CO–MANAGEMENT OF MARINE RESOURCES AS AN INSTRUMENT TO FACILITATE CONFLICT RESOLUTION IN HAWSTON

by

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1. INTRODUCTION

The living marine resources of South Africa belong to the people of the country. With a steady growth of the human population and the subsequent increased demand for food, it is imperative that the resources of our waters are managed for the optimal social and economic development of all South Africans. The ownership of the resources are vested in the state and it is, therefore, the state's responsibility to ensure that the chosen form of fisheries management promotes both sustainability and equity.

The aim of this paper is to explore whether co-management can be implemented at Hawston, as a possible instrument to eradicate conflicts between the residents of this long established fishing community. As a starting point, the historical background of fisheries in South Africa will be discussed. It is clear that the oppressive apartheid regime was primarily responsible for the immense problems that are nowadays faced by disadvantaged coastal communities. The underlying theoretical framework will be intensively discussed by citing the works of some distinguished scholars. I believe that a clear understanding of the theoretical background of issues around co-management will help to resolve the problems in Hawston. The questionnaire will be discussed in detail by extrapolating some of the information on graphs and tables. I hope to link the information gleaned from the questionnaires and the interview sessions, with the theoretical background of fisheries management so as to establish whether co–management could be implemented successfully in Hawston.

2. BACKGROUND INFORMATION

During my preliminary visits to Hawston, I surmised from discussions with many residents that the problems in Hawston have originated many years ago. I therefore decided to research the historical background of fisheries in South Africa. I believe that a knowledge of this background is essential to ensure that the problems in Hawston are examined in their appropriate context.

2. BACKGROUND INFORMATION

2.1 HISTORICAL BACKGROUND OF FISHERIES IN SOUTH AFRICA

2.1.1 The Fishing Industry during Apartheid

The words quoted below epitomise some of the fundamental problems in the South African fishing industry, caused primarily by the apartheid legacy.

"Fishing communities on the Cape's west and south coasts face an uncertain future, given the steady decline of already scarce resources. Poverty and unemployment stalk villages such as Ebenezer, Doringbaai, Paternoster, Hawston and Arniston. Despite the fact that the commercial fishing industry is a multi–million rand industry which has reaped great financial rewards, precious little has trickled down to traditional fishing communities. The story of how these once vibrant and thriving villages have been brought virtually to their knees is a depressingly familiar tale of greed, corruption, government mismanagement and over fishing by the commercial sector. Regulations, such as those requiring the licensing of boats, the acquisition of skipper's licences and fishing permits, have consolidated and perpetuated the shift in control of the industry to the commercial sector. This predominantly White sector could more easily obtain permits and licences because they were in a better position to finance the boats and the equipment required to be considered for the licences. Poorly educated and sometimes illiterate fishermen found their lifetime of experience discounted when they were unable to pass the written exam for the skipper's licence. These regulations, in addition to discriminatory laws applied during the apartheid era, have resulted in the impoverishment and marginalisation of fishing communities, furthering the steady alienation of these communities from their resource base, and causing great bitterness and hardships." (Weekly Mail and Guardian, 13–19 January 1995).

The previous illegitimate apartheid government marginalised the disadvantaged population groups (mainly Africans, Coloureds and Indians) from the fishing sector. Laws and regulations favoured White fishers whilst discriminating against the other groups. This aspect is explicitly expressed by Hersoug (1995:2) when he states that forty years of apartheid and many years of traditional colonial discrimination has left the fishing sector with the following characteristics:

- an extremely uneven distribution of resources between White and Blacks.
- a skewed distribution between small–scale and large–scale operators.

- an uneven regional distribution.
- a fisheries administration dominated by White politicians and rule–bound White administrators.

Black communities, including Africans, Coloureds and Indians, were terribly incapacitated with respect to quotas, ownership of vessels and acquisition of licences. For example, "in 1994 the total South African quota amounted to 512437 tons within the eight species regulated by TACs (hake, sole, pilchard, anchovy, horse mackerel, South and West Coast rock lobster and abalone). Of these quotas 0.75 per cent were awarded to blacks. Of the 2700 registered commercial fishing boats in South Africa, 7 per cent are owned by blacks, while 4000 fishing licences issued, approximately 6 per cent are issued to blacks" (Hersoug, 1995:3).

A few large companies such as Irvin and Johnson, Sea Harvest, Marine Products and Oceana monopolised the fishing industry to the extent that they received the bulk of all available quotas. Quotas were unfairly allocated to those companies that dominated the removal, processing and marketing of marine resources. The small–scale business sector could not compete with the established companies.

The administrative system consists of a Department of Sea Fisheries, located within the Ministry of Environmental Affairs and Tourism. The Sea Fisheries Research Institute is the chief advisor to the Minister. The administrative institutions are all located in the Western Cape. This is perhaps expected because the fishing industry is concentrated in this province, although there are other important maritime provinces such as the Eastern Cape and Kwa–Zulu Natal. Political pressure dictated how quotas and licences were awarded. During the previous order, no or little attention was given to Black fishermen and communities. The ultimate result was that the administration systems and the office bearers of the various institutions lacked legitimacy among Black people.

2.1.2 Traditional Fishers

For a number of years fishing along most of the South African coastline was done in a traditional way, such as the fish traps of Kosi Bay, community collection of resources in Transkei, spear fishing in estuaries and treknetting. When advanced methods such as nylon

ropes, multi–hooks and gill nets were introduced, it drastically changed the traditional methods of fishing.

Unlike industrial fishers, traditional fishers use small boats operated by a small crew. The fishermen usually use traditional gear and investment levels are low. In traditional fisheries, the catch is normally consumed locally. The harvesting of the fish and the success thereof depends to a great extent on weather conditions. The harvesting process is also time–consuming. The success of the traditional fishery also depends greatly on the skill and knowledge acquired by the fishers, through experiential learning over a considerable period of time. Knowledge in respect of fish types and species, tidal behaviour, fish migration patterns, their feeding habits, their spawning grounds and their food types are all crucial for success.

2.1.3 Commercial Catch Rates and Commercial Fishing Capacity

As already mentioned above, traditional fishers are dominated by industrial fishers. A few conglomerates control the fishing industry in South Africa. In this sub-section, figures are given for the total nominal catch and catch per sector of the South African commercial sea fisheries, estimated values of landings, products of the various South African commercial fisheries and the total number of licensed South African commercial fishing vessels in the fisheries zone of the Republic as at 12 September 1995. The statistical data revealed in the tables indicate, to a fair degree of correctness, that the South African commercial fishing sector is relatively large in size and volume. However, most of the income generated in this sector is not spread across the wider South African population. For example, a very large percentage of the resource rent of Hawston lines the pockets of a few large consortiums. It appears that the Hawston fishing community earns only a negligible percentage of the resource rent. According to the poachers, this is their main motivation for engaging in illegal activities.

According to the South African Commercial Fisheries Review (1994: 2), South Africa's total commercial catch in 1994 was 543925 tons. The total catch decreased by 11% (*refer to Table 1*) when compared to that of 1993, and the second lowest recorded since 1975.

TABLE 1: ***Total nominal catch and catch per sector of the South African commercial sea fisheries (Walvis Bay, Moçambique and foreign fleets excluded)***

Fishery Sector	Nominal Catch (t)	
	1993 1992/93	1994 1993/94
Seaweeds (wet weight)	7 826	6 783
Bait organisms (including red–bait from mussel culture)	11	14
Mussels and oysters farmed/flattened	2 240*	2 854
Picked oysters and marketable wash–ups	50**	75**
Abalone	603	613
Whelks and crabs	2	–
Periwinkles	–	0 076
Horse mussel	1	–
Prawns farmed	35	21
Rock–lobster fisheries		
West Coast	2 177	2 198
South Coast	1 025	1 067
Subtotal rock lobster	*3 202*	*3 265*
Crustacean trawl	554	275
Pelagic fisheries	357 040	315 095
Line fisheries		
Tuna	4 903†	4 069†
Squid jigging	6 308	6 442
Handline fishery	9 275††	12 985
Subtotal line–fish	*20 486††*	*23 496*
Harder and St. Joseph fishery	1 748	1 228
Demersal fisheries		
Offshore	190 000	167 103
Inshore	15 233	15 104
Midwater	6 350	4 187
West Coast sole	90	–
West Coast gurnard	210	–
Offal (trash fish)	2 512	1 079
Subtotal demersal	*214 395*	*187 473*
Longline experiment	–	2 452
Seals	–	–
Guano	643	281$
Total	*608 836††*	*543 925*

*	Does not include 508,270 oysters cultured in Walvis Bay in 1993
**	Does not include oysters picked in Natal
†	Does not include 2,287 t tuna caught and landed in Namibia by South African vessels in 1993 nor 1,546 t in 1994
††	Updated
$	Scraped in 1988 but removed in 1994

South African Commercial Fisheries Review (1994:3)

Despite the decline in catches, the wholesale value of the industry's products increased by 19% to peak at R1418 million (*refer to Table 2*).

TABLE 2: ***Estimated values of landings and products of the various South African commercial fisheries (Walvis Bay and Moçambique excluded)***

Fishery Sector	Value (R million) F.O.B. Wholesale (Processed)	
	1993*	1994
Seaweeds	2 819	2 782
Mussels and oysters farmed	9 481†	13 759†
Oysters collected	0 408	0 945
Abalone	32 777	53 884
Rock–lobster fisheries		
West Coast	83 915	103 995
South Coast	54 355	64 352
Subtotal rock lobster	*138 270*	*168 347*
Crustacean trawl	12 667	5 651
Pelagic fisheries (bait included)	232 134	289 475
Line fisheries		
Tuna pole fishery	30 760	21 823
Squid jigging	66 234	69 252
Handline fishery	48 124	73 246
Subtotal line–fish	*145 118*	*164 321*
Mullet and St. Joseph fishery	3 197	2 555
Demersal fisheries		
Offshore and Midwater	570 373	626 268
Inshore	43 455	52 164
Subtotal demersal	*613 828*	*678 432*
Hake longline experiment	–	38 122
Guano	0 637	0 219
Total	*1 191 336*	*1 418 492*

*	Updated
†	Cultivated prawns are included in both years and red bait in 1994
N.B.	R1 = ± $(US) x 0,28 in mid 1994

South African Commercial Fisheries Review (1994:4)

Abalone showed the most significant increase of 64% in the wholesale value of the sector's products. Demersal fisheries remained the most valuable, comprising 48% of the total wholesale value while pelagic fisheries came second at 20% (South African Commercial Fisheries Review, 1994:4).

The South African commercial fishing fleet totalled 4021 vessels during 1993/94 (*refer to Table 3*).

TABLE 3: ***Licensed South African commercial fishing vessels in the fisheries zone of the Republic on the last day (30 June) of the licensing years 1993/94 and 1992/93 (as at 12 September 1995)***

Registration area*	Registration letters	≤ 4,99 m	5 – 7,99 m	8 –11,99 m	12 – 19,99 m	20 – 24,99 m	> 25 m	Regional totals
Port Nolloth	PNA	135	–	1	6	–	–	142
Hondeklip Bay	HB	42	–	–	5	–	–	47
Vredendal District (including Doring Bay)	VR	115	1	1	7	–	–	124
Lambert's Bay	ADF	187	22	35	10	8	–	263
Piketberg District (including Elands Bay and Velddrif)	PQ	326	46	3	2	11	2	390
Saldanha Bay area	SBH	173	65	8	10	12	21	289
Vredenburg District (including Paternoster and St Helena Bay)	SH	253	58	26	18	22	6	383
Table Bay area (including Bok Bay and Yzerfontein)	CT	69	158	1	–	–	–	228
Cape Town Harbour	CTA	–	1	6	74	14	72	167
Hout Bay	HTB	8	9	14	77	20	3	131
Simonstown Harbour	STH	2	4	10	4	–	–	20
Simonstown area (including Cape Point and False Bay areas)	ST	123	152	–	–	–	–	275
Kalk Bay	KB	4	22	37	6	–	–	69
Somerset West District (including Gordon's Bay)	SW	56	136	11	3	–	–	206
Caledon and Hermanus Districts (including Hawston)	C	63	47	1	2	–	–	113
Gans Bay (including Klein Bay and Pearly Beach)	DDF	60	48	–	5	7	–	120
Bredasdorp District (including Waenhuiskrans and Struis Bay)	BR	34	116	24	–	–	–	174
Heidelberg District (including Witsand and Infanta)	SM	6	21	–	–	–	–	27
Riversdale District (including Still Bay and Puntjie)	R	32	97	1	–	–	–	130
Mossel Bay	MBA	–	7	11	6	18	3	45
George District	G	3	7	–	–	–	–	10
Knysna District (including Plettenberg Bay)	KN	5	30	1	4	–	–	40
Humansdorp District (including Jeffreys Bay and Oyster Bay)	H	7	109	17	13	–	–	146
Port Elizabeth area	PEA	1	40	11	51	11	7	121
Port Alfred District	P	4	83	3	–	–	–	90
East London area	ELA	1	20	2	1	–	–	24
Durban area	DNA	–	5	11	7	3	13	39
Natal coast	N	16	178	8	–	–	–	202
Total (1993/94)		1 725	1 483	243	311	126	133‡	4 021‡
Total (1992/93)†		1 786	1 483	244	314	133	134‡	4 094‡

* The computer allocation of vessels to registration areas has been adjusted to reverse changes between 1 July 1994 and 12 September 1995

† Updated for licences issued after 30 June 1993. In total 12 more vessels are listed than in the previous review

‡ Includes 6 licensed vessels not registered in South Africa on 30 June 1994 and 4 on 30 June 1993

Approximately 80% of the fleet consisted of dinghies, ski–boats and catamarans, almost all of which were less than 8 metres in length. The overall fleet showed a slight decline from the 4094 vessels in 1992/93 (South African Commercial Fisheries Review, 1993:6).

2.1.4 Vision for the Future

Based on preceding statistics, it is an acceptable fact that, once thriving coastal fishing communities have become marginalised by apartheid practices.. It is, therefore, of paramount importance that the lifestyles and roles played by coastal fishing communities be recognised. Generally the lifestyle of these communities is one of shared values, traditions, identity and co–operative togetherness. It is essential that their knowledge and experience be considered when decisions are to be made around the management of our marine resources. It is important that these communities feel valued in the decision-making processes. It is hoped that if people participate in decision-making, a sense of ownership would prevail. If the empowerment of the coastal fishing communities is not attained, it will go against the principles of the White Paper on Reconstruction and Development (RDP) document wherein it is explicitly stated that "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". The White Paper on Marine Fisheries Policy for South Africa (1997:8) states: "... all natural and marine resources of South Africa as well as the environment in which they exist and in which mariculture activities may occur, are a national asset and the heritage of all its people, and should be managed and developed for the benefit of present and future generations in the country as a whole". The White Paper (1997:13–14) also states that "the management and development of fisheries shall in all material aspects comply with the long term objectives and principles of the Reconstruction and Development Programme (RDP)" and therefore "local communities, labour, scientists and resource users must play an active role in the management of marine resources".

In the White Paper on Marine Fisheries Policy for South Africa, there appears to be a shift towards empowering local fishing communities in the management of marine resources. It is my feeling that co-management will help to empower the fishing community of Hawston. It is therefore important to examine the Hawston community and it's under-lying conflicts. I believe that it is useful to know the past when planning the future.

2.2 THE HAWSTON COMMUNITY AND ITS CONFLICTS

The Hawston community is located near Hermanus on the Cape south west coast approximately 120km away from central Cape Town. The community of Hawston consists of about 8000 residents, many of whom have resided in the area for well over 30 years. In terms of the Group Areas Act of 1966, Hawston was declared "an area for occupation and ownership by members of the Coloured group (Government Gazette 28 April 1972), and presently about 99% of the residents are Coloured.

There are two distinct parts to Hawston. On the side closest to Hermanus, a predominantly White area, live many wealthy Coloured families. These people purchased their land from the Hermanus municipality and have built themselves palatial homes. Many commercial divers from the Overberg Commercial Abalone Divers Association live in this part of Hawston. Less than a kilometre away are the poorer section of the community who live in what is commonly called "scheme houses". These small houses, consisting of two to three rooms, were provided by the Hermanus municipality.

Maria Hauck (1997:68) cited research undertaken by Schutte in 1993 on some aspects of the socio–economic profile of Hawston. Schutte recorded that only 26% of the working population of Hawston engage in the fishing sector. Schutte found that 64 out of 86 respondents did not have a flush toilet system. The Development Council of the Overberg region confirmed these figures. With regard to education the Development Council (1995) established that more than 50% of the population did not have a grade 8 level of education. Many unemployed people of Hawston live off the sea.

It is the view of many commercial divers that the poorer sections of the community were envious that the divers were accomplishing a better standard of living through the abalone industry. This envy increased during the early 1990s, when the demand for abalone increased tremendously. The poorer sections of the community saw the abalone industry as a means of supporting their daily needs and also to acquire a level of wealth. It became obvious during the interview sessions that many residents moved into the abalone industry illegally. The number of poachers increased daily. It was the general feeling of the community that many poachers held full-time jobs. During the day, many worked either as domestic "chars", shop assistants, waiters, artisans (as builders, plumbers, electricians etc.), factory hands and

drivers. After work and during weekends some of the working class continued their poaching activities (this information was recorded on audio-cassette during the interview sessions.

The Overberg Commercial Abalone Divers Association were unhappy that their livelihood was threatened by poachers. The divers felt that they had to incur major expenses to keep their operations going whilst the poachers were having an open access to a resource which was decreasing all the time.

Yet another reason for the ongoing conflicts (according to the commercial divers interviewed), was the removal of some of the diving rights from the Overberg Commercial Abalone Divers Association; this right was instead allocated to new entrants. The commercial divers were very angry with what they considered to be an unilateral, non–compensatory move by the Department of Sea Fisheries. Their anger was perhaps justifiable because the new entrants received the diving rights without paying a cent whilst many old and new commercial divers had to pay huge sums of monies ranging from R360,000 to R780,000 to purchase diving rights (data recorded during interviews of commercial divers)

When new quotas were to be allocated by the Quota Board, it was decided to give these to new entrants belonging to previously disadvantaged communities who have suffered under the apartheid system. According to Mr. Le Roux, secretary of the Overberg Commercial Abalone Divers Association, not all beneficiaries of the new quotas came from disadvantaged communities. According to Le Roux, "one person who received a new quota is a Frenchman who became a South African citizen only in June last year. Another is a retired Gauteng businessman who settled in Gansbaai and allegedly told locals he would get a quota because he had the right connections, ... then there is a wealthy chap from Kommetjie who received a quota, while another Hout Bay gentleman who held a large crayfish quota was also given a perlemoen quota" (Weekend Argus, 4/5 November 1995). This indiscriminate allocation of quotas was a major bone of contention. People wanted to know how and on what basis the Quota Board had made the allocations. This supposedly unfair allocation of quota, coupled with the increasing levels of poaching, has created conflicts between the commercial divers and other members of the Hawston community. Many residents, especially the informal divers, believe that the solution is to give a reasonable quota to community members who are not part of the formal diving sector. There are, perhaps, two ways to accomplish this. The

one way is to increase the present 605 tons to perhaps 650 tons; the increased tonnage could be given to the poachers. This will mean that there will be additional pressure on the already decreasing resource, which in the long run will face extinction. The second way will be to take away some of the quota from the commercial divers. Once again, the divers will be on the losing end, especially if they are not compensated. The question that will always come to mind is whether allocation of quota to the poachers will stop poaching. Many concerned people believe that it is a myth that poaching will stop if poachers get their rightful quota. This view was explicitly stated in an editorial (Hermanus Times, 30 July 1995) : "It does not matter if they get 100 tons, poaching is too lucrative to stop at any circumstances, except the extermination of the species" .

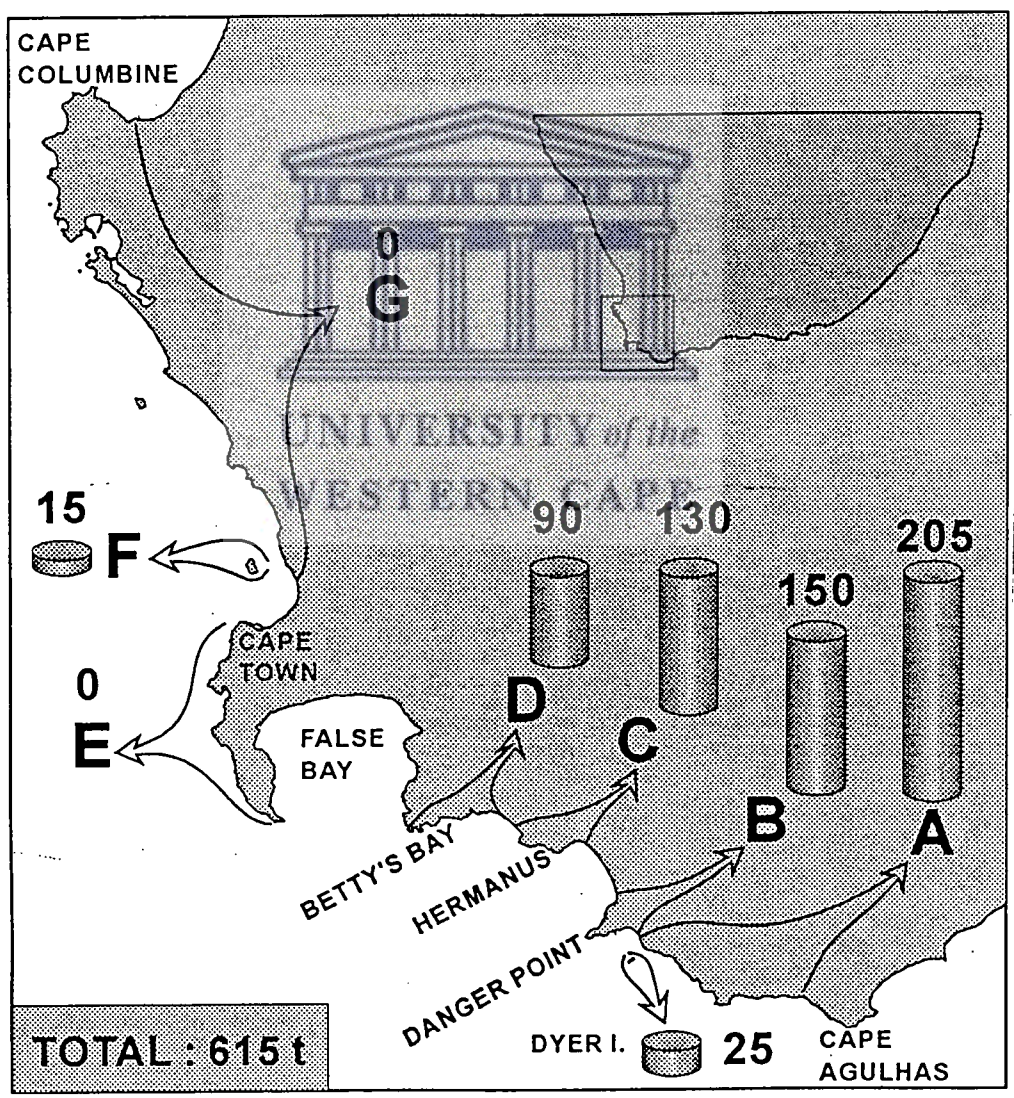
The commercial divers were bound by law to deliver their catch of abalone to specified processing factories or "packers", as they were commonly called. The diver was paid R23.75 for each kilogram of abalone delivered. Canned or frozen abalone was sold between $70 and $95 to the lucrative Far Eastern markets. The divers felt that they were underpaid, and demanded that they get a fair slice of the income earned from exports. To express their anger, the members of the Overberg Commercial Abalone Divers Association marched to the premises of Tuna Marine, which is a major processing plant in Hermanus. Mr. Don Stein, a member of the divers association had this to say: "The perlemoen (abalone) industry makes R60 million annually. Of that, R13.5 million goes to the divers – the divers employ three times the number of people the factories employ". He said that perlemoen was sold to overseas markets up to R400 a kilogram while the divers are paid only R23.75 a kilogram. (Hermanus Times, 5 December 1995). Many divers expressed the view that they have been diving for many decades and they have pioneered the establishment of the abalone industry; it is for this reason that they felt that they deserved much more than they are presently getting. Mr. Dynaard, who has been in the diving business for 39 years had this to say: "People think because we have boats and bakkies we are rich, but the bank owns these things ... 42% of my income is taxed and I still have to pay assistants and other overheads" (Cape Times, 5 December 1995).

