and dependency may not be sufficient to define a subsistence fishing community. For example, on the rural and small-town areas of the West Coast, most of the harvesting of fish and rock lobster is from boats, and most of the catch is sold. Whether these fishers are “subsistence” fishers or not depends upon the definition of “subsistence” employed. There are also fishers living in metropolitan areas. The size of such settlements and the heterogeneous nature of the people living there militate against calling them a “community” of any kind, let alone a “subsistence-fishing community”. There is also a wide range of economic activities associated with metropolitan areas and a lower level of dependence on marine resources, if one takes the total population into account. However, the fishers contacted during the study had low levels of education and were not well placed to obtain other jobs. Not having agricultural land to fall back upon in metropolitan areas, they were very dependent upon marine resources for their survival. Their location in an urban centre meant that they were part of a cash economy and sold most of their catch for money. Whether they should be termed “subsistence fishers” or not, it is clear that they are extremely vulnerable, as Peluso *et al.* (1994) have noted for all communities that depend on natural resources.

Marine harvesters living in the former Transkei and KwaZulu homelands display yet another pattern of marine resource harvesting. Many have a long history of marine resource use, live in clearly identified, fairly homogeneous communities, consume most of what

they harvest, are poor people and largely harvest resources that yield low financial returns if sold. Typically, they have access to land and engage in subsistence agriculture. The marine resources form an important complement to the food of the poorer households in some of these areas (Hockey *et al.* 1988). However, many people in these communities are only occasional harvesters of marine resources. All of the foregoing makes the designation of "subsistence fishing zones" for "subsistence fishing communities" an extremely difficult task.

Nevertheless, there are useful guidelines. Subsistence-fisher zones are most likely to be a useful management tool where: (a) a large proportion of the community uses marine resources; (b) the community forms a cohesive and identifiable group; (c) reliance on these resources is high; (d) there is a long history of harvesting; (e) resources are in short supply, and (f) competition occurs between different sectors using the resources.

The transition from the apartheid political system to a democratic dispensation since the early 1990s has brought with it the onerous task of addressing the crippling poverty and inequality afflicting the country. Although South Africa ranks as an upper-middle income country, approximately 50% of South African households are classified as poor (May 1998, Carter and May 1999). In response to this harsh reality, the alleviation of poverty has become one of the central tenets of the government's social expenditure programmes, the fishing sector being no exception: "The primary objective of fisheries policy is the upliftment of impoverished coastal communities through improved access to marine resources and the sustainable management of those resources through appropriate strategies" (ANC 1994, p. 104).

Balanced against this ideal is another reality: that most marine resources are fully exploited or over-exploited (Branch *et al.* 1996). This leaves only four avenues to establish a more equitable balance of resource-use: (1) transformation of the existing industry; (2) re-allocation of rights; (3) use of "new" resources, and (4) restoration of rights curtailed by law.

The first two primarily concern the established industrial-scale fisheries. They can transform their own internal structures to become more representative of society. If, however, new independent entrants are to be given rights to commercial quotas, these can be granted only at the cost of reducing allocations made previously to the fishing industry. This risks disruption of market supply lines and employment by the industry. Nevertheless, re-allocations have already taken place (Hutton *et al.* 1997).

Of particular relevance to the topic of subsistence fisheries are inshore resources such as rock lobster and abalone, which are accessible and can be har-

vested without recourse to high-technology, capital-intensive equipment, but yield high financial returns. Both lie at the heart of controversy as to which resources should be made available to subsistence fishers and which should not. Both 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 when allocations were made available. Benefits to poor fishing communities were few and the process served as a loophole to increase poaching.

"New" resources are not thick on the ground, but they do exist. They include expansion of kelp and seaweed harvesting and processing, shallow subtidal whelks, octopus, West Coast limpets and sale of bait (Cockcroft *et al.* 2002).

Restoration of rights goes to the heart of subsistence fishers who rely on marine resources to meet their basic needs of food security. Until the Marine Living Resources Act focused attention on them, they were marginalized and either ignored or persecuted. They did qualify as "recreational fishers", legally entitling them to harvest resources. The quantities they could harvest legally under this guise were, however, inadequate to meet their nutritional needs. Restoring their rights and recognizing their distinctive needs, as well as establishing appropriate management procedures for them, are giant steps that must be taken.