2.3 ABALONE FISHERY

The competition for abalone between divers, belonging to the Overberg Commercial Abalone Divers Association, and poachers is the main reason for the conflicts in Hawston. I therefore felt that a knowledge of the abalone fishery is important for this study.

The South African abalone fishery began in 1949 in the area of Gansbaai, and is dependent on the species, *Haliotis midae*, which live at depths of 10 metres amongst the kelp *Ecklonia maxima*. The abalone fishery soon spread to cover a coastline of 580 km from Cape Columbine to Quoin point (Tarr, 1992:8). Figure 1 shows the eight fishing zones and the respective Total Allowable Catch per zone.

FIGURE 1: ***Total Allowable Catches (tons) For Abalone Per Fishing Zone, 1994/1995***



South African Commercial Fisheries Review(1994:11)

The industry quota is ratified by the Department of Sea Fisheries and the total amount is caught by a group of about fifty commercial divers. The removal and delivery of abalone is strictly controlled. The diver's permit stipulates the amount of abalone to be caught and to which factory they must be delivered. Similarly, the factory permit will indicate which diver and what exact amount must be delivered to the factory.

The "hookah" system replaced the "hard hat" helmet diving gear to overcome obstacles posed by the dense forests of *E. maxima*. The divers use fibreglass boats with either single or double outboard motors. Two crew members assist the diver; one takes charge of the control mechanism of the boat while the other checks on the gas supply and also monitors the catch for undersize animals. Divers remove the abalone with a flat metal object and collect them in a open–necked bag. The increasing weight of the collection bag is made manageable by connecting it to an air supply. A partially inflated bag is ideal for collection while it is fully inflated for surfacing. Usually the divers make a number of dives to collect the animals over a three to four hour duration per day.

Catches are off–loaded at eight demarcated landing points in the presence of a sea fisheries inspector, whose duty is to place a seal over the total catch; the catch is then taken by road to a processing plant where the abalone is canned or frozen. Altogether there are five factories, most of which are located in Hermanus. Hermanus remains the hub of the abalone industry in South Africa. The factories are compelled by legislation to market 10% of the abalone locally but many believe that this is not done; instead, much of this is exported illegally.

Abalone was until recently a comparatively small scale operation; the lucrative Far Eastern market has catapulted the demand for abalone. Initially, 52 legal commercial divers ensured supply. However, the excessive demand and high prices has attracted hundreds of poachers. Recently, both Chinese triads and local gangsters have moved into the poaching scene. According to superintendent Peter Jacobs of the Organised Crime Aliens Investigation Unit, "right the way along the coastal strip, two or three strong criminal groups have almost centralised control over the poaching industry" (Cape Times, 10/12/96). The problem has become serious as one poacher told the reporter of the Cape Times, "if they tell us tomorrow we will get a quota, we will ensure it (the resources) will last another 100 years. We feel hurt

to see that the next person has the right to haul everything out while we must sit and watch" (Cape Times, 06/12/96). Poachers remove abalone indiscriminately. Since poachers usually shuck the abalone from their shells before transportation, it makes it difficult to calculate how many animals are under the legal minimum size. However, through careful scientific estimates it has been established that some of the confiscated abalone hauls consisted of as much as 85% below the legal minimum size. This indicates that size limits mean nothing to poachers. Given that large volumes of abalone are illegally harvested even before they have reached their full reproductive potential, it has serious negative implications for the sustainability of present harvest level rates in the future.

The Sea Fisheries Research Institute believes that the poachers in Hawston have removed about 500 tons of abalone in 1996 alone; this is a staggering amount when one takes into account that the industrial annual quota was set at 550 tons. If effective control mechanisms are not implemented soon, the resource is unlikely to continue supporting existing catch rates in the future. Hence, the need for this study to explore a co-management system for Hawston.

2.4 ROCK LOBSTER FISHERY

The coastline along Hawston and its surrounding areas is richly endowed with abalone and rock lobster. The high demand for abalone has resulted in a huge price increase for this delicacy. Poaching has increased to the extent that concerns are raised around the sustainability of this resource. The rock lobster is also poached but at a lower level. Although my research focused mainly on abalone, I decided to briefly describe the rock lobster fishery. My main reason for this inclusion is that if, and when, abalone is no longer economically viable due to decreased numbers, then it is probable that poachers would shift their focus to rock lobster.

The rock lobster industry in South Africa is based on two species, the South Coast rock lobster (*Palinurus gilchristi*) and the West Coast rock lobster (*Jasus lalandii*). The South Coast rock lobster lives at depths between 100 to 200 meters of the southern coast from Port Alfred to the Agulhas Bank. The South Coast species is caught by means of small plastic traps baited with fish and attached to a long line. Generally, 150 traps are attached to each long line. Each vessel carries between 1000 to 2000 traps which are placed in water for an

average 24 hours. A total of 452 tons of South Coast rock lobster was caught in 1993, with a combined value of R44,325,000.

The distribution of West Coast rock lobster in South Africa is from Alexander Bay in the North to Hermanus in the south. Most of the commercial stock is found less than 80 meters deep between Doring Bay and False Bay. Limited stock is available along the Namaqualand coastline, i.e. along Port Nolloth and Hondeklipbaai. The West Coast rock lobster is caught with the aid of inshore traps and hoopnets deployed by small vessels. The traps have greater efficiency and are therefore more commonly used. This species is also harvested by recreational fishers. The TAC for the 1994/1995 season amounted to 2000 tons. The total catch in the 1993/1994 season amounted to R47,872,000.

No minimum size is stipulated for the harvesting of the South Coast rock lobster; generally animals are caught from a size of about 60mm carapace length. A TAC of 450 tons tail mass was established since 1984 to protect the species. The TAC for the 1996/1997 season was reduced to 412 tons.

The West Coast rock lobster is controlled by a quota system. This quota system is dictated by a TAC which is sub–divided according to geographical areas. This species is easily accessible and because of its economic value, both recreational and quasi–recreational harvests have increased; poaching of this species also rocketed in recent years. The increased harvests have caused serious declines in the population of this species resulting in the progressive decline of the TAC to reach a low of 1700 tons in the 1996/1997 season.

The West Coast rock–lobster would have proved to be the saviour of the disadvantaged and poor fishing communities of the west coast of South Africa, if it was managed properly. Control over the recreational and illegal harvest is poor, made worse by the length and inaccessibility of the coast line. Also, the industry is controlled by a few large corporate businesses that show little concern for the economic and social well–being of local coastal communities.

3. MY STUDY

3.1 RESEARCH OBJECTIVES

My study will focus on the fishing community of Hawston. Due to the increased demand for abalone since the early 1990s, poaching has increased at an alarming rate in Hawston. Conflicts between the different stake-holders have become the order of the day. In this study, I will attempt to establish whether co-management can be used as an effective tool to manage the resources (especially abalone resources) in Hawston. I believe that the acceptance and adoption of co-management will minimize the conflicts that have divided the once stable community of Hawston. It is also hoped that my research will help policy-makers in their endeavours to implement a viable management plan to protect and preserve the rich resources of Hawston.

3.2 THEORETICAL FRAMEWORK

A theoretical framework explaining, in some detail, such aspects as the commons, the need for fisheries management, goals of fisheries management, the fisheries management regime (FMR), customary marine tenure (CMT) and co-management are crucial for establishing a viable management plan for Hawston.

3.2.1 The Commons

The commons include natural resources such as forests, fisheries, wildlife and irrigation waters. These resources are not owned by individuals but are shared.

Fisheries is classified as a commons which is shared by a number of people. No individual has ownership over any of the resources, i.e. no part of the commons can be declared private property. Although, generally, fisheries is described as a renewable resource, as opposed to a non–renewable resource, if the fisheries is not managed optimally, then the resources can be depleted to the extent that it becomes non–renewable. This will usually happen when the rate of harvest continually exceeds the rate of natural growth; it could also happen if the resource population falls below a critical level through some factor which degrades the habitat. The challenge is therefore "how to co–ordinate use by numerous individuals in order to obtain an optimal rate of production or consumption overall" (Oakerson, 1992:41).

I will mention four characteristics of common property resources. The first one being subtractability. Subtractability means that any user removes from the commons that amount of the resource that he/she utilises that would otherwise benefit someone else; subtractability can also mean that cumulative use by a number of individuals will lessen the total yield of the commons by the amount used by the individuals. The second being the exclusion principle. Exclusion means that access to the resource can be regulated on an individual basis or partial regulation can be applied to those coming from outside the commons. The third characteristic is one of indivisibility. It is virtually impossible to divide the commons into separate units. Lastly, one must evaluate the degree of efficiency of the commons. Efficiency generally refers to the overall rate of use. Both overuse and underuse of the commons will be construed as inefficient use. Inefficient use of the commons is closely related to equity, i.e. whether individuals are getting a fair and reasonable share of the resource equivalent to their level of contributions to the regulation of the use of the resource.

Common property regimes are forms of management whereby participants collectively manage a resource within the ambit of a set of rules that promote interdependence and sustainability. Generally, a common property regime consists of a group of users, a properly defined and demarcated resource boundary that the group uses and manages and a set of rules and regulations that provide the accepted parameters within which the resource should be used. The most challenging part of a common property regime is how well the group of users can organise themselves. There must be a sense of loyalty, commitment, compliance and a sincere desire to collectively work towards the common good.

3.2.2 Fisheries Management

3.2.2.1 The Need for Fisheries Management

The central objective of management is to ensure that the resources are utilised as best as possible. The yardstick for the measurement of "best as possible" is unique to a specific fishery, and it differs from one to the other. Generally, the type and quantity of resources and the socio–economic position of the fisher community will determine how best to utilise the available resources. Management is to exercise some form of control, either directly or indirectly, on the effort and its components. This is true for both formal and informal systems of fisheries management.

It is important to distinguish between management and development because both concepts are generally confused and erroneously used synonymously. Hersoug and Paulsen (1996:6)) state that "management is usually called for long before a fishery is biologically overexploited, while development is absolutely called for when a resource is in fact overexploited, not least in order to channel people and economic resources to other economic sectors". Management and development go hand in hand and cannot be arbitrarily separated.

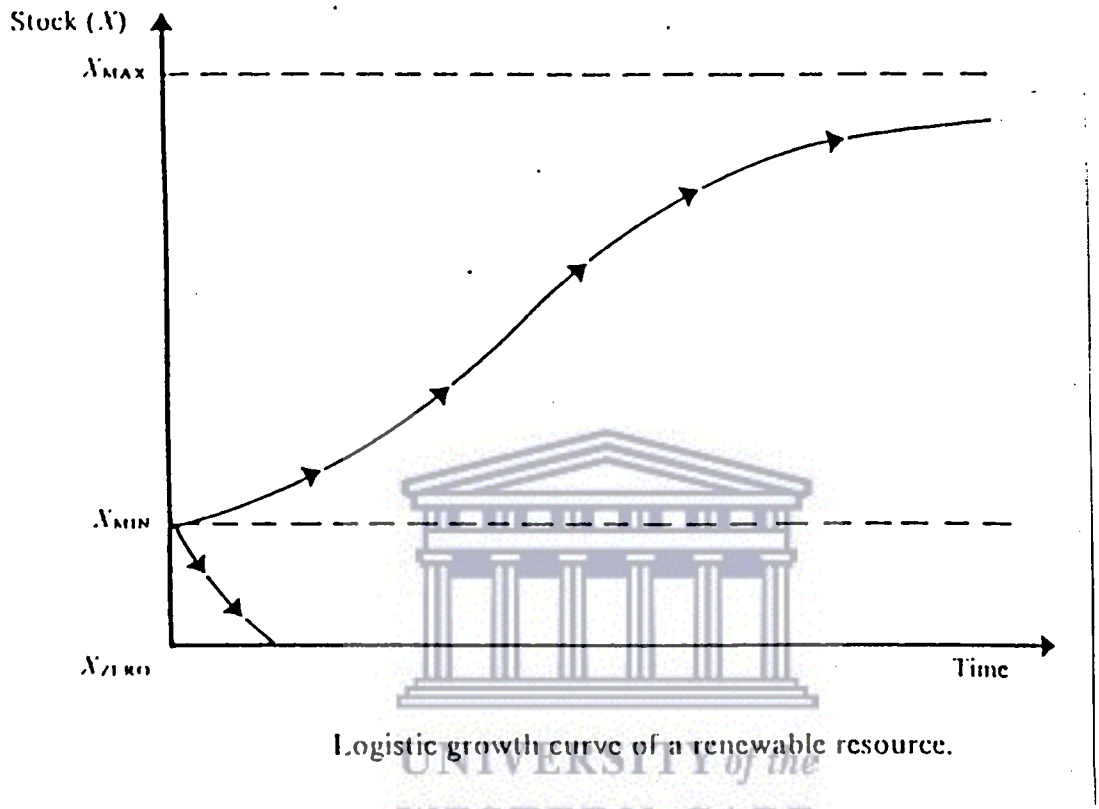
3.2.2.2 Goals of Fisheries Management

In general terms, effective management of a fishery is aimed towards attaining biological, economic and social goals. The biological goal is aimed towards maintaining a reasonable stock size so that the resource is available at all times. This means that the stock size must be at a level large enough to make extinction unlikely. The economic goal pertains to maximising the resource rent in the long run. The social goal involves the use of part of the resource rent for social projects. Distribution of income will take place when social projects are established to improve education, health and welfare. I will attempt to explain the biological, economic and social goals with the aid of "The Gordon–Schaefer Model", which is based on the works of Gordon (1954) and Schaefer (1957).

Although the "Gordon-Schaefer Model" is far too simple for practical application, it serves to illustrate the social losses that result from an open access exploitation of a fishery. This is the case in Hawston, where increased poaching has created a type of open access. Also, the "Gordon-Schaefer Model" illustrates the advantages and limitations of simple bio-economic models.

The biological part of the model are based on the assumptions that only the long term management of a single fish stock is taken into account. The stock is not differentiated on the basis of stock segments or age classes. When the stock biomass X increases, the number of new individuals and mature adults will increase. With this increase, there will be greater competition for food and space, and therefore the mortality rate will increase. Therefore the net growth in stock biomass, G(X) increases at a decreasing rate. Such a growth pattern is called logistic growth and it is illustrated in Figure 2.

FIGURE 2:

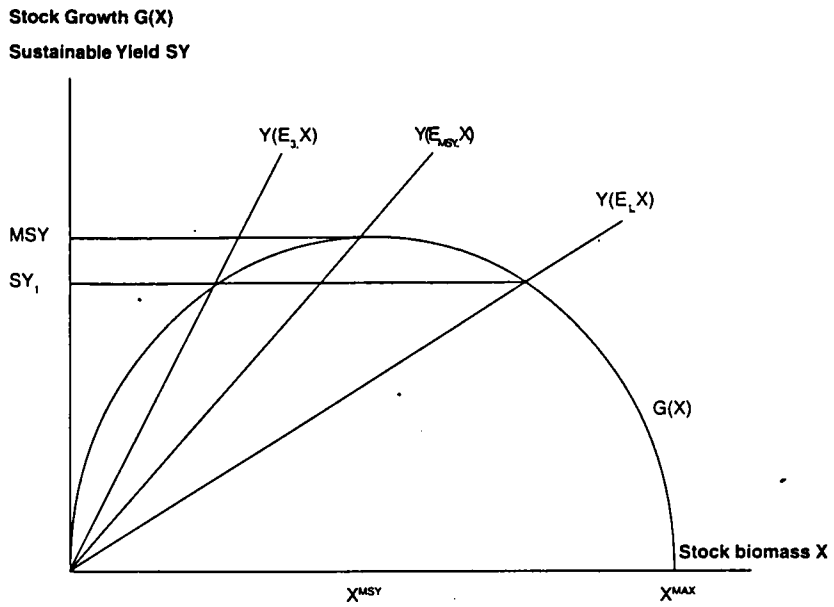


Logistic growth curve of a renewable resource.

In Figure 2, X_{min} represents the smallest sustainable stock. If the stock level falls below X_{min}, it will become extinct. Therefore, the biological goal is to keep the stock size well above X_{min}.

The maximum level of net biomass growth is reached when stock size equals X_{msy}. If the resource is not harvested, stock size grows beyond this level and eventually reaches that of the carrying capacity at X_{max}. This relationship is represented by G(X) in Figure 3, where E_i denotes different levels of harvesting effort.

FIGURE 3:

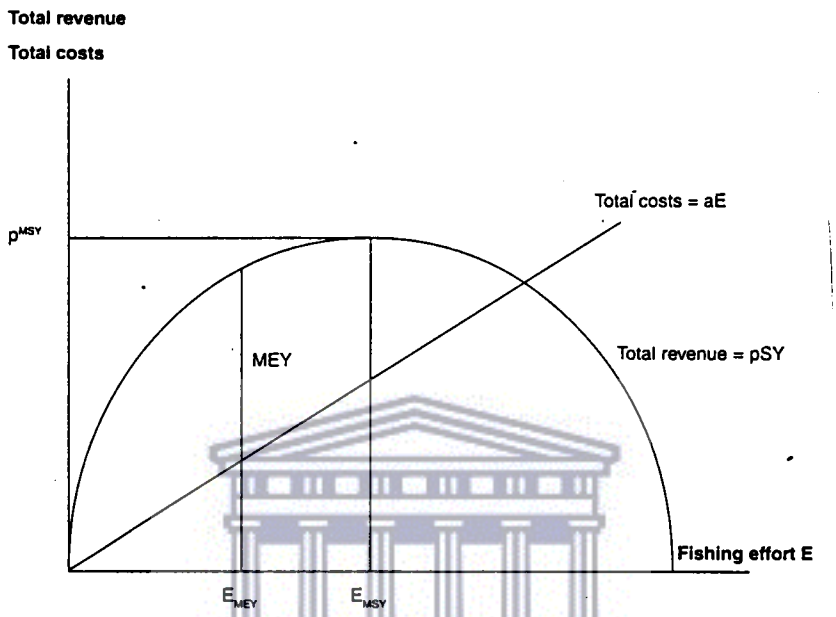


When fishing activity is introduced into the model, yield Y is assumed to be a linear function of fishing effort E, for a fixed stock level X. When the level of effort is fixed, it is assumed that the long term yield increases proportionately with stock biomass. This is the Schaefer production function for a fishery. It is indicated in Figure 3, where $E3>E_{msy}>E1$ represents three different effort levels, each of which is represented by linear curves Y (E1, X), Y (E2, X) and Y (E3, X) respectively. In Figure 3, the relationship between fishing effort and sustainable yield is also depicted. Low effort levels such as E1 correspond to a large stock size with limited growth and therefore of low harvest levels. As effort increases to E_{msy}, the stock size decreases to point X_{msy}. At this point, both the biomass and sustainable yield are at the maximum. When the maximum sustainable yield, MSY (i.e. the maximum catch that can be caught on a sustainable basis) is attained, then the biological objective is satisfied. If effort is again increased, the stock biomass will decrease further; the sustainable yield will also decrease. The yield level SY_1 may be reached in 2 ways: large fish stock/low effort or small fish stock/high effort. This means that a too large effort will waste resources compared to a well managed fishery which may reach the same yield for a smaller effort.

Economists have challenged the biological objective of just emphasising the maximum sustainable yield; they believe that the income generated from the industry is equally important. On the basis of economics, constant prices for harvest (p) and fishing effort (a),

produces a total revenue curve which is given by the yield–effort relationship, in the long run, as seen in Figure 4.

FIGURE 4:



The long run yield–effort relationship first increases, and then decreases as effort increases. When the effort is at zero, then the stock is not exploited; but when effort reaches its maximum, stock size falls to zero. The "Total Cost" curve represents the product of the quantity of fishing effort and the unit cost of effort.

The resource rent (the net economic gain from exploiting the resource) can be measured by the vertical difference between the total cost and total revenue curve. Figure 4 indicates the following important points:

- A maximum sustainable yield (MSY) can only be gained by applying a long term effort level, E_{msy}.

- All points on the growth curve represents sustainable utilisation of stock in biological terms. Increasing effort beyond Emsy will reduce stock growth and sustainable yield; therefore, efforts beyond E_{msy} will represent ***biological overfishing***.
- The maximum economic yield (MEY) will be achieved by applying the effort level E_{mey}, where the difference between total revenue and costs are the greatest.
- If the effort is greater than E_{mey}, then ***economic overfishing*** will take place, i.e. resource rent will be reduced (this is due to increased fishing costs because of reduced stock size).
- If the resource is assumed to be open access and therefore exploited by a large number of vessels with the objective of maximising income, then actual effort will approach E_{oa}. At this fishing level there is both biological and economic overfishing of the stock. This means that the resource rent will be totally dissipated.

Both the biological and economic objectives were considered to be too narrow by social scientists. Therefore the social objective was introduced i.e. the maximum social yield (MScY) or optimum yield (OY) (Hersoug and Paulsen, 1996:96). The social objective concerns the distribution of resource rent among the fishing community. This objective is attained by investing in social projects; however, there is no guarantee that such projects will function at the optimum level. If the community has a high level of unemployment, such as in Hawston, then social needs may dominate the economic objective.

Within the context of the model described above, the central problem of poaching in Hawston has far reaching implications. On a biological level, poaching will definitely deplete the stocks. Poaching is similar to open access in that, in both instances, the stock levels drop. If the stock levels drop too low, then the resources will not be able to sustain themselves. On an economic level, unabated poaching will remove the very stocks that would have been an economic life-line to the community. Moreover, in poaching, the costs are higher because the poachers have to devise ways and means to evade capture by the sea fisheries inspectorate and by the South African Police Services. On a social level, uncontrolled poaching will ultimately lead to the extinction of the species. This will mean that there will be no profits and no way of making a living. In other words, depletion of stocks will impact negatively on the social upliftment of the community which is primarily dependent on marine resources for it's income.

3.2.2.3 The Fisheries Management Regime (FMR)

Generally, the fisheries management regime (FMR) involve a number of activities within several institutions. According to Arnason (1992:16) , the three most important components of FMR are:

- ***Fisheries Management System (FMS)***: pertains to the regulatory mechanism, encompassing rules and regulations, for the fishery.
- ***Monitoring, Control and Surveillance (MCS)***: provides data for both the management unit and the judicial system for the purposes of monitoring and controlling fishing activities.
- ***Fisheries Judicial System (FJS)***: decides the type and extent of punishment of those who violate rules and regulations.

The Fisheries Management Regime is a western concept, structured on the basis of scientific knowledge. However, this western concept can be adapted to suit local conditions. Many nations do not have an official FMR. According to Hviding and Jul–Larsen (1995:10)), the coastal, riverine and estuary fishery of such nations are regulated by local resource management systems, which they called Customary Marine Tenure (CMT).

3.2.2.4 CUSTOMARY MARINE TENURE (CMT)

Hviding and Jul–Larsen (1995:11) state that CMT can be used to define most community–based resource management systems; this is also applicable to Hawston. Traditional CMT systems are common throughout the world, of which the South Pacific and African systems have been extensively studied and documented. CMT is linked with the wider social and cultural contexts of local communities. The management system encompassing such practices as demarcating exclusive fishing zones with limits on fishing gear, species and size and number caught is based on customary law. Within CMT systems are embedded control, monitoring and surveillance mechanisms. Local fishermen decide the rules and regulations and the type of punishment to be given to those who break the customary laws. Such regulatory mechanisms usually co–exist with the complex local knowledge of the marine environment. Hviding and Jul–Larsen (1995:13) state that "CMT systems guide and constrain local people regarding where they *may* go fishing and how they may do so; whereas environmental knowledge tells them how they *ought* to fish to obtain the best catches". The

close links between environmental knowledge, resource management and the different fishing methodologies makes CMT systems very dynamic, rather than being static.

It is generally believed that local communities know a lot about the behaviour patterns of fish and the environmental factors that will have a bearing on such behaviour. This wealth of knowledge can be explained by the fact that the local people have, for a number of years, accumulated observations and shared such observations with other fisher folks. Local people were always concerned about the natural environment and its ability to reproduce the resources on which they rely for survival. Through everyday experiences they observe, interpret and acquire knowledge which is used to develop, maintain or even modify their systems of management. In their endeavours to increase their knowledge base, there is always a struggle for power and prestige through competition. This might be considered advantageous within social institutions; the negative side of it is that competition and power might conflict with the objectives of resource management. According to Hviding and Jul–Larsen (1995:15), "in case after case it is found that even from the perspective of competition and increased power, customary tenure systems often have positive effects on the regulation of exploitation. In their struggle for control over resources, people try to exclude each other and often succeed in doing so, and this is sometimes found to have very positive effects on the state of the resources".

It is worthy to note that customary marine tenure systems are usually different from nation to nation. Such differences are shaped by cultural differences rather than the type of available resource.

3.2.2.5 CO–MANAGEMENT

According to Pomeroy and Williams (1994:1), approximately 20 million people in the developing world are directly involved in fisheries and aquaculture; about one billion people rely on nutrients acquired from aquatic products as their main source of animal protein. As the human population increases and as the other food resources on earth decreases, more and more societies will be dependent on aquatic resources to satisfy their food requirements. It is therefore important that fishery resources are managed in such a way that they become self–sustainable so that such resources can be conserved for future generations. It is the view of many fisheries management experts that over–exploitation and environmental degradation

stem from social, economic and political facets. This is especially applicable to small scale fishers, who are usually marginalised by the larger scale fishers, by virtue of their low social status, low income, poor living conditions and negligible political clout. It is for this reason that Pomeroy and Williams conclude that the main focus of fisheries management should be "people, not fish".

Traditionally, when fisheries were developed in the last forty years or so, it was always the government that took the lead in the management of the fisheries. According to Jentoft (1989:138), there are usually three reasons for the state to involve itself with fisheries management. Firstly, it is an accepted fact that open access frequently leads to over–exploitation to the extent that the resource is depleted. In this regard, state intervention is targeted towards attaining efficiency. Secondly, the state gets involved for equity reasons. This means that because the state is the custodian over all natural resources, it is therefore the state's obligation to the people of the land to ensure that the resource rent is distributed among all participants. Thirdly, the state's involvement stems from its established administrative capacity, which is so essential to organise, implement and monitor management schemes. In its endeavours to meet the above mentioned goals, the state generally uses both indirect and direct regulations. Indirect regulations attempt to control effort, i.e. regulating the number of participants, the size of their boats, the type and amount of gear used etc. Direct regulations include such measures as fixing the TACs and establishing quotas which are aimed towards limiting output. In the long run indirect regulations did not have the desired effect because alternative, more advanced technology accelerated over–capitalisation and resource depletion; also, it was both difficult and costly to administer and to enforce the regulations. Nowadays, direct regulations are favoured by governments.

In spite of all the comprehensive regulatory mechanisms, most governments failed to control over–exploitation and the subsequent degradation of the environment. Even attempts to nationalise and privatise did not help to improve the conditions. Ostrom (1990) identified three main models used by researchers to explain why natural resources are exploited to the extent that the economical viability of the resource is destroyed. The first model is the one popularised by Hardin (1968:43-48). Hardin makes the point that herders will add more and more animals to grazing land in order to maximise their personal benefits; the herder shows

little concern for the eventual degradation of the land because he only incurs a part of the costs of over–grazing. The second model is described as the prisoner's dilemma; this model is precisely defined by Ostrom "as players involved in a non–co–operative game in which all players possess complete information. Each player has a dominant strategy in the sense that the player is always better off choosing the strategy to defect no matter what the other player chooses. When all players choose their dominant strategy, a non–pareto optimal equilibrium is the result. A pareto optimal outcome occurs when there is no other outcome strictly preferred by at least one player that is at least good for the others". The third model is based on the work done by Olson on group theory. This theory states that self–interested participants will not voluntarily commit themselves fully towards attaining a common or group interest.

Perhaps it is fitting to quote the wise words of Hardin, who very concisely alludes to an alternative paradigm for resource management. Hardin, in his "Tragedy of the Commons" (1968:1243-1248) states that "the only kind of coercion (he) recommends is mutual coercion, mutually agreed up by the majority of the people affected". Over–utilisation will result in the depletion of resources. If the resources are depleted, a greater effort will be required to harvest the resource; this will mean that the costs will increase. Ultimately, over–utilisation will make it difficult to attain the social, economic and biological goals of a fishery. To circumvent such problems, there has been a recent trend to decentralise fisheries management, to shift from a centralised top–down form of management to a co–operative system of "sharing the responsibility and authority between the government and local fishers/community" (Pomeroy and Williams, 1994:1). This joint partnership between the government, local fishers and other stakeholders is commonly referred to as co–management, a concept as pointed out by Sagdahl (1992:3), "is widely used, but poorly defined". The implementation of co–management principles is a possible solution to the problems in modern day fisheries.

David Symes (1997:4) locates co–management within a continuum of five basic alternative management systems. These are:

- ***Enlightened Dictatorship***: the state maintains total control over all aspects of fisheries management. The state has a well organised information gathering network in the form of an established advisory centre. This centre receives proposals, mandates and advice from various stakeholders but the final decision is made by the state.

- ***Decentralised Management***: in this system, only the administrative functions such as collection of data, assessment of financial aid and the monitoring function are delegated to lower levels of the state bureaucracy, while the broad policy issues around the fisheries remain with the central state. Whilst user groups are involved in the decision making processes at local levels, the final decisions are made by the central state.

- ***Delegated Management***: in this case, responsibilities for management are given to agencies which lie outside the national, regional and local government. Such agencies may take the form of trust organisations, co–operatives and/or private companies. The state decides the framework within which the agency will exercise its powers. Although delegated management includes devolved management responsibilities and user group participation, the user groups do not necessarily involve themselves in the formulation of policies.

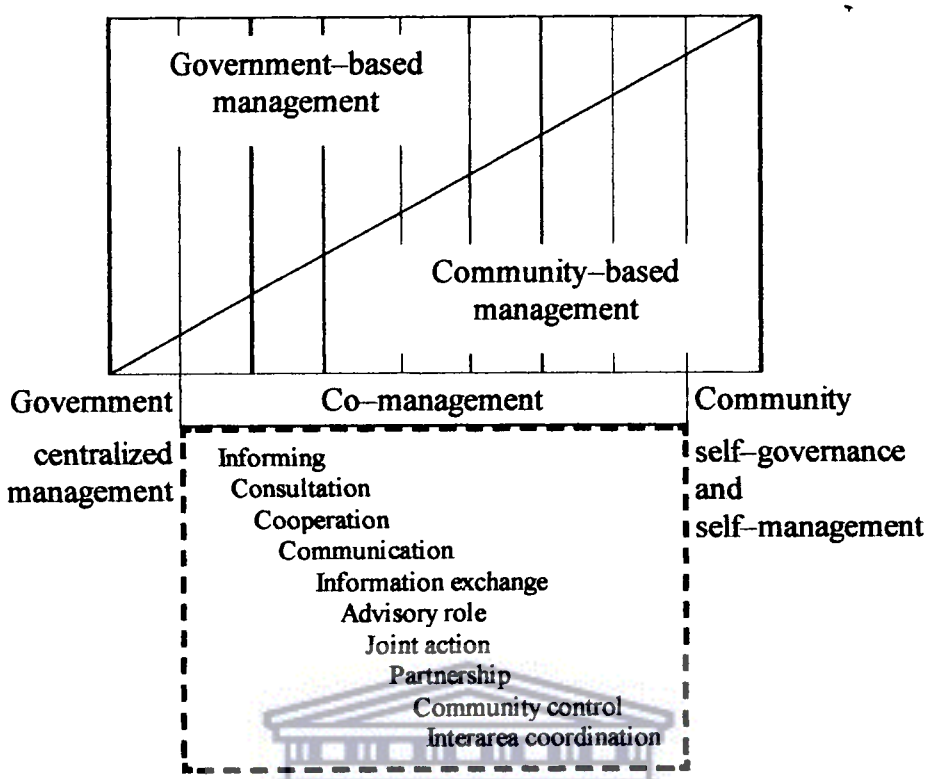
- ***Co–management***: this is a special type of delegation process where the state establishes the legal framework, but the decision–making powers are shared between the government and user groups. The user groups are directly involved in the management process – not only as joint decision makers but also as an authoritative, autonomous body to make and to implement certain regulatory decisions within agreed areas of responsibility.

- ***Autonomous Self–management***: this is the extreme form of delegated management whereby all management responsibilities of the fisheries are devolved to user groups, without any form of intervention by the state. This form of self–governance is rare because user groups do not always have the capacity to carry out all the management functions of a fishery.

Perhaps it is appropriate to explore some common definitions of co–management. Kuperan and Abdullah (1994:308) define co–management (which they also call community based management) as a set of development programmes wherein "both the government and fishermen co–exist to develop economic strategies which benefit both parties". Jentoft (1989:143) writes that co–management means "that government agencies and fishermen, through their co–operative organisations are sharing responsibility for management functions". He also states that "fishermen's organisations are granted authority by law to enforce regulations on member fishermen ... this authority is based on legislated ownership rights to fishing territories". Sevaly Sen (1994:405) defines co–management as "a variety of management arrangements where responsibility and decision–making for resource management is shared between governments, user groups and other stakeholders". Contrary to Kuperan and Abdulla, Sen views co–management to be different from community based management in the sense that the government is also involved in the decision–making processes in co–management. Hersoug and Ranes (1997:7) extend the concept of co–management even further by stating that it should not just focus on only resource management; rather it should include such basic issues as sales regulations, subsidies, credit and the development of infra–structure in the fishing industry.

Co–management is formal in the sense that regulations are made explicit and public, and that the decision–making process itself has to follow certain procedures which ensure active participation from the affected interests. In a co–management system, the management responsibility and authority is shared between the local levels of the fishing community and the various levels of government, be it national, provincial or local. Usually the main roles played by the government is to provide a legislative framework (only after discussions with all role players) to assist arrangements at the local level, to facilitate problem solving and trouble–shooting and to provide assistance and services to help the growth and development of local small–scale fishers. There is a hierarchy of co–management arrangements, as reflected in Figure 5 (adapted from Berkes, 1994:56).

FIGURE 5: ***A hierarchy of co–management arrangements (after Berkes, 1994: 51-62)***



The amount of responsibility and authority that the government and various levels have must be negotiated. Due to the complexity of fisheries management, co–management can not be viewed as a single instrument to remedy all problems; instead co–management should be viewed as one of the many ways, all of which can be adapted to suit specific areas, communities and situations. It is believed by many experts that co–management, if properly implemented, could effectively address sustainability, efficiency and equity in fisheries management.

The ***potential advantages*** of co–management are:

- a less hierarchical system with a high degree of transparency.
- an increased level of legitimisation of the policy process and the regulatory mechanism thereof.
- lower management and monitoring costs especially when one takes into account that centralised state bureaucracies can prove to be very costly. Costs are reduced because the participants at ground level are fully involved in the monitoring process.

- greater levels of acceptability of the legislative structure of the state because all stakeholders contribute towards the legislative structure.
- a sense of ownership of the management process which leads to greater levels of participation and commitment of the fishers in the management of the resource.
- more reliable data input because the fishers themselves are able to assist in collating data which they have accumulated over decades.
- greater community rapport and togetherness.
- general improvement in the sustainable use of the resources and decreased conflicts between the various participants.

According to Ostrom (1990, 1992) and Pinkerton (1989), the key conditions for co–management are:

- ***Clearly Defined Boundaries***: the area to be managed should be clearly demarcated, of reasonable size so that local fishers can easily observe and understand its eco–system. If the area is too large, effective management would be problematic.

- ***Clearly Defined Membership***: the fishers who have the right to fish in the demarcated area should be clearly defined; their numbers must not be too large so as to restrict effective communication and decision–making. In addition, all office bearers must be democratically elected.

- ***Group Cohesion***: the group of fishers must have a common understanding of ideology, fishing gear type, rules and regulations concerning setting of TACs, quotas, accessibility to the resource (What? When? How?), enforcement and monitoring instruments and problems and possible outcomes so as to encourage harmonious team–work. It must be noted that if stakeholders are poorly organised, poorly educated and poorly represented, successful co–management will not be possible.

- ***Existing Organizations***: the fishers must have prior experience of community based systems and organisations.

- ***Benefits Exceed Costs***: fishers expect that the benefits will exceed the investment costs.

- ***Participation By Those Affected***: all decisions about managements must be made by the same people that collect information on the fisheries.

- ***Management Rules Enforced***: the management rules must be simple enough to be monitored and enforced by all fishers.

- ***Legal Rights To Organize***: the fishing community must have legal rights to organise themselves to address their needs.

- ***Co–Operation And Leadership At The Community Level***: an individual or core–group take responsibility for the management process.

- ***Decentralization And Delegation Of Authority***: the state must formally decentralise administrative functions; it must also delegate management responsibility to local groups.

- ***Co–Ordination Between Government And Community***: a co–ordinating body, consisting of members of all stakeholders should be established to monitor management, resolve conflicts and to enforce rules.

Yet another factor that is crucial for successful co–management is one of legitimacy. If the participants are fully consulted every step of the way about the co–management plan, and if they have actively contributed in the decision–making processes, then it is more than likely that they will, of their own accord, follow all rules.

Challenges Of Co–management

The challenges listed overleaf are adapted from the paper presented by Svein Jentoft (1989:147-151) to the National Marine Fisheries Services of the United States.

- Fisheries management, especially that concerning regulations, requires comprehensive resources and skills. It is doubtful that local communities, such as those in Hawston, can meet this requirement. Many local communities, especially those that have been oppressed during the apartheid era, did not receive quality education and training to equip them for the wider aspects of life.

- Although co–management aims to minimise conflicts, at times conflicts are unavoidable. Groups or individuals may come into the decision making processes with conflicting ideologies. Also, certain regulations and the strict monitoring thereof could easily frustrate members. Some members may even choose to leave the arrangements. It is important to keep all participants committed to the agreed system so that breakaway groups do not form. Therefore, the political costs of regulating fishing behaviour can be high. Generally, the more homogeneous the group, the greater the chances of cordial, co–operative relations between the membership. This is also true for Hawston.

- The organisations participating in the co–management arrangement must be manageable. It is important to devise strategies of bringing the different groups of users together and deciding which stakeholders should be represented and how they should be chosen. Too large a group could create conflictual problems, especially since different organisations tend to compete with one another. Generally, the higher the number of organisations involved, the fewer the functions that can be delegated.

- The monitoring group chosen by the fishers themselves usually find it difficult to check on their colleagues especially when certain individuals are breaking the rules.

Co–operation is one of the key principles of co–management. Co–operation is a learning process. Knowing and practising collective values emanate from a spirit of co–operation. If the stakeholders do not have an experience of co–operation and collective action, co–management is doomed to failure.

In an effective and sustainable co–management arrangement, many stakeholders must be consulted at regular intervals, especially prior to its implementation. All decision - making processes involve consultations with all concerned parties. This consumes valuable time and may delay decisions that are worthy of immediate attention. Such delays could make the fishery inefficient. There is a fine balance between democracy and efficiency. Too much democracy will decrease efficiency and vice versa. The challenge is to take a middle line, i.e. there will always be a compromise between democracy and efficiency.

It is generally believed that if a co–management plan is implemented and run properly, it is very likely that it would bring management to a level somewhere between open access and the optimal regime. Can this be attained in Hawston? Is co–management a possible solution to the uncontrolled and ever increasing poaching in Hawston? Why do the people in Hawston poach? What do people feel about poaching? If co–management can work in Hawston area, what criteria must be satisfied to ensure its success?

To obtain answers to the above questions, I did an empirical study of Hawston.

3.3 METHODOLOGY

I interviewed 16 residents. Four samples from each of the following sectors were interviewed: commercial divers, poachers, community leaders and informal divers/subsistence fishers. Interviews were conducted at the homes of interviewees and all the responses were recorded on a audio–tape. These tapes were played and analysed in the late afternoon on the days of the interviews. One possible shortcoming of the interviews is that they were completed on different days and at different times of the day. Although the interviewee enjoyed the comfort of his/her home to express views freely, the fact that the interviews were conducted on different days and at different times of the day, it is possible that the lack of standardisation could have negatively impacted on the responses. It is possible that lack of attention, physical and mental exhaustion, as well as varying degrees of anxiety could have affected the quality of the responses.

Detailed questionnaires were also prepared and handed to 78 residents of Hawston. These questionnaires were given on a Friday and collected on the Sunday of the same weekend. Possible respondents were randomly selected. Some questionnaires were given to the

chairperson of the Overberg Commercial Abalone Divers Association for distribution among his diving colleagues. A set of questionnaires were handed to one of the leaders of the poaching syndicate. I personally handed questionnaires to other stakeholders such as women, subsistence fishers, informal divers, community leaders and divers assistants who work from boats. I did not have a list of names and addresses of all residents; neither did I select my respondents in a specific manner. At this point, it is important to note that at the time of my research, Hawston was in turmoil. Differences between the conflicting agendas of the stakeholders led to numerous violent confrontations. It was, therefore, not unnatural for residents to view foreigners to the area (like myself) with suspicion. I, therefore, spent many weekends acclimatising myself to the Hawston area with the goal of convincing people that I was a bona fide researcher. By treading carefully, I was able to convince many residents that my research was important for the Hawston community. My trust - building exercise had positive spin–offs because I was able to hand out questionnaires to residents through referrals by other residents. This method of referrals has some inherent weaknesses. The main one being that I could have been referred to friends. It is my feeling that the crisis in Hawston would have been discussed at social gatherings and therefore a group of friends could have already developed similar opinions on the issues affecting Hawston. Yet another problem of the referral method is that only the responses of the more active residents (those who are willing to talk freely) were recorded; I might, therefore, have missed out the responses of those who shy away from attention, but who are capable of making constructive contributions. Although 78 questionnaires were handed, only 52 questionnaires were returned, i.e. a response rate of approximately 67 percent. Out of this total batch, 7 were either incorrectly completed or were incomplete. The remaining 45 questionnaires were intensively analysed with the aid of a computer programme, the results and findings of which are extensively discussed below.