Nevertheless, all four avenues must take cognisance of the reality that marine living resources are finite. They can serve to uplift poor subsistence fishers, but there are limits to what they can contribute to wealth creation. Severely overexploited shores such as those in Transkei (Hockey and Bosman 1986, Lasiak 1998) will be of benefit to no one.

### Demographic profiles

From the demographic data, a synoptic profile of the sampled fisher households can be pieced together. Overall, the fishing communities surveyed were characterized by: (1) high residency rates (averaging 95.2%); (2) an average of 5.3 persons per household; (3) domination of fishing activities by men in most areas; (4) a relatively low average age (27 years), a relatively high reliance on child labour (15% of the fishers) and a high demographic dependency ratio of 0.53. Education levels were low (<35% had completed primary school). Unemployment was high: 40.2% among the "economically active" sector aged 15–65. This figure is much higher than the national average of 29.3% (Statistics

SA 1998).

Distinct demographic discrepancies existed between the East and KZN coasts on the one hand and the South and West coasts on the other. In particular, two findings stand out. (1) The fisher households of the East and KZN coasts were more rural than in other regions, migrancy rates were higher, household sizes were larger and dependency ratios higher, and unemployment rates were more severe. (2) Subsistence fishers were generally more youthful than commercial fishers, and had a greater female contingent. Women were also more often involved in fishing on the East and KZN coasts than elsewhere. Nonetheless, there was a greater overall propensity for men rather than women to be fishers.

The fact that migrancy rates were low is of importance when developing a sense of who "subsistence fishers" are and trying to define them. One important criterion often voiced is that they should be part of a community with long-standing connections with marine fishing (Branch *et al.* 2002). High residency rates would facilitate this.

### Poverty profiles

The definition of poverty has been the subject of some debate among policy analysts, but it includes the inability to attain a minimum standard of living (World Bank 1990), the lack of resources with which to attain the type of diet or life-style that is socially acceptable (Townsend 1979), and constrained choices and unfulfilled capabilities (UNDP 1996). The consensus sees poverty as being characterized by the inability of individuals, households, or entire communities to command sufficient resources to satisfy a socially acceptable minimum standard of living. This is the notion of poverty accepted here.

Three overall messages emerge from the survey on poverty. First, poverty levels were generally high among fisher households. A low incidence of waged employment (~50%), relatively small incomes (averaging R455 per month per household) and a high rate of food insecurity (53%) all point to this (Table II). Low levels of education (Fig. 3) are a contributing factor, but high unemployment (Fig. 4) is a central cause. With monthly expenditure on food averaging R389 per household (Fig. 5), subsistence harvesting can be expected to make a significant contribution to the basic needs of food security, either by consumption of catch or by sale or barter to generate money to buy food. In addition, 32% of fisher households draw government grants in the form of pensions or disability grants. This conforms to the pattern shown in earlier livelihood surveys in the country as a whole. Previous

work has noted the importance of such sources of income in poor communities (Ardington and Lund 1995). As May (1996: p. 14) has noted: "South Africa is unique among developing countries in that it has a well functioning social pensions system which has high coverage among the elderly in rural areas. Claiming these rights from the states in the form of pensions and disability grants has been shown to be of critical importance to household incomes". In summary, a range of indicators point to poverty being rife in most of the fisher communities.

Second, poverty was differentially distributed among regions, with the lower 40<sup>th</sup> percentile ("poor") and lower 20<sup>th</sup> percentile ("ultra-poor") being over-represented along the East and KZN coasts, where education levels were also lower than elsewhere, and unemployment reached 50% or more (Table II, Figs 3–5). Relative poverty levels were highest on the East Coast (57% poor) and in KZN (49% poor) and much lower on the South and West coasts (28 and 18% respectively). In part, this reflects the biogeographic distribution of natural resources, because the western parts of the country experience higher levels of productivity and support the bulk of the commercially lucrative stocks. It also reflects the previous existence of homelands in Transkei and KwaZulu, where black people were concentrated with limited access to employment.

Third, in rural areas, with less opportunity for employment, isolation from markets, low levels of education and poor provision of services all conspiring, poverty was greater than in towns and metropolitan areas. Rural fishers were twice as likely to be poor than fishers in other areas.