A number of newspaper clippings, articles and books written by distinguished authors, as well as government White papers were consulted to develop the theoretical framework of this research report.

4. SUMMARY OF THE DATA

4.1 INTERVIEWS

During my visits to Hawston, I interviewed a cross–section of the fisher community. Representatives of the following stake–holder groups were interviewed: the Overberg Commercial Abalone Divers Association, the Informal Divers, the Boat Assistants Association, the Vissersmaatskapy, Line Fishers and Poachers.

The following questions were posed during the interviews:

- Why are people poaching?
- Name the groups of people involved in poaching.
- Do you think that commercial divers also poach?
- What about school children? Are they also poaching? Explain.
- Do you think that the South African Police Services are doing their best to curb poaching? Explain.
- Do you think that the Sea Fisheries Inspectorate are doing their best to curb poaching? Explain.
- What about the courts? Are they helping to curb poaching? Explain.
- Do you think that environmental education will help to curb poaching? Explain.
- Do you think that poaching is a good thing? Why?
- Why are there so much conflicts in Hawston?
- How do you think that poaching can be stopped?
- How do you think that conflicts can be stopped?
- What is your view on co–management as a tool to solve the problems in Hawston? Do you think it will work? Explain.

These interviews presented me with a macro–focus of the main issues at hand, some of which will be discussed below.

Poaching is increasing at an alarming rate in Hawston. The poachers can be divided into three categories: the main buyer, the informal divers and two or more carriers. The main

buyer is usually based in Hawston and is well connected with syndicates who are firmly established in the black–market trade of abalone. The informal divers and carriers are usually a mix of school children and others who are either holding full–time jobs or have left their jobs. The latter group may comprise school educators, ambulance drivers, and trades–persons such as plumbers, builders, electricians and a carpenters. The general opinion of all interviewees is that the only people who could justify poaching on the basis of unemployment and poverty are those traditional fishers who always lived off the sea for many years. Many poachers have voluntarily left their jobs and they blame unemployment and poverty for their actions. It is the accepted view that many people have entered the lucrative poaching trade to become "rich overnight" or "to make easy money". The South African Police Services and the Sea Fisheries Inspectorate are perceived to be performing poorly in their attempts to curb poaching. Two main reasons are cited for their inadequacy. They are grossly under–staffed and they fear some of the violent elements in the Hawston community. In addition, the South African Police Services are accused of bribery, corruption and inefficiency. It is my feeling that the police services are viewed with suspicion especially, when one thinks of their dismal performance during those years of oppression during the apartheid era. If the community does not trust the police services, friction is unavoidable. There is also a general opinion that the local magistrate court is very lenient in sentencing poachers. Often, the low fines do not serve as a deterrent because the poachers make thousands of rands for a few hours of work, and therefore readily pay the fines.

All interviewees accept that poaching is bad. They know and understand that unabated poaching will deplete the stocks so rapidly that the community will be exposed to a social tragedy in the long run. Although many feel that environmental education could help to curb poaching, they are also of the view that this will be inadequate because the "greed for money" will dictate that poaching should continue.

The reasons for conflict are many, the central one being poaching. The demand for abalone increased greatly in recent years, mainly because of the entry of Chinese triads. Suddenly every one wants to be a supplier, demanding that the legitimate commercial divers should not monopolise the industry. According to Rodney Gillian, chairperson of the Overberg Commercial Abalone Divers Association "the commercial divers are not against giving access to others into the industry ... as long as this is done fairly ... it is unreasonable to

expect us to let go of our quota without monetary compensation ... we have paid thousands of rands for our entrenched diving rights ... many of us are still paying off our debt to the banks" (interview recorded on audio–tape).

It appears that the commercial divers are more financially independent than the majority of people living in Hawston. My impression is that the skewed financial pattern is causing jealousy and ill–feelings in the community. There are also inter–family and intra–family feuds. Within the same family are poachers and legal commercial divers. These two groups are constantly conflicting with each other because of their divided allegiance. The police and sea fisheries inspectorate are somewhat caught in the middle: the commercial divers think that the authorities are not doing enough while the poachers do not trust the authorities and accuse them of working in cahoots with the commercial divers. There also appears to be some political undertones, the depth of which I was not able to unravel.

Although some of the residents heard of co–management previously, almost all of them did not know its complete meaning. After a brief explanation, all the interviewees believed that co–management may prove to be the remedy to the problems in Hawston. They were especially keen to form a joint monitoring unit to ensure equity, sustainability and efficiency in the abalone industry. According to Mr. Gillian, his organisation "The Overberg Commercial Abalone Divers Association" is of the view that the community should have an increased quota. His members are willing to relinquish some of their diving rights as long as they are adequately compensated.

4.2 QUESTIONNAIRES

The questionnaire consists of three parts:

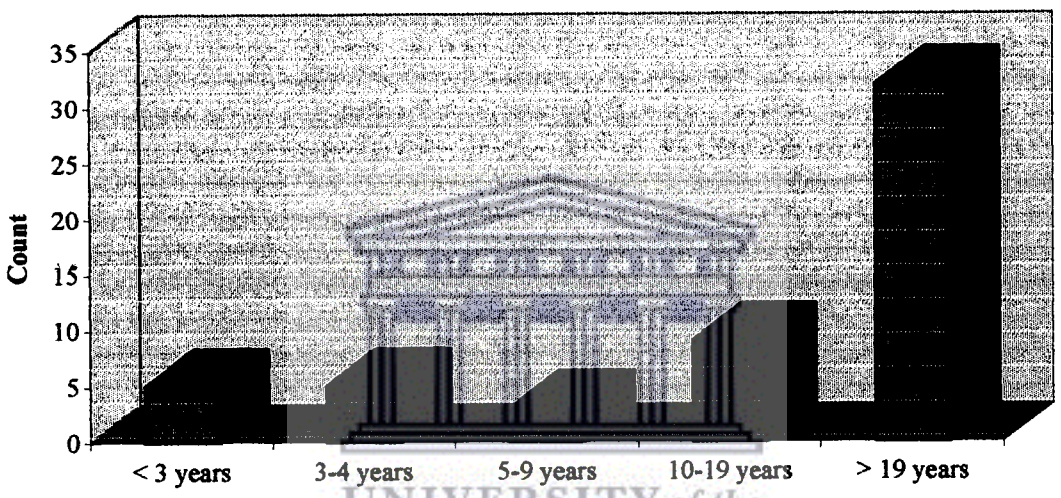
- background information of the Hawston community;
- their involvement (if, any) in poaching and their attitude towards poaching; and
- their knowledge, views and acceptance and/or non–acceptance of co–management as a possible solution to the conflicts in the community.

Data from each of the three parts is summarised below.

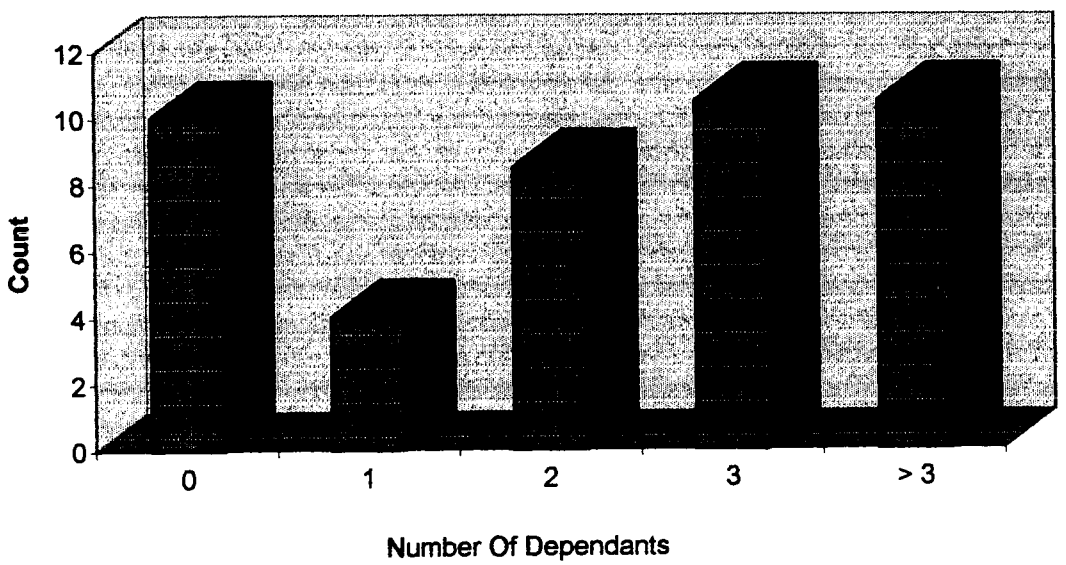
Background Information

Out of the total 45 respondents, 38 were male, only 4 were female while the remainder did not divulge their gender. 20 were above 35 years old, and 26 were between 18 and 35 years. The large majority of respondents lived in Hawston for more than 19 years (*refer to Graph 1*); although only half of them tied the matrimonial knot, 67% were responsible for providing the basic necessities for life for more than 2 dependants (*refer to Graph 2*)

GRAPH 1:



GRAPH 2:

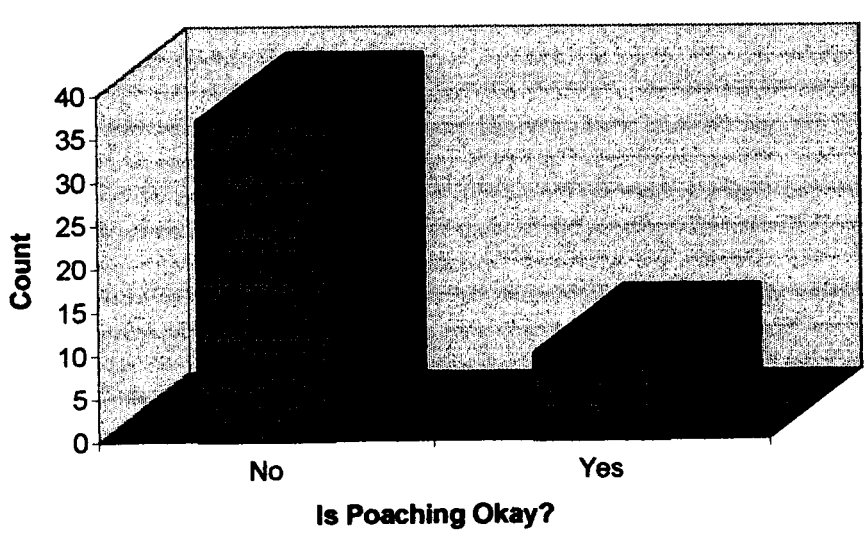


With regard to educational background, 22 received some level of high school education, only 8 completed their matriculation examinations, only 4 completed a diploma while none of the sample completed a degree. The remainder had received tuition at only the primary school level. From these statistics it appears that many residents are poorly educated but in spite of this, many are active in community organisations. Only 16 respondents admitted that their daily income for survival comes from poaching. It is interesting to note that the average income of the group lies between R1000 and R3000 per month. Only 9 carry a mortgage bond, the majority of whom service a bond less than R50,000. Just about half of all respondents own a motor vehicle.

Poaching

The groups of people who are usually involved in poaching activities, either directly or indirectly, are school children, housewives, commercial divers, boat fishermen, artisans (those who have either qualified or have some experience in trades such as building, carpentry, engineering, etc.) and informal divers. It appears from the responses that the informal divers are the main culprits. Many poachers blame their participation on the combined factors of poverty, unemployment and the desire to make more money than they could possibly make in the employed sector. Although poaching is continuing at an alarming rate, a staggering 37 individuals (82%) do not think that poaching is a good thing, as reflected in Graph 3

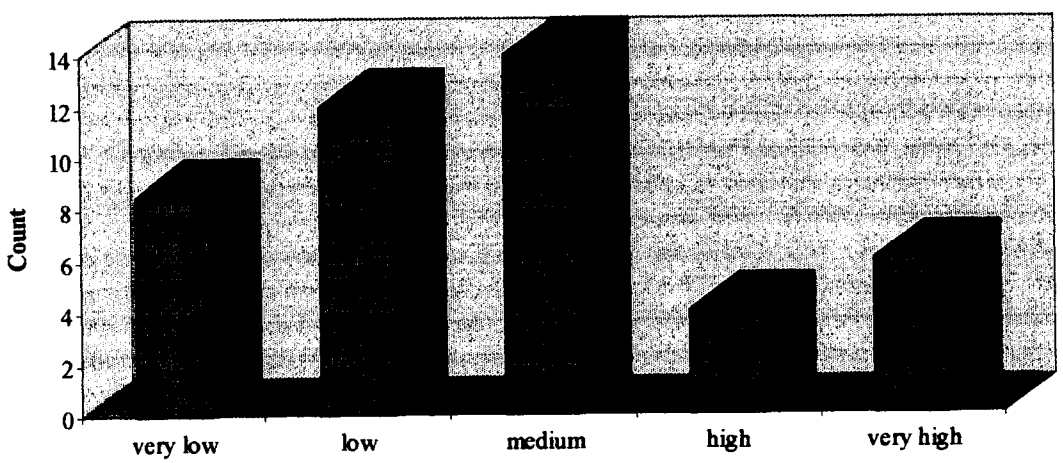
GRAPH 3:



Most of the poachers who disapproved of their illegal activity stated three main reasons for their stance: poaching causes and/or encourages crime; poaching in the long run, destroys the marine resources which will ultimately affect the economic and social well-being of the Hawston community. Those who supported poaching cited poverty and unemployment as their main reasons. It is interesting to note that as many as 36 individuals think that poaching should be stopped.

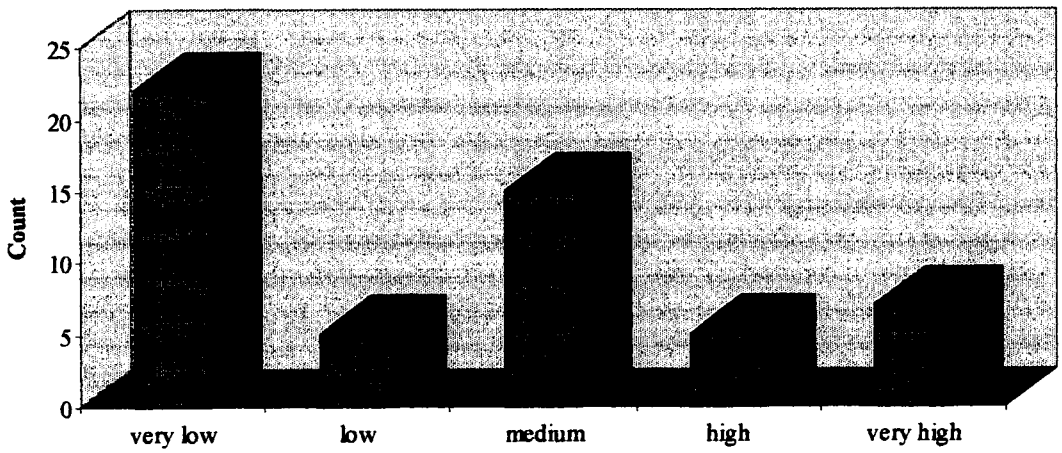
When questioned as to how poaching can be stopped, there was a mixed response. The responses, arranged in the sequence of strong to weak support are: deploy more police personnel, give the community a reasonable quota, sensitise the community to the long run disadvantages of poaching, increase fines imposed by the local magistrate court, deploy more sea fisheries inspectors to work hand in hand with the police, give the informal divers a reasonable quota, provide more job opportunities and jailing, instead of merely imposing fines on poachers. When the respondents were asked to circle the appropriate number, to indicate the level of effectiveness of the police, sea fisheries inspectors, magistrate court and the community leaders in helping to curb poaching, the cumulative data indicates that control over poaching leaves much to be desired. This sad state of affairs is represented in Graph 4, 5, 6 and 7.

GRAPH 4:



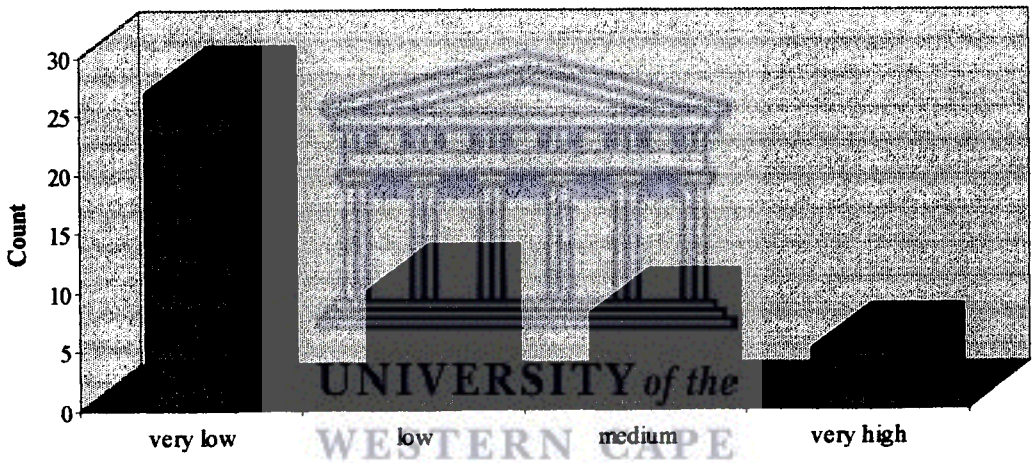
Effectiveness Of The Police To Curb Poaching

GRAPH 5:



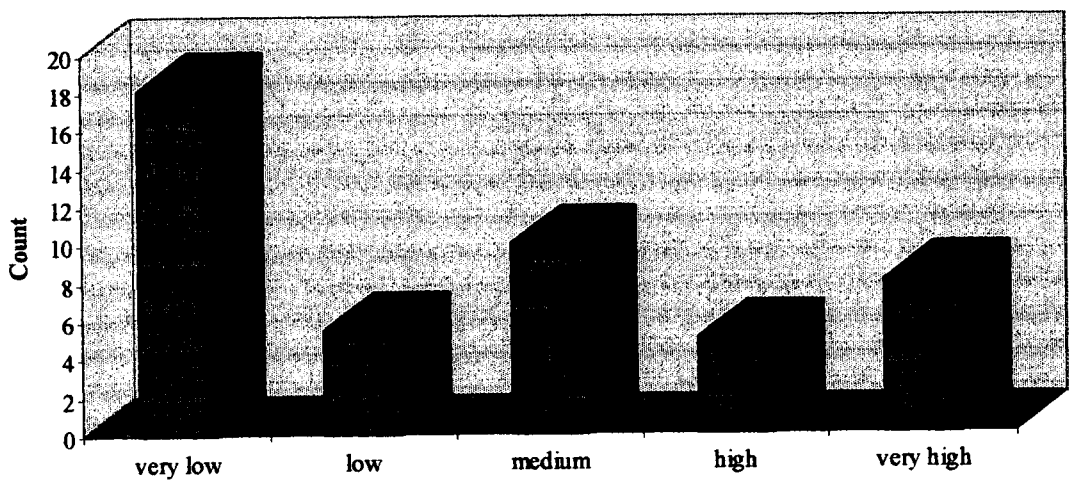
Effectiveness Of Sea Fisheries To Curb Poaching

GRAPH 6:



Effectiveness Of Community Leaders To Curb Poaching

GRAPH 7:



Effectiveness Of The Magistrate Court To Curb Poaching

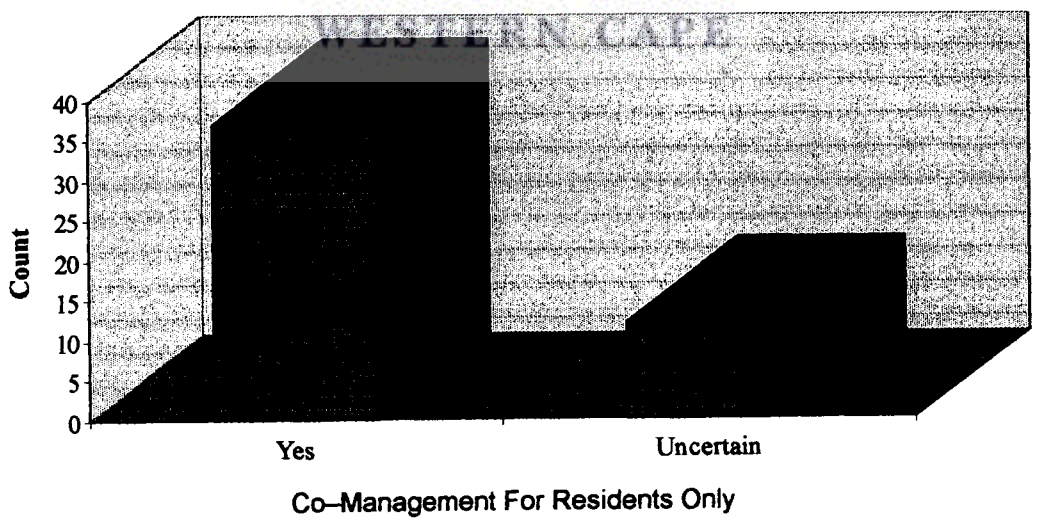
Co–management

During the tape–recorded interview sessions, I realised that almost all the interviewees had no knowledge of co–management. I therefore included a brief description of co–management in the questionnaire; for the benefit of those who may have a difficulty in comprehending written information, I also verbally discussed the concept before they commenced with the questionnaire.

Twenty nine individuals (64%) did not hear of co-management previously. I briefly explained the concept to those who were hearing it for the first time. Many respondents were excited about co-management; this is revealed by the fact that 35 (78%) accept co-management as a possible solution to the problems in Hawston, 9 were uncertain while only 1 did not accept co-management.

Thirty five residents expressed the view that only people who lived in Hawston for a long time should be part of the co–management plan for Hawston (*refer to Graph 8*).

GRAPH 8:



Many qualified this view by stating that length of residence by itself is significant but not sufficient; such long standing residents should also come from a fishing background. With

regard to those to be excluded from the co–management plan, it was the overwhelming view of respondents that migrant divers (divers not living in Hawston) and those who were qualified to do other jobs were the main groups of people that were to be excluded.