The legacy of apartheid has contributed to poverty, with the poor households having had low levels of education and limited access to other services required to fulfil basic human needs. The policy isolated many black people in areas where employment was limited and put legal limitations on job opportunities. Both factors affected fishers, but they were more specifically affected by restrictions (both legal and tacit) on the subset of people who were likely to get fishing quotas: disproportionate allocations were made to a relatively small number of white-owned commercial companies. Finally, it meant that the needs of subsistence fishers were not even considered. Largely, they became illegal by edict and were treated as such by law enforcement agencies.

Poverty in South Africa has a strong racial dimension, being concentrated among the African population, and was notably higher in rural areas, especially the former homeland areas. Additionally, poverty has been shown to be higher than average for female-headed households and children (Klasen 1997). In

surveys of fisher households, however, female-headed households were much less likely to be among the "poor" than male-headed households.

The links between poverty and low education levels are obvious, but there are other less obvious implications for the implementation of a subsistence fisheries programme. Both factors lead to problems of communication. Illiteracy, inadequate access to television and national newspapers and the unlikelihood of poor fishers consulting the Government Gazette must compel authorities to develop appropriate means of communication, both to consult fishers and to inform them of developments. During the surveys of communities it was clear that first-hand contacts between fishers and Regional Fieldworkers were central to communication (Harris *et al.* 2002b), and lack of effective channels of communication were seen as a major obstacle to current management practices (Hauck *et al.* 2002).

#### Use of marine living resources

The most obvious result emerging from the survey was that fish and rocky-shore invertebrates constituted the most important resources throughout the country. On the West Coast, rock lobster was the second-most important resource; in the South and KZN biogeographic provinces, estuarine invertebrates filled this position. The remaining groups were harvested at roughly equally low intensities, with obvious gaps where resources did not occur in a particular region. The heart of commercial harvesting for abalone lies along the western sector of the South Coast. The reported rate of use there was surprisingly low, probably reflecting the fact that poaching is rife in the area (Hauck and Sweijd 1999) and harvesting almost certainly under-reported. Kelp and seaweeds were reported as being harvested by only a small number of households, but the absence of any reports of kelp/seaweed gathering on the West Coast is an anomaly. Beach-cast kelp is gathered there by people employed by companies that have concessions to collect washed-up kelp (Griffiths and Branch 1997, Anderson *et al.* in press). Both are commercial resources either gathered by employees of companies granted concessions to harvest kelp, or sold by harvesters to dealers or factories for processing.

These patterns confirm the conclusions of Clark *et al.* (2002) about the relative use of different resources and their geographic distribution. Their conclusions were based on a different method of gathering data, i.e. reliance on knowledgeable local experts rather than consultation with fishers. The concordance of the two datasets is reassuring. In both cases, fish and

rocky-shore invertebrates headed the list in terms of frequency of use, diversity increased eastwards, and there was an increasing shift towards use of low-value resources in the east.

The present survey showed that resources were used for three main purposes: to be sold, eaten or used as bait (Fig. 9). Fish, rock lobsters and abalone featured strongly among those that were nearly all sold. All three were among the "top ten" groups reported to be most frequently harvested (Table III). Bait organisms (worms, sand and mudprawns, redbait) were also among the "top ten". Nearly all intertidal rocky-shore invertebrates were "all or mostly consumed", the exception being oysters, about half of which were sold on the South Coast.

There were clear regional differences in the use of resources. Two need emphasis. First, the diversity of harvested resources increased from west to east. This was evident in both the coarse analysis of all resources (Fig. 7) and in the more fine-scale analysis of fish alone (Fig. 8). This is a direct reflection of biogeographic patterns (Brown and Jarman 1978, Turpie *et al.* 2000), but is also because of the accessibility of resources in particular localities. None of the resources were offshore species that require capital-intensive fishing. Three groups of fish were prevalent in catches: (a) nearshore, shoaling species that can be caught in shore-based seine-nets: harder, yellowtail *Seriola lalandi*, queen mackerel *Scomberomorus plurilineatus* and aggregations of white steenbras; (b) near-shore linefish caught with rod-and-line or handline: kob, elf, hottentot *Pachymetopon blochii*, snoek *Thyrsites atun*, Roman *Chrysoblephus laticeps*, steenbras *Lithognathus lithognathus*, galjoen *Dichistius capensis*, blacktail *Diplodus sargus capensis*, musselcracker *Sparodon durbanensis*, grunters *Pomadasyus* spp., bronze bream *Pachymetopon* spp., river bream *Acanthopagrus berda*, stumpnose *Rhabdosargus* spp.; (c) species that enter estuaries and use them as nursery areas, and can be caught there in gillnets, traditional fishkraal traps or by angling, e.g. harders, grunters and steenbras.

Second, most of the commercially lucrative species are concentrated in the Western Cape. The four most important commercial groups – hake *Merluccius* spp., pelagic fish, West Coast rock lobster and abalone all reside there (Cochrane 1995, Hersoug 1998). The result was that patterns of use differed regionally, as Griffiths and Branch (1997) have noted before. Fishers on the West Coast and parts of the South Coast focus on species they can sell, and the highest proportion of households declaring themselves "commercial" lay on the westerly section of the South Coast. Use of subsistence resources was more intense along the KZN Coast and the eastern part of the South Coast. It is

ironic that the greatest intensities of subsistence harvesting are in the east where biomass of resources is lowest (van Erkom Schurink and Griffiths 1990, Bustamante and Branch 1996).

In terms of gender, fishing was dominated by men (Fig. 9), but there were regional differences. Involvement of women was greatest along the KZN Coast, especially in the context of harvesting intertidal rocky-shore invertebrates, and particularly in rural areas (Table I).

One important issue resolved by the survey was the extent to which fishing equipment is handmade or purchased. Overall, 62% of equipment was purchased, even though most of it was unsophisticated gear. Handmade equipment was in the majority on the KZN Coast, conforming to the fact that poverty levels were highest there. Because most equipment is purchased, it is inappropriate to link "subsistence" with "handmade equipment", as was considered in formulating the definition of subsistence fishing (Branch *et al.* 2002). Nevertheless, the vast majority of all equipment was "low-technology", a characteristic that did feature among the criteria defining subsistence fishers.

Another important clarification was that none of the resources was used solely for self-consumption. This evidence was fundamental in shaping debates about the definition of subsistence fishers (Branch *et al.* 2002). It made it completely impractical and counterproductive to limit the term to those who harvest for personal consumption alone.

The issue of what constitutes a high-value resource is an important but difficult one, addressed more fully in Branch *et al.* (2002) as part of the definition of "subsistence". High-value resources are generally not seen as appropriate for subsistence use. If a resource can be sold at a high price, then it is, and should be, a commercial resource.

The categorization of resources as having micro-scale or small-scale commercial versus subsistence potential should not be based solely on their monetary value and the capital cost of harvesting, but also on the regularity of supply of sufficient volumes to meet market demands. Commercial marketing of a resource implies a regular supply chain. Developing supply lines and marketing channels for resources that have not historically been marketed on a broad scale is challenging. With the correct support, micro-scale enterprises are well positioned to take advantage of opportunities for innovative development of new markets. Sound management and allocation of resources could, with sufficient support, provide a means for survivalist resource users to move out of the "poverty trap" in which they find themselves.

Despite the complexity associated with according high-value status to certain resources, the utility of

grouping resources into value categories is that it allows appropriate associated management.

The most clear-cut cases of resources that should be considered commercial and not subsistence are rock lobsters and abalone. Both West and East Coast rock lobster provide opportunities for people to move from a survivalist subsistence situation to running an artisanal micro-enterprise. They could provide a means for poor people to escape the "subsistence poverty trap" and develop into micro-entrepreneurs. The high value of the resource on its own should not constitute a reason for denying emergent micro-entrepreneurs access to this resource, provided that the enforcement of sustainable harvesting levels is ensured. Previous attempts to create "subsistence rights" for West Coast rock lobster (and abalone) were not a great success. They opened the door to poaching and did not lead to effective and long-term benefits to the fishing communities. It would be better to allocate quotas for artisanal micro- or small-scale commercial enterprises, and for a small (and controllable) number of entities to be given commercial rights under strictly monitored conditions, leading to the establishment of stable and profitable markets and long-term rights. Both industrial-scale and micro-scale enterprises should be granted allocations of quotas for the West Coast rock lobster. Small or micro-scale commercial operations could occur in parallel with large-scale industrial harvesting, the former operating in shallow water and using small nets and hoopnets, and the latter in deeper water using traps from larger boats. This would follow the model developed in Chile, where artisanal fishers can gain exclusive rights to shallow-water benthic resources and industrial fisheries operate offshore (Minn and Castilla 1995).