Good support was expressed for the factors which were considered important for the success of co–management. The factors arranged from those with strongest support to those with weakest support are: committed leadership, export rights, effective enforcement, stop poaching, democratic election, exclusive rights, equitable profit distribution and participation by all inhabitants. When asked to indicate which factors would be possible reasons for deciding against co–management, the 2 mostly cited reasons were "it is impossible to stop poaching" and "it will be difficult to enforce effectively".

5. DISCUSSION OF RESULTS

The information obtained from the interviews was used to structure a questionnaire and to formulate some hypotheses around the issues at Hawston. My goal was to use the data from the questionnaires to check the validity of my hypotheses.

The hypotheses are:

- Respondents from the lower income groups are more likely to support poaching.
- Younger respondents are more likely to support poaching.
- Younger respondents are more likely to use poverty to justify poaching.
- Younger respondents are more likely to use unemployment to justify poaching.
- Poorly educated people are more likely not to have strong feelings against poaching.
- People with a higher educational background are more likely to have a greater knowledge of co–management.
- People with a higher educational background are more likely to accept co–management.
- Residents who have lived in Hawston more than 19 years are more likely to feel strongly against poaching.
- People with high bond payments are more likely to support poaching.

- Older residents are more likely to accept co–management.
- Commercial divers are totally against poaching.

I intended to use the chi square test to validate each of the above hypotheses. Unfortunately, the number of missing cells in each test battery made the chi square test results insignificant. I then proceeded to combine the variables. In this attempt, I was confronted with two problems. Firstly, it did not make sense to combine such variables as educational qualifications and secondly, the test results of most combinations were just as insignificant as the results obtained without combining the variables. I will therefore attempt to establish the validity of each of my hypotheses by examining tables obtained after data were cross-tabulated, using the Statistical Package for the Social Sciences.

TABLE 4: ***Respondents From Lower Income Groups Are More Likely To Support Poaching***

Income			AGE				Total
			18–24 years	25–34 years	35–49 years	50 and above	
> 1000	is	no	2	4	2	1	9
	poaching	yes	2	2			4
	Total		4	6	2	1	13
1000 to 2999	is	no	4	6	6	1	17
	poaching	yes	1	1			2
	Total		5	7	6	1	19
3000 to 4999	is	no		2	2	1	5
	poaching	yes		1			1
	Total			3	2	1	6
5000 to 9999	is	no	1		4	1	6
	poaching	yes			1		1
	Total		1		5	1	7

Table 4 reveals that only 6 respondents who earn less than R3000 support poaching. 26 people in the income group lower than R3000 do not support poaching. When one examines the figures for those earning in excess of R3000, only 2 respondents support poaching while 11 do not support poaching. It appears from these data that income level has little or no relevance to attitude towards poaching.

TABLE 5: ***Younger Respondents Are More Likely To Support Poaching***

Income Source			AGE 18–24 years	AGE 25–34 years	AGE 35–49 years	AGE 50 and above	Total
None of the above	is poaching	no		1	3	2	6
		yes			1		1
	Total			1	4	2	7
Poacher	is poaching	no	4	4	1		9
		yes	3	4			7
	Total		7	8	1		16
Informal diver	is	no		1			1
	Total			1			1
Commercial diver	is	no	2	2	4	2	10
	Total		2	2	4	2	10
Boat assistant	is	no	1	4			5
	Total		1	4			5
Artisan	is	no			6		6
	Total				6		6

Only 7 respondents from a total of 22 in the age group younger than 35 years support poaching. Above this age group, that is 35 years and older, only 1 respondent supports poaching. It is clear that support for poaching is more prevalent among the younger people.

TABLE 6: ***Younger Respondents Are More Likely To Use Poverty To Justify Poaching***

Poverty Justifies Poaching			AGE 18–24 years	AGE 25–34 years	AGE 35–49 years	AGE 50 and above	Total
Yes	is poaching	no	1				1
		yes	2	4			6
	Total		3	4			7
No comment	is poaching	no	6	12	14	4	36
		yes	1		1		2
	Total		7	12	15	4	38

6 respondents younger than 35 years justify poaching on the basis of poverty. 19 respondents from this age group do not support poaching and 18 of them reserved their comment/s on the question whether poaching can be justified by poverty. On the whole, all the respondents who

agreed that poverty justifies poaching are younger than 35 years. Of this group, 6 out of 7 also agreed that poaching is okay. Therefore, it can be safely concluded that my hypothesis, that younger respondents are more likely to use poverty to justify poaching, is valid.

TABLE 7: ***Younger Respondents Are More Likely To Use Unemployment To Justify Poaching***

Unemployment Justifies Poaching			IS POACHING OKAY		Total
			No	Yes	
No comment	Age	18–24 years	7	3	10
		25–34 years	12	4	16
		35–49 years	14	1	15
		50 and above	4		4
Total			37	8	45

19 respondents younger that 35 years do not consider poaching to be okay; they also make no comment on the question whether unemployment justifies poaching. It is also interesting to note from the same table that only 8 respondents okay poaching; of these, 7 are younger than 35 years. My hypothesis is invalid.

TABLE 8: ***Poorly Educated People Are More Likely Not To Have Strong Feelings Against Poaching***

Want To Stop Poaching			IS POACHING OKAY		Total
			No	Yes	
No	Education	primary school	2	1	3
		secondary school		4	4
		matric		1	1
Total			2	6	8
Yes	Education	primary school	9		9
		secondary school	14		14
		matric	8		8
		diploma	3	1	4
Total			34	1	35
2	Education	secondary school	1	1	2
Total			1	1	2

Of the group of 8 respondents who do not want poaching to stop, 3 have only primary school education. Of the group of 35 respondents who want poaching to stop, 9 have only primary

school education. However, of the group that do not want poaching to stop, 7 have no more than secondary school education as compared to 23 out of 35 of the group that want poaching to stop. My hypothesis is therefore not strongly supported.

TABLE 9: ***People With A Higher Educational Background Are More Likely To Have A Greater Knowledge Of Co–Management***

Acceptance Of Co–Management			KNOWLEDGE OF CO–MANAGEMENT		Total
			No	Yes	
No	Education	matric		1	1
	Total			1	1
Yes	Education	primary school	6	5	11
		secondary school	12	2	14
		matric	4	4	8
		diploma	1	2	3
	Total		23	13	36
Uncertain	Education	primary school		1	1
		secondary school	5	1	6
		diploma		1	1
	Total		5	3	8

Only 7 respondents with education levels of matriculation and beyond have a knowledge of co–management whilst 5 respondents do not have any knowledge about co–management. In contrast, 8 respondents of the lower education group have a knowledge of co–management while 23 do not. It appears from the data that one cannot conclude convincingly that educational levels have a bearing on knowledge of co–management because the sample of 45 is dominated by the people who fall into the lower education category, i.e. those that possess only primary and/or some level of secondary school education (but, not attaining a matriculation certificate).

TABLE 10: ***People With A Higher Educational Background Are More Likely To Accept Co–Management***

Age			ACCEPTANCE OF CO–MANAGEMENT			Total
			No	Yes	Uncertain	
18–24 years	Education	secondary school		3	2	5
		matric		5		5
	Total			8	2	10
25–34 years	Education	primary school		3	1	4
		secondary school		5	2	7
		matric		3		3
		diploma		2		2
	Total			13	3	16
35–49 years	Education	primary school		7		7
		secondary school		3	2	5
		matric	1			1
		diploma		1	1	2
	Total		1	11	3	15
50 and above	Education	primary school		1		1
		secondary school		3		3
	Total			4		4

Table 10 reveals that 25 respondents with primary and/or secondary school education (but not matriculation) accept co–management. Only 11 respondents with matriculation and/or diploma accept co–management. On the whole, all respondents, with one exclusion, accept co–management. Therefore, my hypothesis is invalid.

TABLE 11: ***Residents Who Live In Hawston More Than 19 Years Are More Likely To Feel Strongly Against Poaching***

Want To Stop Poaching			AGE					Total
			< 3 years	3–4 years	5–9 years	10–19 years	> 19 years	
No	is	no					2	2
	poaching	yes		1			5	6
	Total			1			7	8
Yes	is	no	2	1		7	24	34
	poaching	yes					1	1
	Total		2	1		7	25	35
2	is	no					1	1
	poaching	yes			1			1
	Total				1		1	2

27 respondents who have lived in Hawston for more than 19 years do not support poaching; of this number 24 want poaching to stop. It is obvious that the large majority of respondents (53%), most of whom have lived in Hawston for more that 19 years, want poaching to be stopped.

TABLE 12: ***People With High Bond Repayments Are More Likely To Support Poaching***

Mortgage Bond			IS POACHING OKAY		Total
			No	Yes	
No	Bond	< 50,000	28	7	35
	Debt	> 199,999	1		1
	Total		29	7	36
Yes	Bond	< 50,000	4	1	5
	Debt	50,000 to 99,999	2		2
		> 199,999	2		2
	Total		8	1	9

Of the 9 respondents who service a mortgage bond, 8 do not support poaching while the one who okays poaching has a bond debt below R50,000. The data makes my hypothesis invalid.

TABLE 13: ***Older Residents Are More Likely To Accept Co–Management***

Age			ACCEPTANCE OF CO–MANAGEMENT			Total
			No	Yes	Uncertain	
18–24 years	Education	secondary school		3	2	5
		matric		5		5
	Total			8	2	10
25–34 years	Education	primary school		3	1	4
		secondary school		5	2	7
		matric		3		3
		diploma		2		2
	Total			13	3	16
35–49 years	Education	primary school		7		7
		secondary school		3	2	5
		matric	1			1
		diploma		1	1	2
	Total		1	11	3	15
50 and above	Education	primary school		1		1
		secondary school		3		3
	Total			4		4

Generally, it appears that the large majority of residents accept co–management irrespective of educational level or age group.

TABLE 14: ***Commercial Divers Are Totally Against Poaching***

		IS POACHING OKAY		Total
		No	Yes	
Income Source	none of the above	6	1	7
	poacher	9	7	16
	informal diver	1		1
	commercial diver	10		10
	boat assistant	5		5
	artisan	6		6
Total		37	8	45

The large majority of respondents do not support poaching. 10 commercial divers are the dominant group, among the others who do not support poaching. As expected, the only people who support poaching are the poachers themselves.

In the above discussion, I attempted to establish the validity of my hypotheses that were constructed prior to the respondents receiving the questionnaires. The hypotheses were structured around three crucial areas: poaching, knowledge of co-management and acceptance of co-management. Out of a total 11 hypotheses, 8 were based on poaching. This is not unexpected since almost all instances of conflicts emanate from poaching. It appears that the majority of poachers are from the young age group. This group use poverty as the main reason to justify their poaching activities. The older residents, especially those who live in Hawston for more than 19 years, are strongly against poaching.

The large majority of respondents had little knowledge of co-management. When this concept was briefly explained to them, they appeared to view co-management as a likely solution to the conflicts in Hawston. Co-management was overwhelmingly accepted by almost all respondents, irrespective of their age group or their educational background.

It is my view that co-management should be implemented in Hawston. My reasons are as follows:

- poaching will exhaust the resources in Hawston if allowed to continue at present levels.
- although the various state institutions are aware of the problems in Hawston, they do not have, as yet, a viable management plan for Hawston.
- poaching and the resulting conflicts will only escalate the costs in an already impoverished community. Also, residents appear to be frustrated with the conflicts; there is a genuine desire to live in peace and harmony.
- it is perhaps easier to educate and rehabilitate those younger residents who are poachers.
- although many residents have a limited knowledge of co-management, almost all of them accept co-management.

6. CONCLUSION

The many years of colonial rule and the illegitimate apartheid regime have created major problems in the fishing industry, many of which are prevalent to the present day. Resources among Whites and Blacks are unevenly distributed; large scale enterprises, mainly owned by Whites, have virtually monopolised the industry. With the formation of a democratic government in 1994, it is hoped that disadvantaged communities will get a fair share of the economic and social benefits of this lucrative industry. Attempts have already been initiated

in this regard with the publication of the White Papers on The Reconstruction and Development Programme and the White Paper on Marine Fisheries Policy.

My research focused on Hawston and its conflicts, emanating mainly from poaching of abalone. The coastal community of Hawston was established in 1966. Many residents were dependent on marine resources for their daily living. The community was close–knit, united and assisted one another during those oppressive years of apartheid. However, the recent demand for abalone by mainly the countries in the East, has divided this once stable community. Prices for abalone sky–rocketed. Poaching increased uncontrollably. The legitimate commercial divers felt that poachers threatened their livelihood. These divers were also unhappy with the prices they received from the processing factories. The residents demanded a quota. Conflicts among the different stakeholders and between the stakeholders and law enforcement units increased to unmanageable levels. The entry of gangsters worsened the problems. The intervention by the government has thus far brought no relief to the major stakeholders of Hawston. It appears that both the Department of Sea Fisheries and the South African Police Services have virtually given up on protecting the rapidly diminishing resources at Hawston. In the mean–time, the poachers continue to plunder the very resources that could have been carefully managed for the common good of all residents.

There is an urgent need to implement a suitable management plan so that optimum biological, economic and social goals can be attained without destroying the self–sustainability of the marine resources in Hawston. Information gathered from the interviews and from the questionnaires reveal a genuine desire by the people to lead normal lives and to protect the marine resources. There is an overwhelming acceptance of co–management as a tool to bring peace to a divided community and also to manage the resources at sustainable levels.

The critical question that comes to mind is: "Can co–management work effectively in Hawston? It appears that co–management is often viewed as a simplistic model to remedy many problems in all fishing communities. I believe that co–management is a complex management tool that requires intensive research of a particular fishing community before it can be applied. The planning stages for co-management in Hawston are therefore crucial; only then, would the immense advantages of co–management become a reality. Thorough

planning is fundamental for any hope that co–management will succeed in Hawston. Only a few of the key conditions for co–management (stated by Ostrom and Pinkerton, and repeated in chapter three of this essay) are evident in Hawston. The area of the commons is not clearly demarcated; the fishers are not clearly identified; the community is divided on many issues and group cohesion is absent; although there are existing organisations, each group has its own agenda; management rules are not established; leadership at community level work for the interests of specific groups; government agencies have not yet penetrated the community with the objective of working together.

I concede that a number of issues must be discussed before considering co–management as a conflict resolution tool in Hawston. Although there are problems, I believe that co–management can succeed in Hawston. As I already stated, thorough planning is crucial. The residents accept the basic principles of this management system. They also appear to have a genuine willingness to resolve the underlying problems that have brought about so much conflict and disunity in the community. However, there are a number of fundamental issues that must be discussed with all stakeholders to find a way forward. The reasons for the conflicts must be analysed carefully with the objective of finding solutions. Penetrating the areas of conflicts will, I believe, be the greatest challenge ... but, it is possible to overcome this challenge. There are a number of questions that need answers.

The main questions are listed below:

- How does one define the commons?
- Who are the stakeholders?
- Do both legal and illegal participants qualify as stakeholders? What about the gang members?
- Can the real fisherfolk be identified?
- Can the legal and illegal groups merge? If so, how does one accomplish this?
- Do the so - called leaders represent the stakeholders? What about the rest of the commons? Will they support the groups?

If the above issues can be resolved, it will help towards establishing the correct climate and conditions for co–management in Hawston.

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8. APPENDIX A (Definitions)

Artisanal : a type of fishing using traditional devices to catch small quantities of marine life.

Biodiversity : the natural, diverse wealth of biological material (plant and animal) in an environment.

Capacity Building : expanding capabilities to undertake certain activities.

Coastal Communities : discreet homogeneous populations at the coast, generally dependent on the sea for their livelihood.

Commercial Fishery : a fishery conducted with the aim of earning money for the entrepreneur, his company and its employees.

Ecosystem : the whole system in which an individual organism lives; the environment as well as all other organisms in the system form part of the ecosystem.

Effort : the quantum, be it measured in manpower, gear or period (or a combination of them), put into fishing in order to make a catch.

Industrial : in the case of fisheries, generally large–scale and capital intensive, and employing many people.

Local Community : a homogeneous group of people, or a population, in the immediate vicinity of something; where fishing is concerned, the term of necessity refers to a community resident at the coast.

Non–renewable Resources : a non–renewable resource is also called an exhaustible resource; if a non–renewable resource is fixed in overall quantity, any use of it in a given time period means that there is less of it available for other time periods.

Quota : a portion (preferably proportion) of a TAC allotted to an individual or group of individuals for a specified period.

Recreational : fishing for enjoyment, for the sport or the relaxation it offers.

Renewable Resource : a renewable resource, under a suitable management regime, will regenerate itself: so, fish and trees are renewable resources.

Subsistence : fishing to live, by taking out only what one requires for oneself or for one's immediate family or community; the definition does not preclude barter or sale of excess catch to obtain other materials necessary for life, but excludes commercial connotations.

Sustainable Utilisation : an extent of utilisation where at, all other things being equal, levels of catch can be sustained *ad infinitum*.

Total Allowable Catch (TAC) : the maximum allowed take (normally annual) from a resource, generally set on scientific, natural, social or economic grounds.

Traditional : having a long established relationship with a fishery.

9. APPENDIX B (Questionnaire)

Please complete the questionnaire by expressing your honest and unbiased opinions. Confidentiality is guaranteed. Please do not indicate your name. Thank you!!!

[A] PERSONAL ***(Place a cross in the appropriate block!!!)***

1. Are you Male ☐ or Female ☐?

2. How old are you?

- ♦ Below 18 years ☐
- ♦ Between 18 and 25 years ☐
- ♦ Between 25 and 35 years ☐
- ♦ Between 35 and 50 years ☐
- ♦ Above 50 years ☐

3. How long have you lived in Hawston?

- ♦ Between 0 and 3 years ☐
- ♦ Between 3 and 5 years ☐
- ♦ Between 5 and 10 years ☐
- ♦ Between 10 and 20 years ☐
- ♦ More than 10 years ☐

4.

4.1 State your marital status.

- ♦ Single ☐
- ♦ Married ☐
- ♦ Divorced ☐

4.2 If married or divorced, how many dependants do you have?

- ♦ None ☐
- ♦ One ☐
- ♦ Two ☐
- ♦ Three ☐
- ♦ Above three ☐

5. What highest educational qualifications have you achieved?

- ♦ only Primary school education ☐
- ♦ some Secondary education but did not complete Matric ☐
- ♦ completed Matric ☐
- ♦ completed a Diploma ☐
- ♦ completed a Degree ☐

6. Do you belong to any community organization?

- ♦ Yes ☐
- ♦ No ☐

7. How do you earn your day–to–day income? Are you a/an:—

- ♦ Poacher ☐
- ♦ Informal Diver ☐
- ♦ Commercial Diver ☐
- ♦ Boat Assistant ☐
- ♦ Artisan ☐
- ♦ None of the above ☐

8. How much money do you earn per month?

- ♦ Below R1000 ☐
- ♦ Between R1000 and R3000 ☐
- ♦ Between R3000 and R5000 ☐
- ♦ Between R5000 and R10,000 ☐
- ♦ Above R10,000 ☐

9.

9.1 Do you have a mortgage bond?

- ♦ Yes ☐
- ♦ No ☐

9.2 If you do, what is your current bond amount?

- ♦ Below R50,000 ☐
- ♦ Between R50,000 and R100,000 ☐
- ♦ Between R100,000 and R150,000 ☐
- ♦ Between R150,000 and R200,000 ☐
- ♦ Above R200,000 ☐

10. Do you own a motor vehicle?

- ♦ Yes ☐
- ♦ No ☐

[B] POACHING

1. Why do you think that people are poaching? Is it because they:—

- ♦ are unemployed ☐
- ♦ are very poor ☐
- ♦ want to make lots of money ☐

2. Which groups of people are usually involved in poaching?

- ♦ Housewives ☐
- ♦ School Children ☐
- ♦ Informal Divers ☐
- ♦ Commercial Divers ☐
- ♦ Boat Fishermen ☐
- ♦ Artisans ☐

3.

3.1 Do you think that poaching is a good thing?

- ♦ Yes ☐
- ♦ No ☐

3.2 Why do you say Yes/No?

_____
_____
_____
_____
_____

4.

4.1 Do you think that poaching should be stopped?

- ♦ Yes ☐
- ♦ No ☐

4.2 If Yes, how can poaching be stopped?

_____
_____
_____
_____
_____

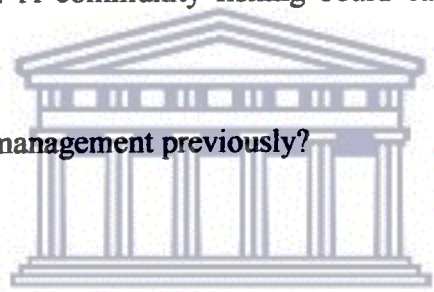
5. Circle the appropriate number to indicate the level at which the following are helping to curb poaching?

		LOW				HIGH
5.1	Police	1	2	3	4	5
5.2	Sea Fisheries Inspectors	1	2	3	4	5
5.3	Magistrate Court	1	2	3	4	5
5.4	Community Leaders	1	2	3	4	5

[C] CO–MANAGEMENT

Co–management is the sharing of responsibility and authority between all stakeholders (such as the Government and the Fishermen) to manage the sustainability, efficiency and equity of a fisheries.

Co–management can be viewed as a possible new way to deal with the distribution of quotas. This means that a well–defined group in Hawston will acquire a joint right to a quota and this right is not transferable. This group will distribute the quota to their members and ensure that poaching does not take place. A community fishing board can be elected to manage the fishery.



1. Have you heard of co–management previously?

   - ♦ Yes ☐
   - ♦ No ☐

2. Do you accept co–management as a possible solution to the problems in Hawston?

   ♦ Yes ☐ ♦ No ☐ ♦ Uncertain ☐

3. If co–management is put into place in Hawston, who do you think should be the participants?

   - ♦ Open to everyone who is interested ☐
   - ♦ Divers only ☐
   - ♦ All families ☐
   - ♦ Only residents who lived in Hawston for a long time ☐
   - ♦ Only residents who are above 18 years of age ☐

4. If co–management is put in place in Hawston, who do you think should be excluded from participation?

- Recreational divers ☐
- Migrant divers (not living in Hawston) ☐
- Women ☐
- Children under 18 years ☐
- People over 60 years ☐
- People who are qualified to do other jobs ☐
- No one ☐

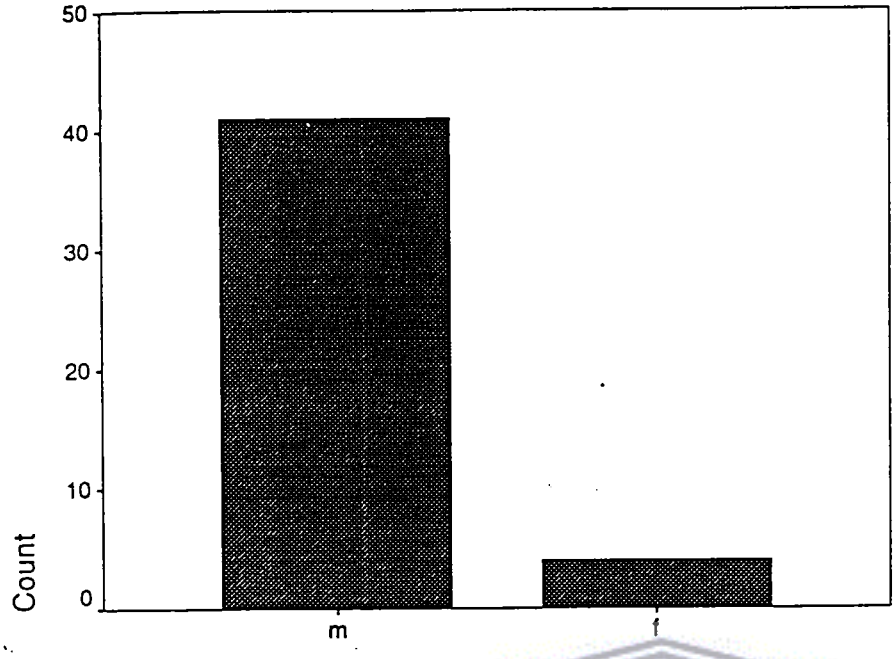
5. Which of the following factors do you consider important for co–management?

- Committed leadership ☐
- Exclusive rights ☐
- Participation by all inhabitants ☐
- Effective enforcement ☐
- Democratic election ☐
- Equitable profit distribution ☐
- Export rights ☐
- Stop poaching ☐

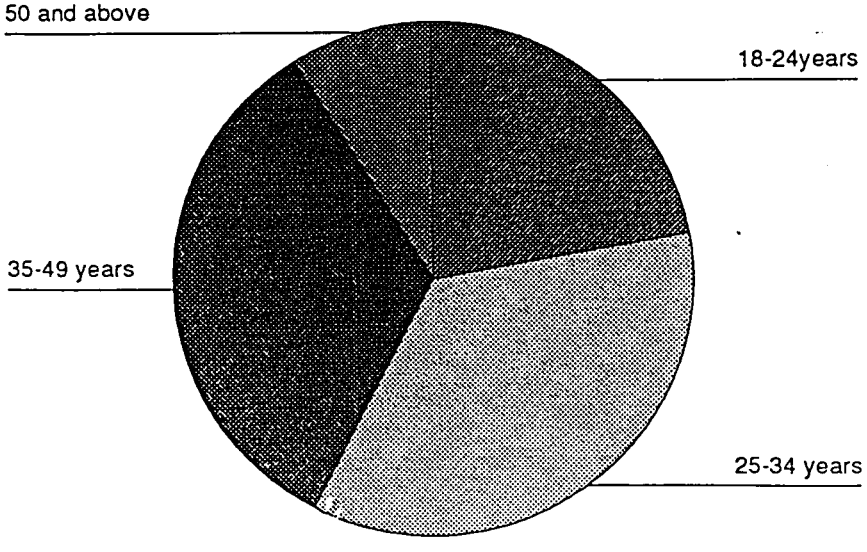
6. Which of the following would be possible reasons for you deciding against co–management?

- The Board will gain more ☐
- It is impossible to stop poaching ☐
- I will benefit more without co–management ☐
- It will be difficult to enforce effectively ☐

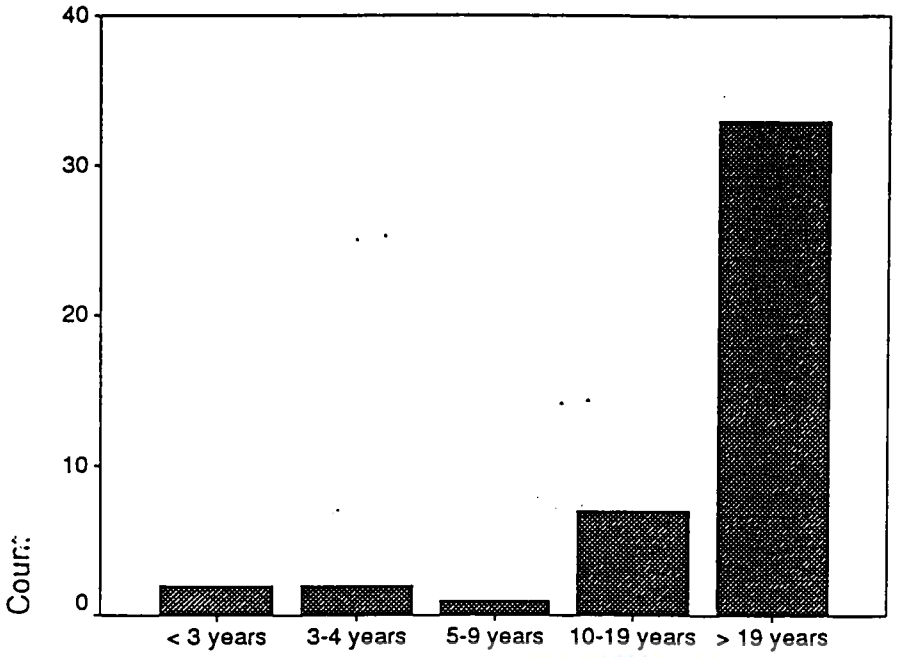
10. APPENDIX C (Graphs and Tables)