In the case of the East Coast rock lobster, Fielding *et al.* (1994) advocated that local sale by fishers be encouraged and developed on the Wild Coast (the eastern part of the South Coast), because the cash value of these rock lobsters is high, even if the amounts caught are not substantial. Fielding *et al.* (1994) specifically recommend that industrial commercialization be excluded, partly because the stocks are relatively small, and partly because this would risk removing control from local fishers.

In theory, abalone also offer opportunities for both industrial and micro-scale commercial operations. In practice, intense poaching jeopardizes both such operations and the future of the entire industry, damping annual allocations and bedeviling attempts to secure re-allocation of quotas from industrial to micro-scale artisanal operators.

Another group of resources that could be considered for micro-scale or small-scale commercial use is bait species. They are accessible, do not require much capital

investment and can be used by harvesters to catch higher-value resources such as fish, or sold to recreational fishers. The true potential of kelp and seaweeds also lies in small-scale commercial enterprises, not subsistence harvesting (Griffiths and Branch 1997, Anderson *et al.* in press).

By contrast, subsistence resources are those that provide better returns by being eaten than sold – when the price that local harvesters could gain from selling the resource is less than the “substitution cost” of the protein value of the resource.

Enthusiasm for granting new entrants rights to subsistence or commercial resources must, however, be tempered with the reality that many resources are already overexploited. For instance, harders, the most widely distributed of the harvested fish, now form the mainstay of gillnet and seine-net small-scale commercial industries along the West Coast. Both they and linefish are, however, severely overexploited (Griffiths 2000, Hutchings 2001, Hutchings and Lamberth 2002). There is no room for expansion.

Intertidal rocky-shore invertebrates are also intensely harvested in certain areas. Two centres for subsistence harvesting of these resources are the South Coast (in what were previously called Transkei and Ciskei), and Maputaland in northern KwaZulu-Natal. Both were coastal “bantustans” under the apartheid regime. Both are heavily harvested or over-harvested (Hockey and Bosman 1986, Hockey *et al.* 1988, Kyle *et al.* 1997, Lasiak 1998).

There are, however, hopeful signs that changes in management strategy can yield more efficient and more sustainable fishing practices, with both benefits for subsistence fishers and improvements in the state of the resources. A successful co-management system has been established at Sokhulu in KZN, where mussel-gatherers and the local authority have established a joint committee and fishers are now participating in experiments and monitoring. Among other things, this has led to their adopting screwdrivers to remove mussels instead of broad-bladed pangas, so reducing the by-catch of juvenile mussels and other species (Harris *et al.* in press). Another success story is the establishment of a local management committee at Arniston, which has chosen to re-invest parts of the profits from fishing quotas back into community bursaries to uplift the education standards of local youth (Hutton and Pitcher 1998). Through improved marketing they have raised their income levels to the highest reported among the 20 surveyed communities.

Co-management is, however, not a panacea for all ills. For instance, legalized netting of fish in St Lucia under co-management was a mixed success because of illegal takes (Mann 1995). Nevertheless, it holds out greater hope than previous management policies in which subsistence fishers were not consulted and lived

with laws they felt were unfair.

This was the first national survey of its kind to explore the socio-economic circumstances and fishing activities of informal fishers on the coast of South Africa. Clearly, substantial numbers of people are involved in such activities, most of whom are relatively poor and depend on fishing to sustain themselves and their families. Most harvest resources for self-use (whether they consume them, use them for bait, or sell them to meet the basic needs of food security). The equipment they use tends to be unsophisticated, although most of it is purchased, and they fish from or on the shore or in estuaries. These characteristics or circumstances are all important, not only in defining “subsistence fishers” (Branch *et al.* 2002), but also in framing appropriate management procedures (Harris *et al.* 2002b). Without an understanding of the socio-economic context of fishers it would be impossible to formulate effective policy and management strategies. The process of obtaining this information has also been an important one, because it has opened communication with fishers and uncovered their concerns and needs (Hauck *et al.* 2002).

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