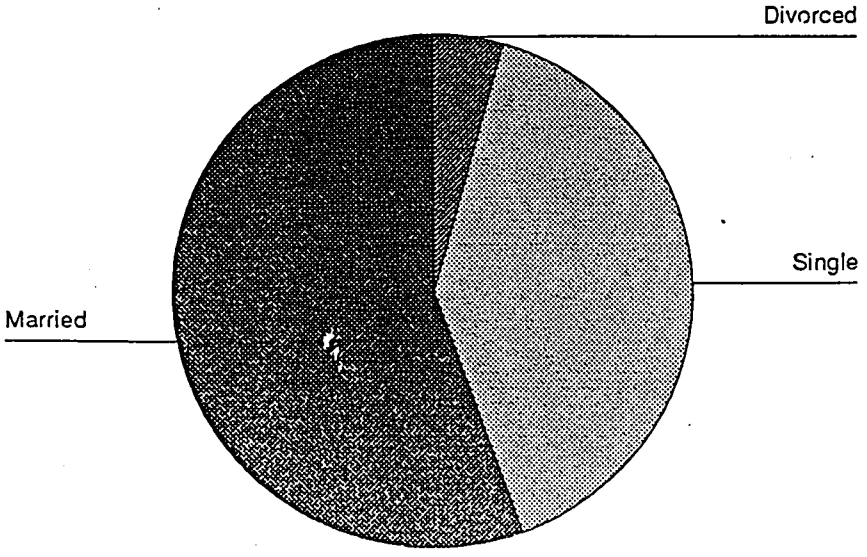
NUMBER OF MALE AND FEMALE RESPONDENTS



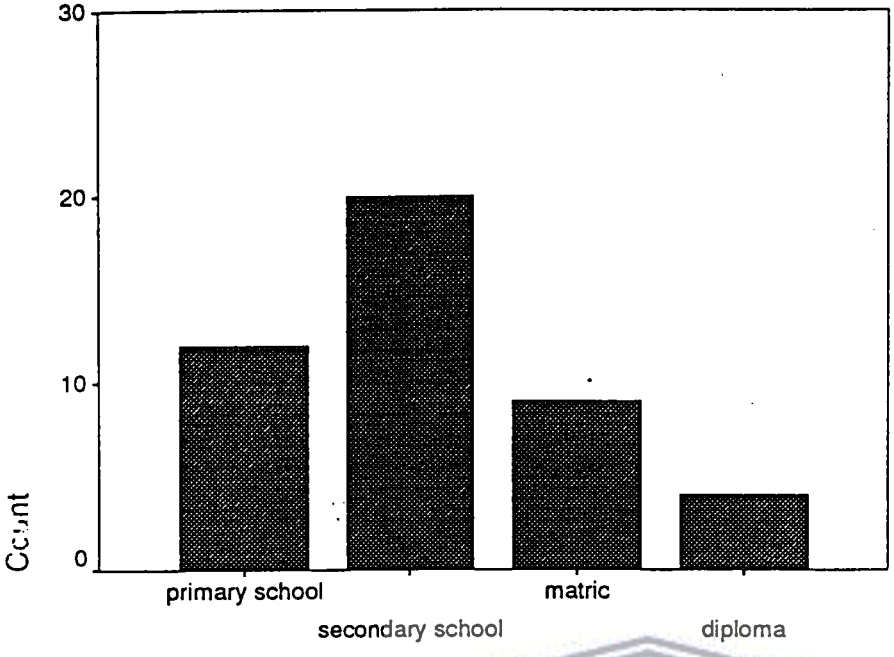
AGE OF RESPONDENTS



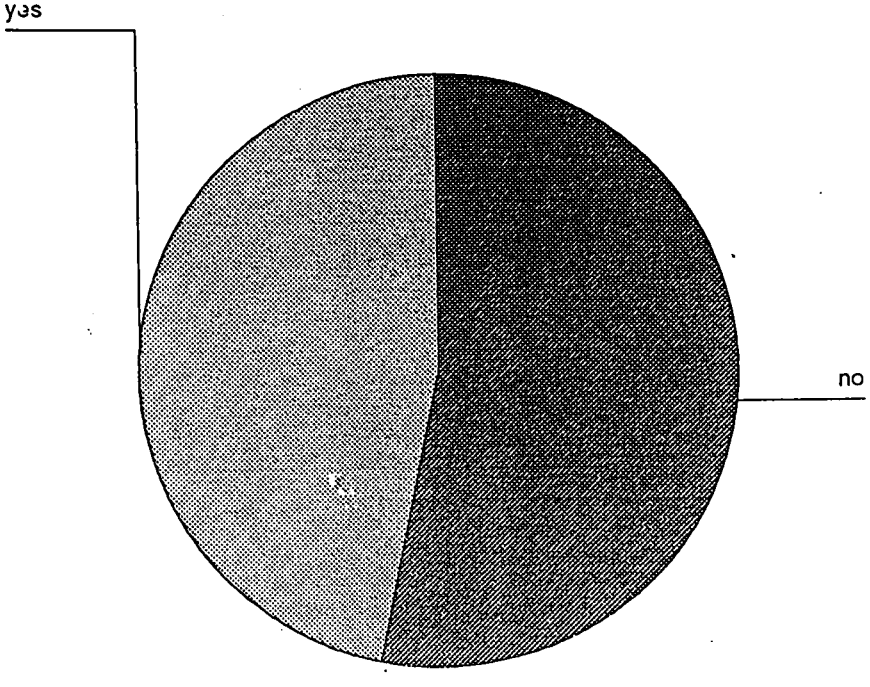
LENGTH OF STAY IN HAWSTON



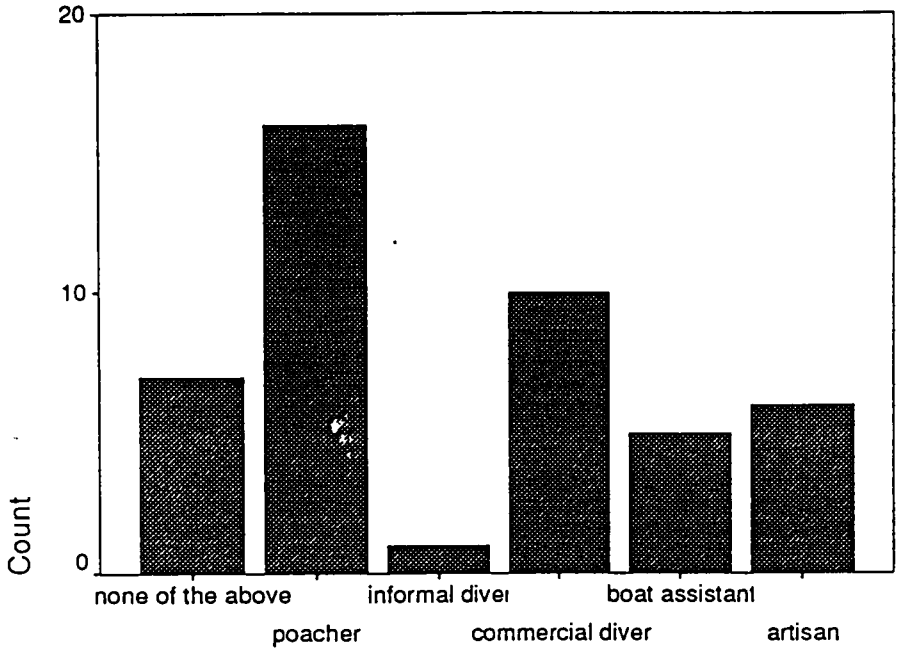
MARITAL STATUS



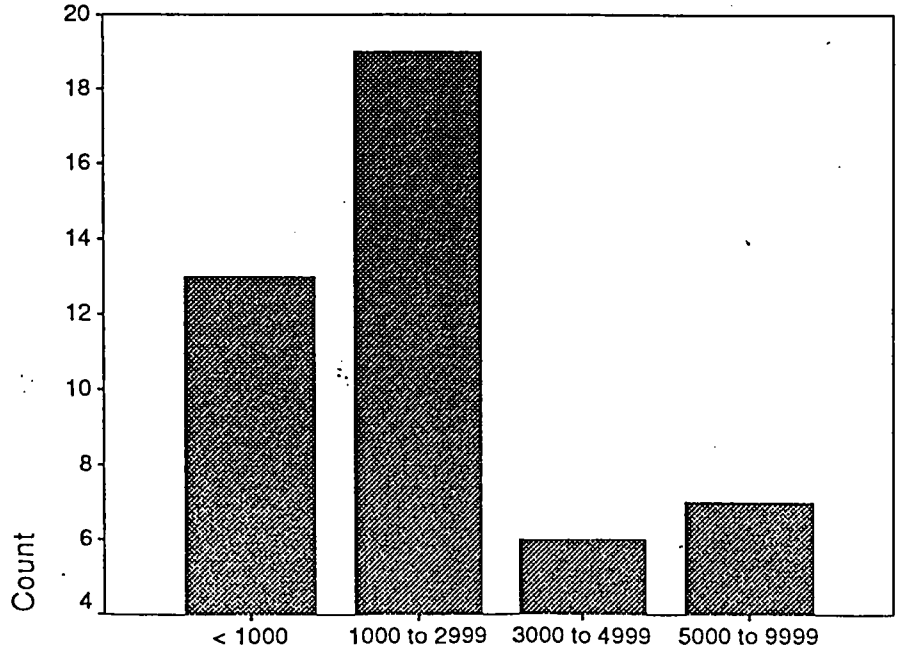
EDUCATIONAL QUALIFICATIONS



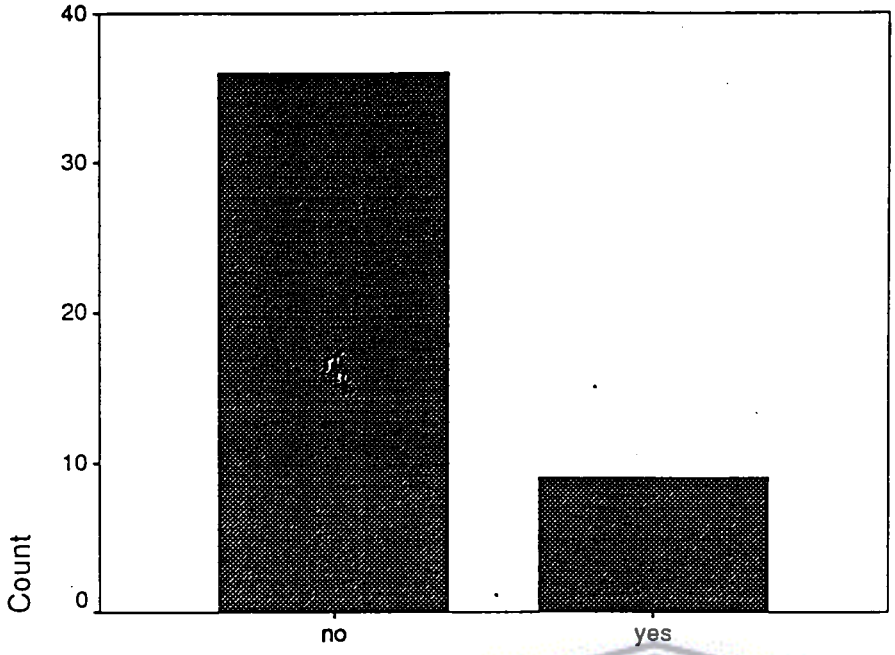
MEMBERSHIP OF COMMUNITY ORGANIZATIONS



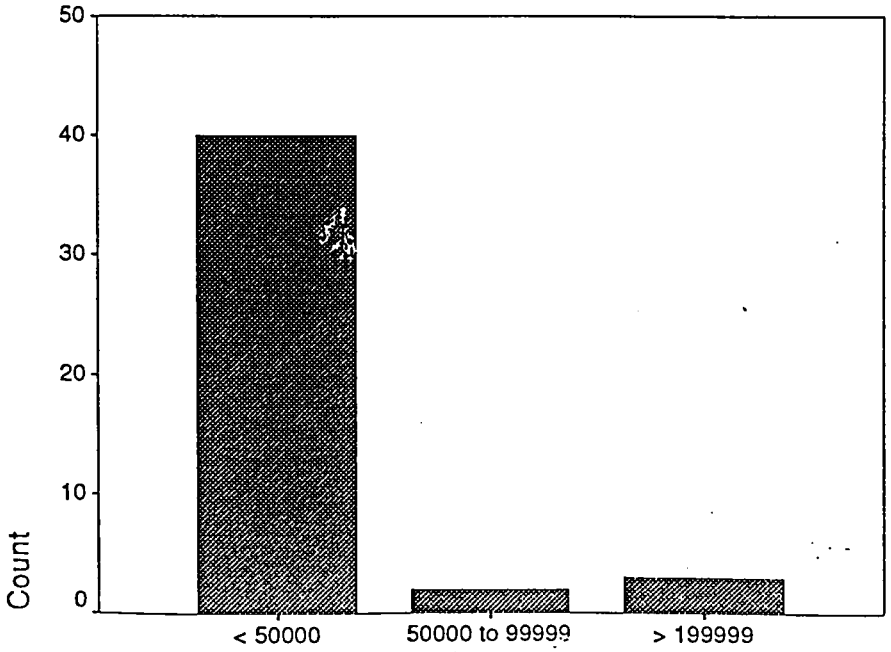
OCCUPATION



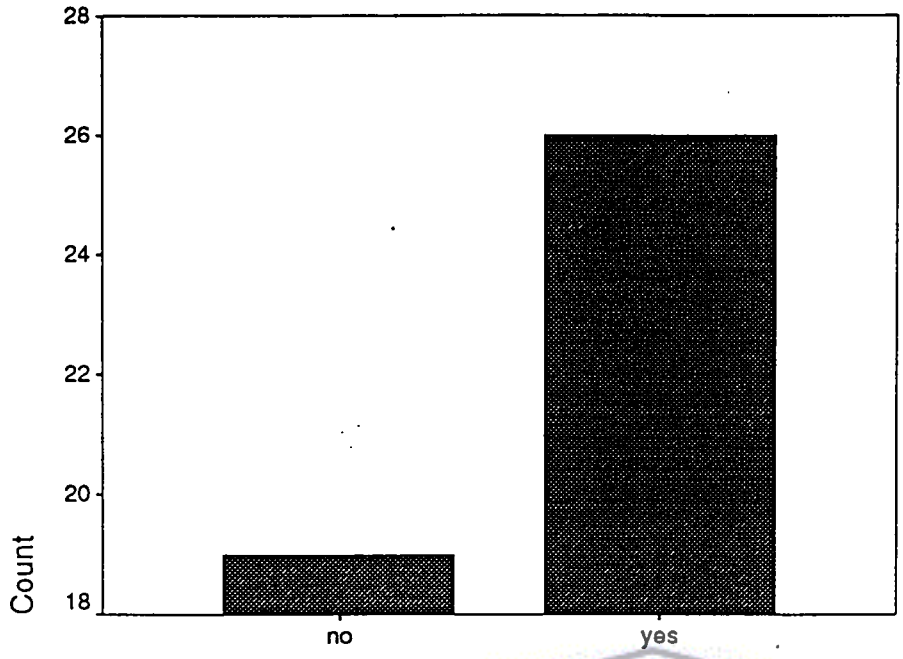
INCOME EARNED PER MONTH



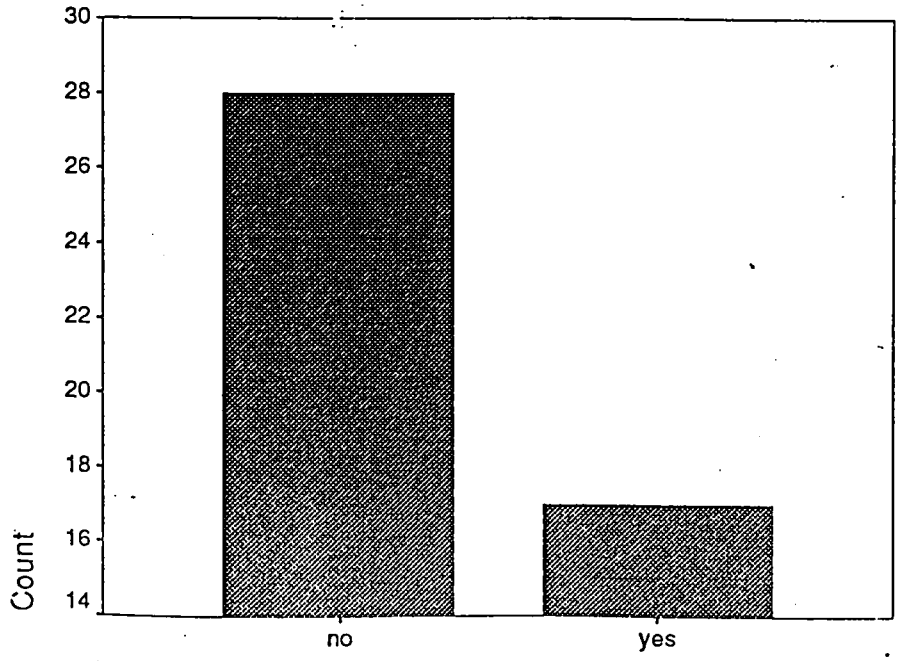
MORTGAGE BOND



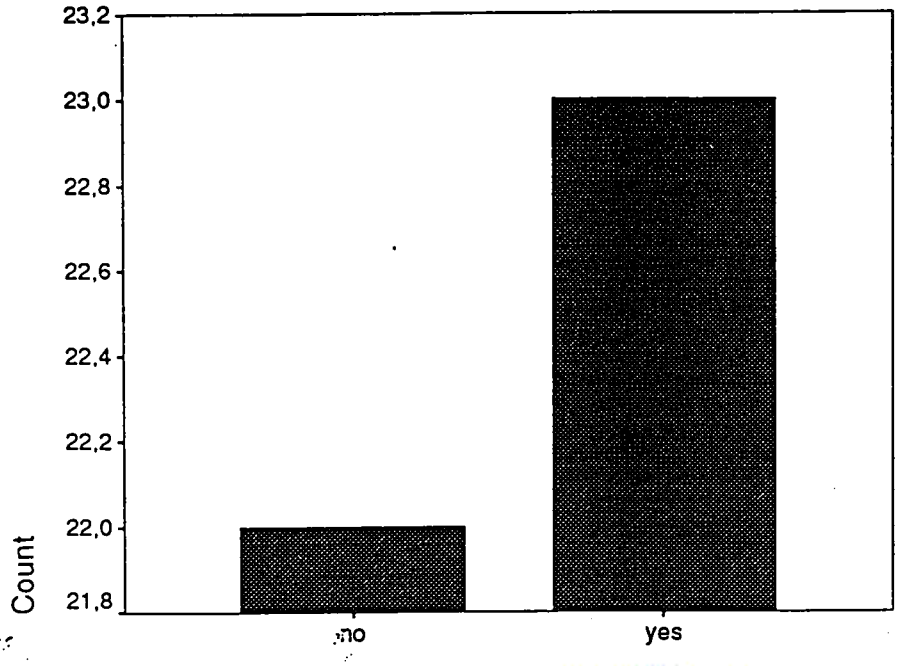
OUTSTANDING BOND AMOUNT



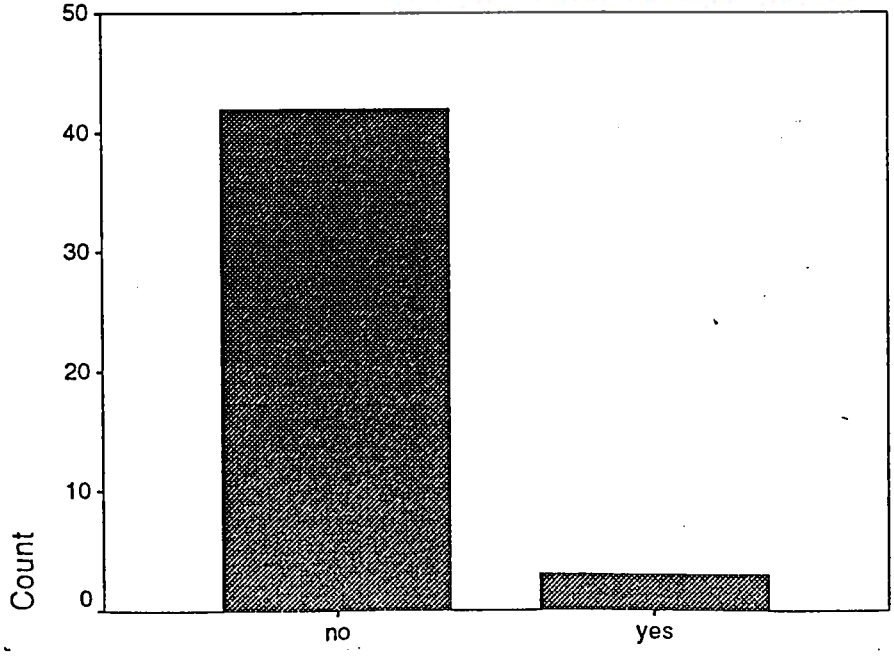
POACHING IS A RESULT OF UNEMPLOYMENT



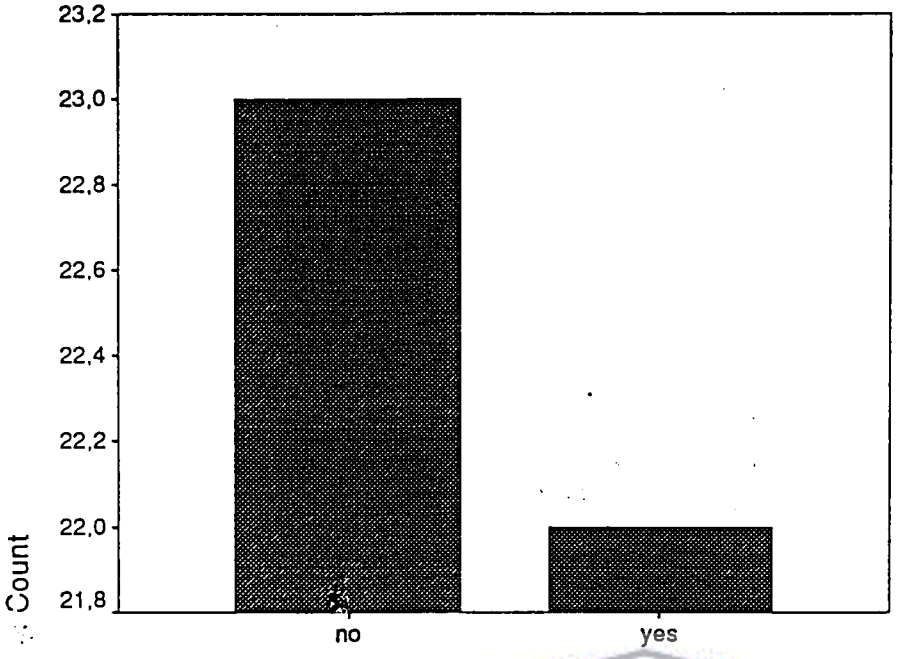
POACHING IS A RESULT OF POVERTY



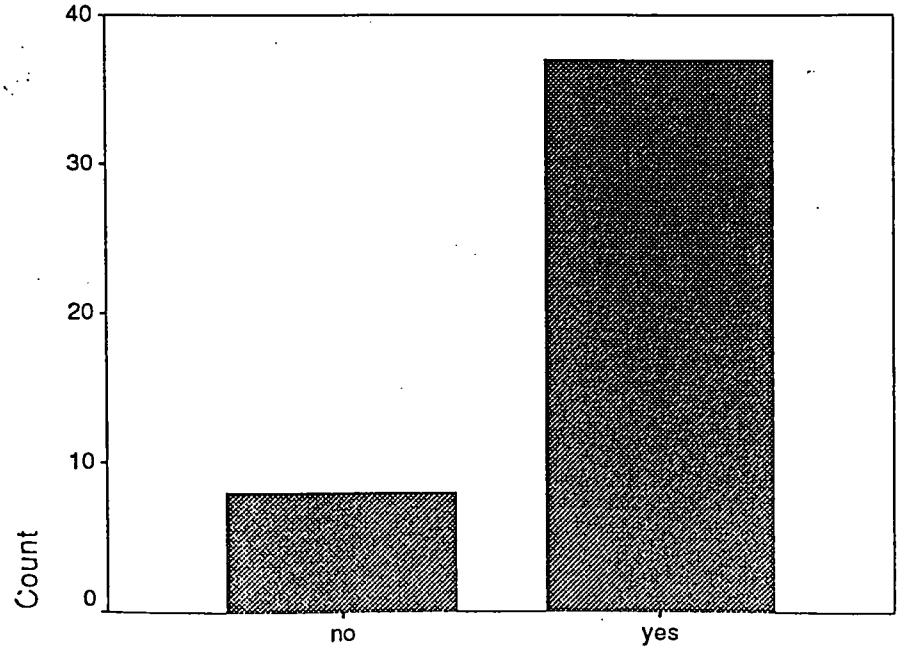
POACHING IS A RESULT OF GREED FOR MONEY



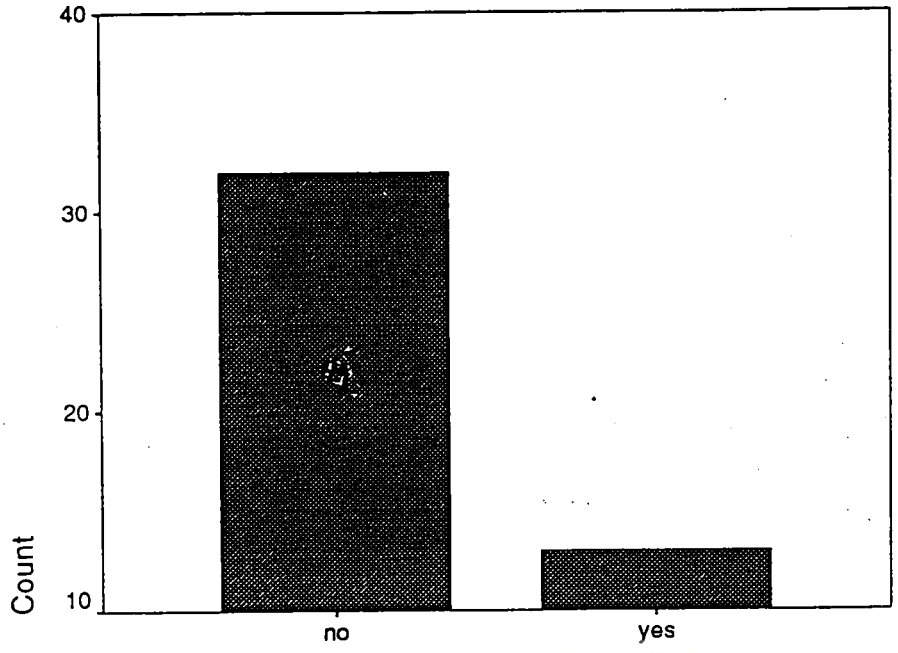
HOUSEWIVES ARE POACHERS



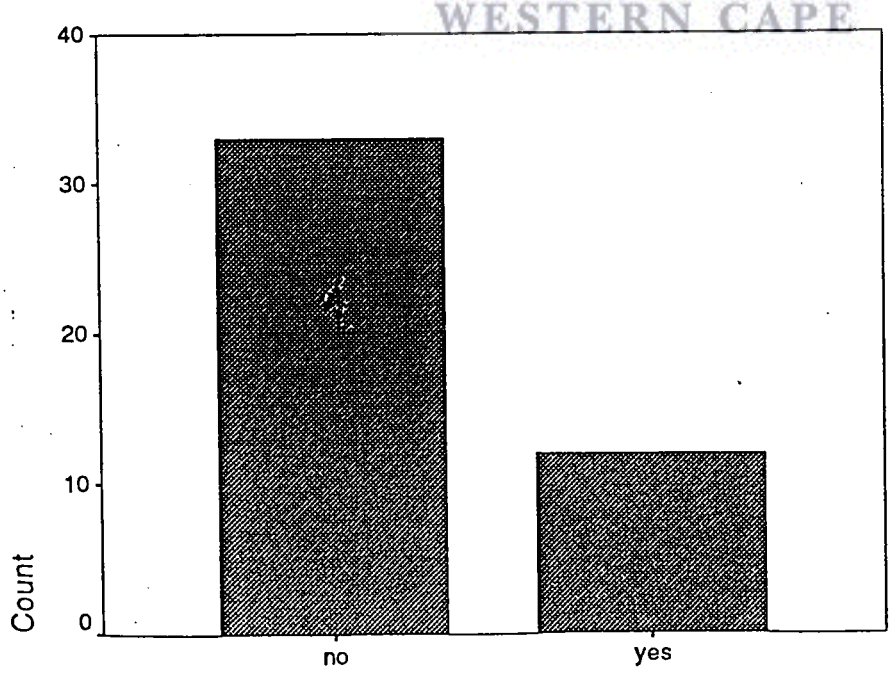
SCHOOL CHILDREN ARE POACHERS



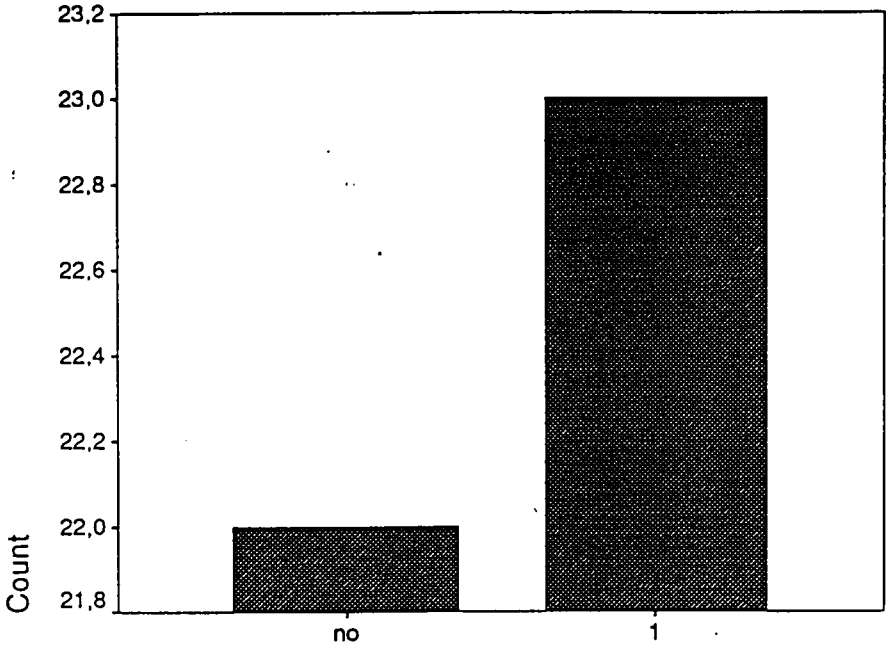
INFORMAL DIVERS ARE POACHERS



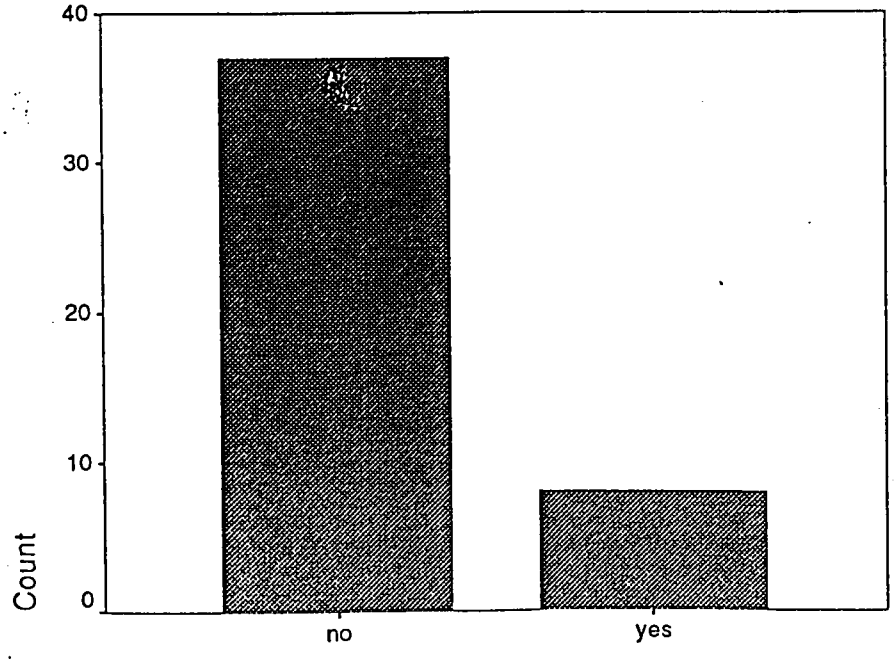
BOAT FISHERMEN ARE POACHERS



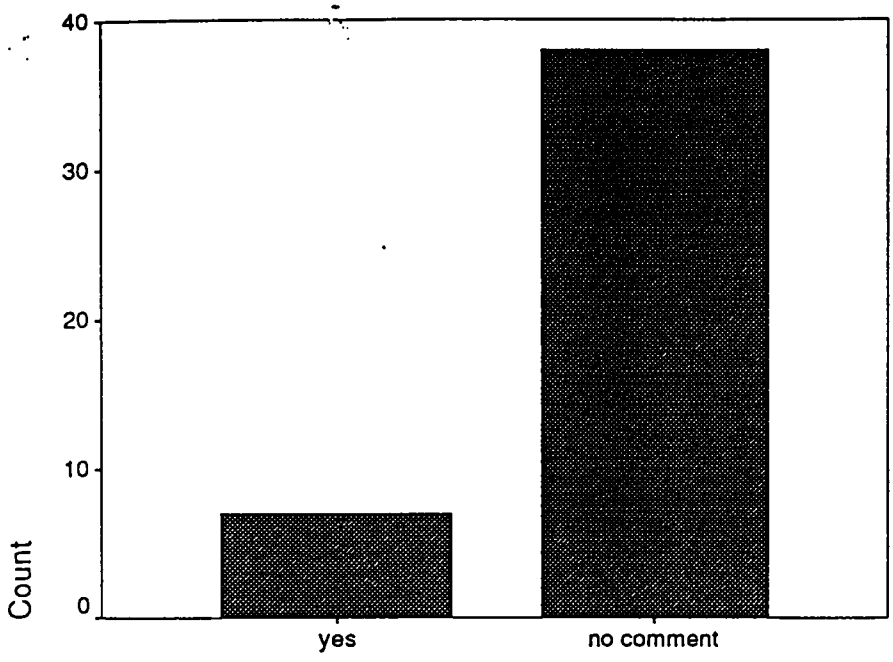
COMMERCIAL DIVERS ARE POACHERS



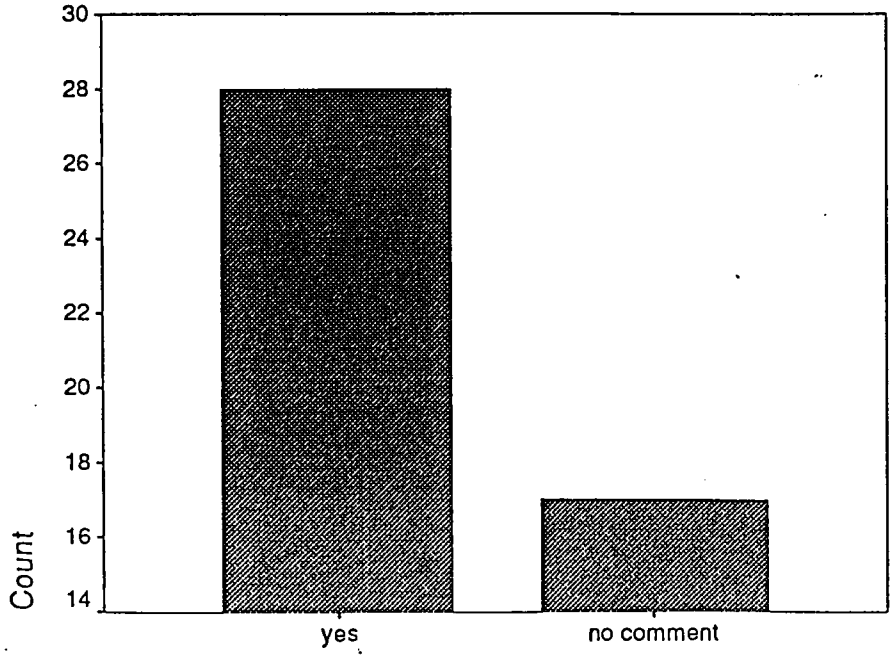
ARTISANS ARE POACHERS



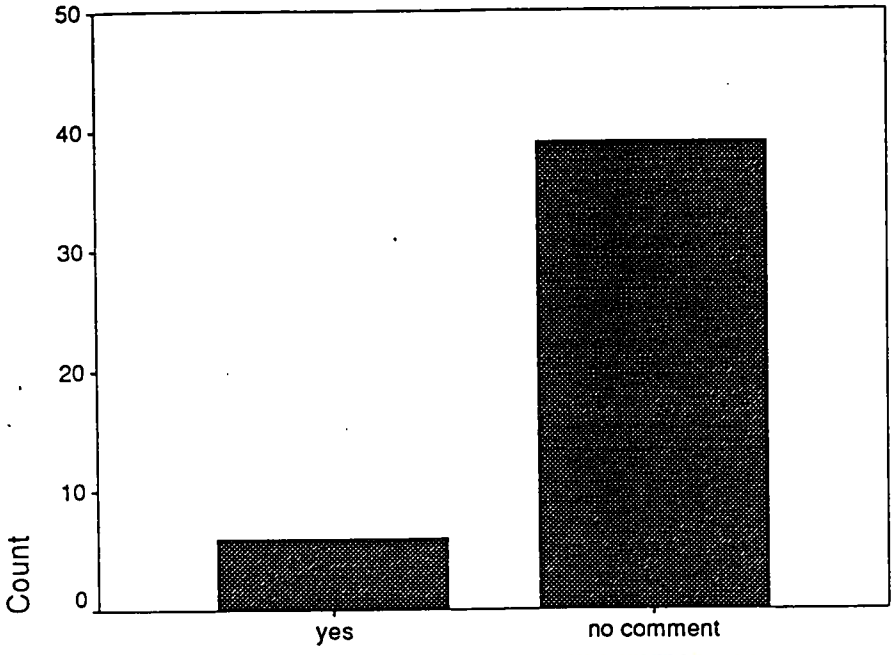
IS POACHING OKAY?



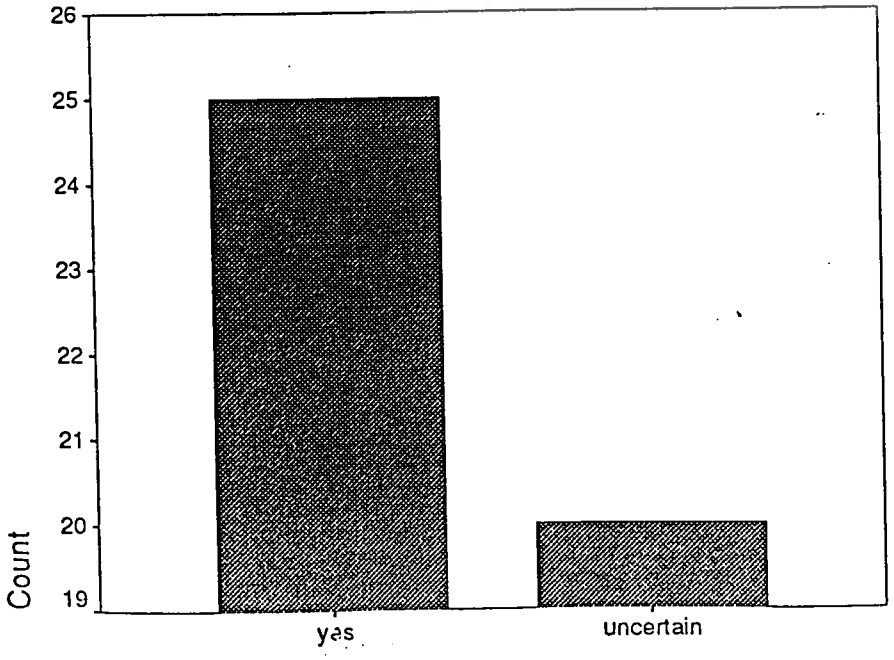
POVERTY JUSTIFIES POACHING



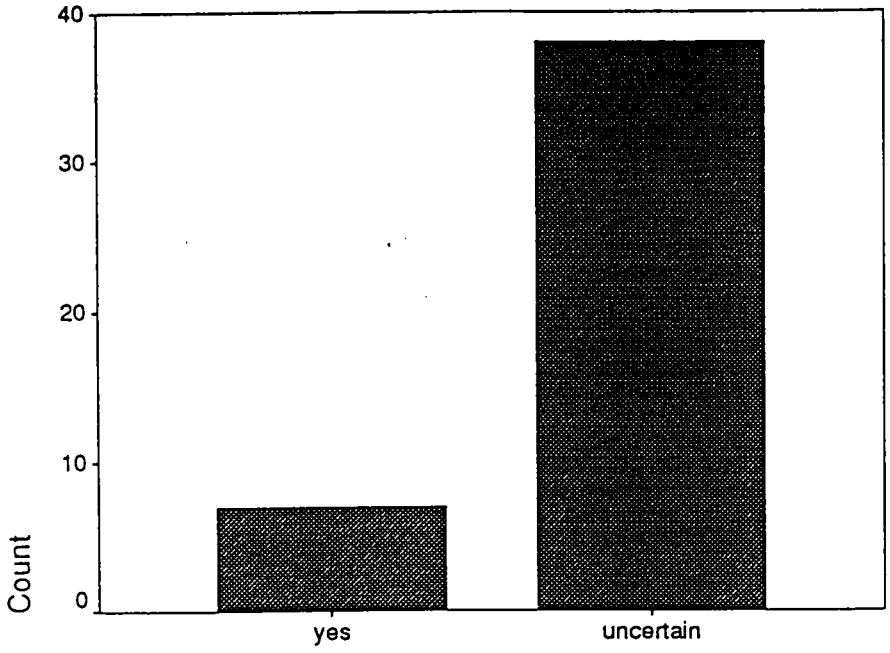
POACHING DAMAGES RESOURCES



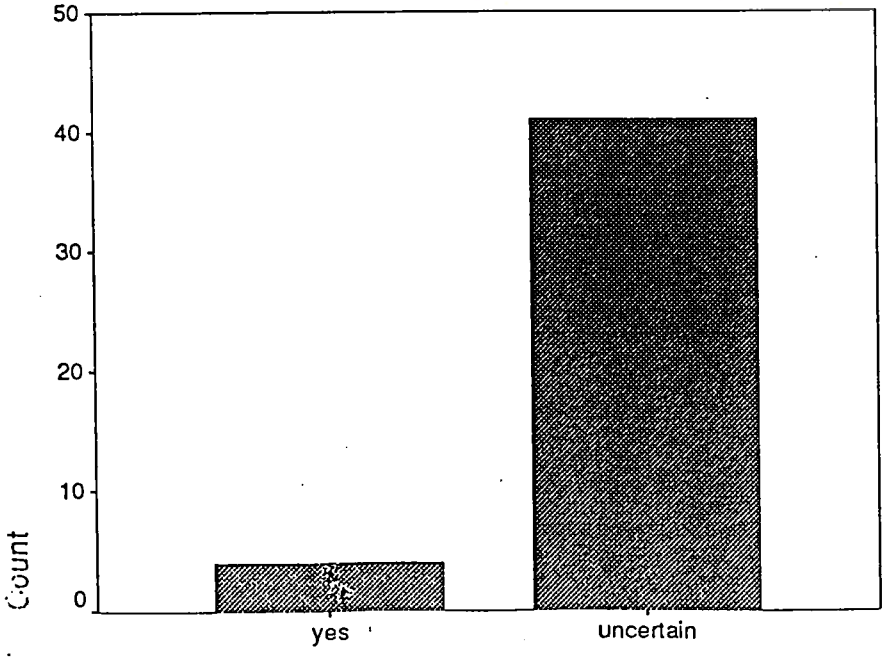
POACHING AFFECTS THE COMMUNITY



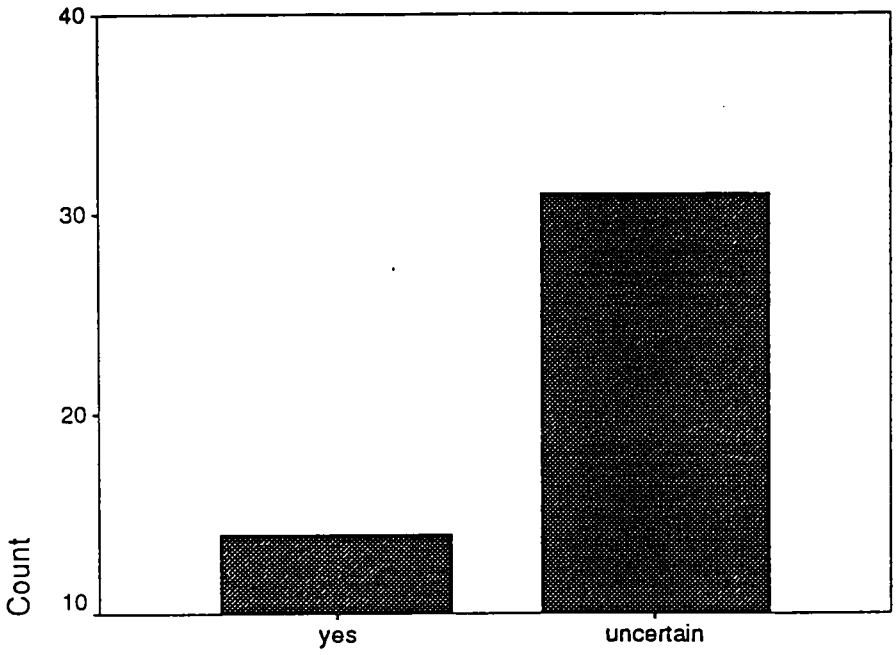
SHOULD POACHING BE STOPPED?



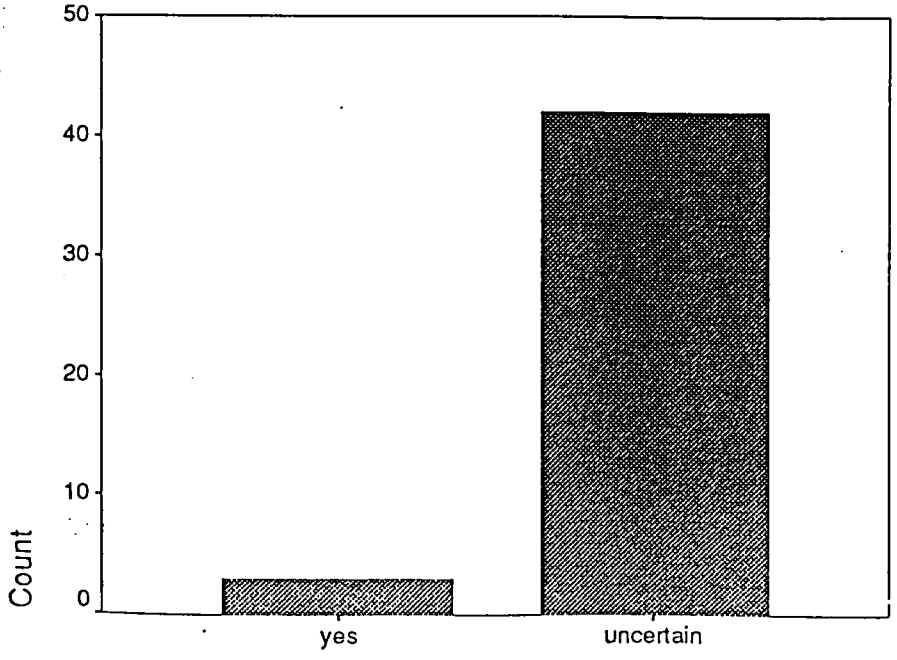
MORE INSPECTORS CAN HELP TO STOP POACHING



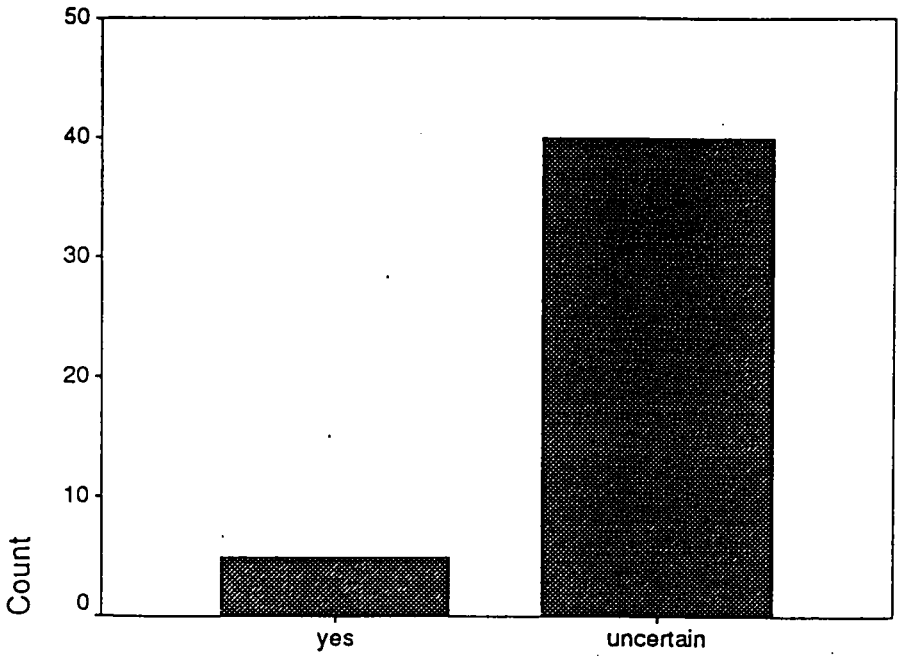
JAILING POACHERS CAN HELP TO STOP POACHING



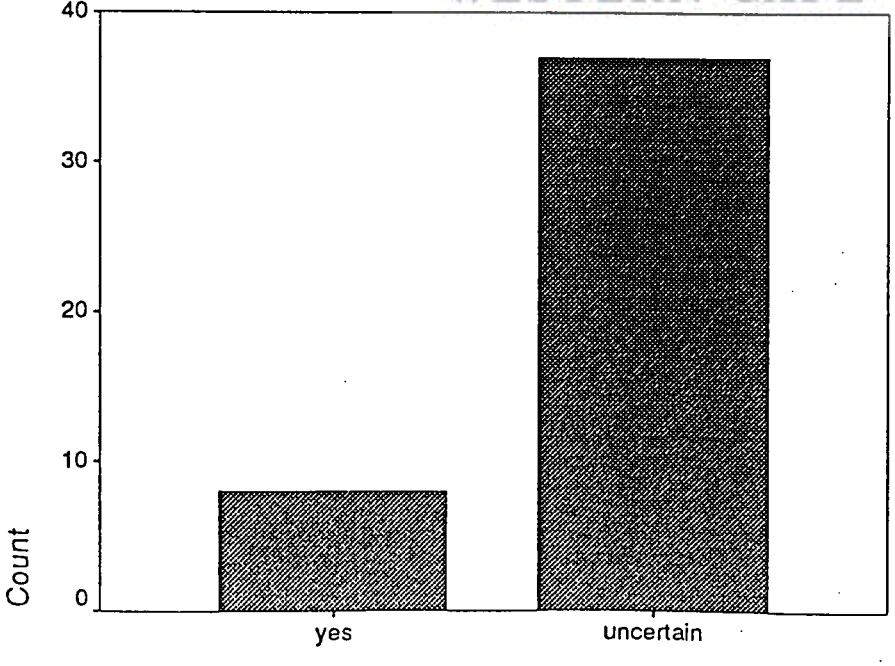
ALLOCATING QUOTAS TO THE COMMUNITY CAN HELP TO STOP POACHING



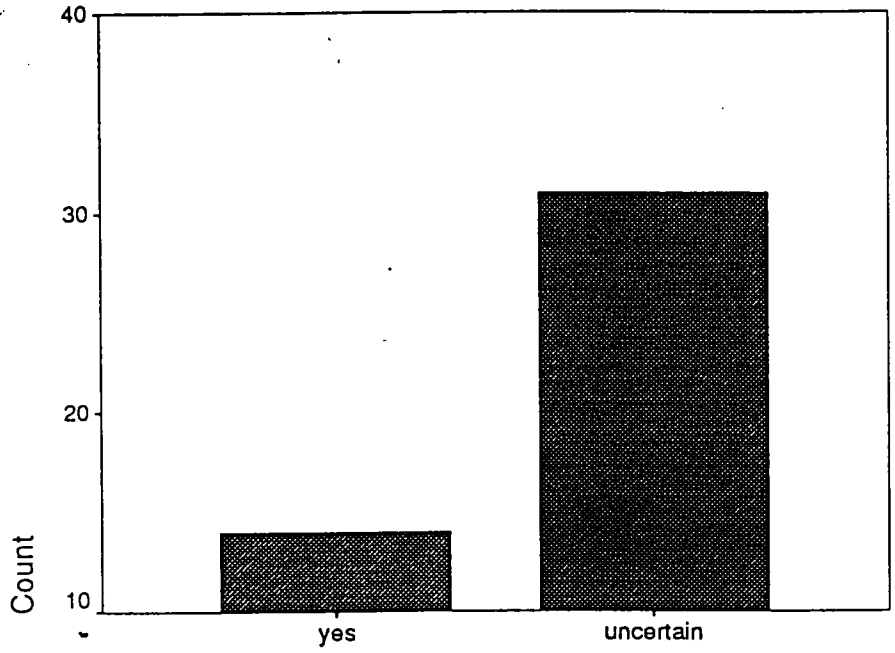
EMPOWERING INFORMAL DIVERS CAN HELP TO STOP POACHING



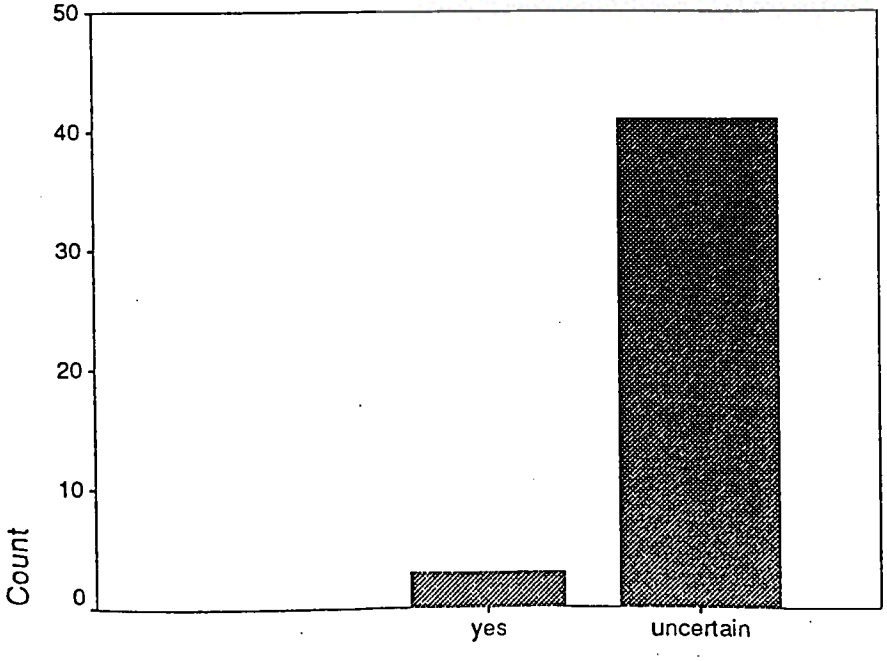
INCREASE IN FINES CAN HELP TO STOP POACHING



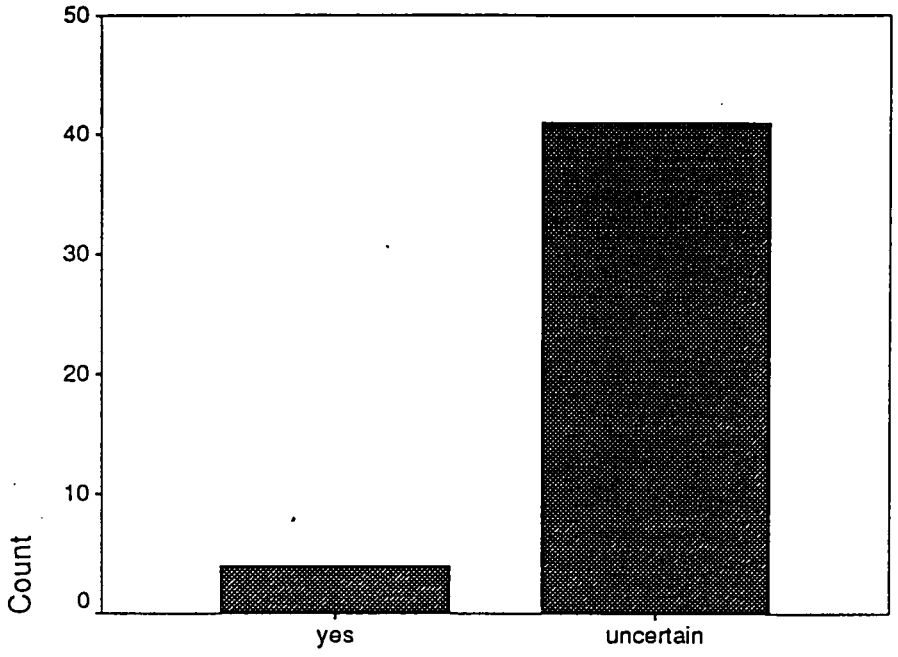
INVOLVEMENT OF THE PUBLIC CAN HELP TO STOP POACHING



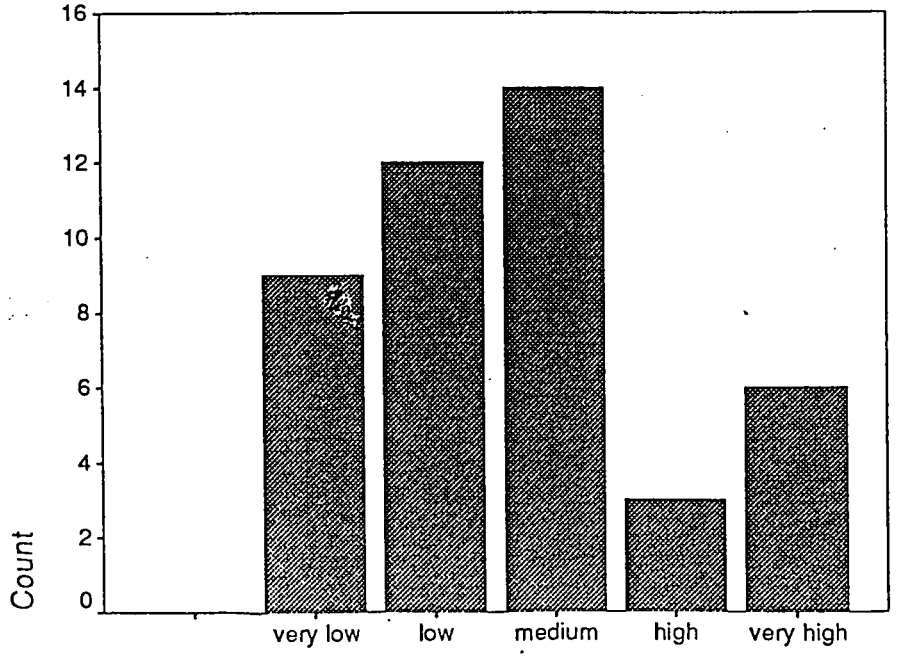
DEPLOYING MORE POLICE CAN HELP TO STOP POACHING



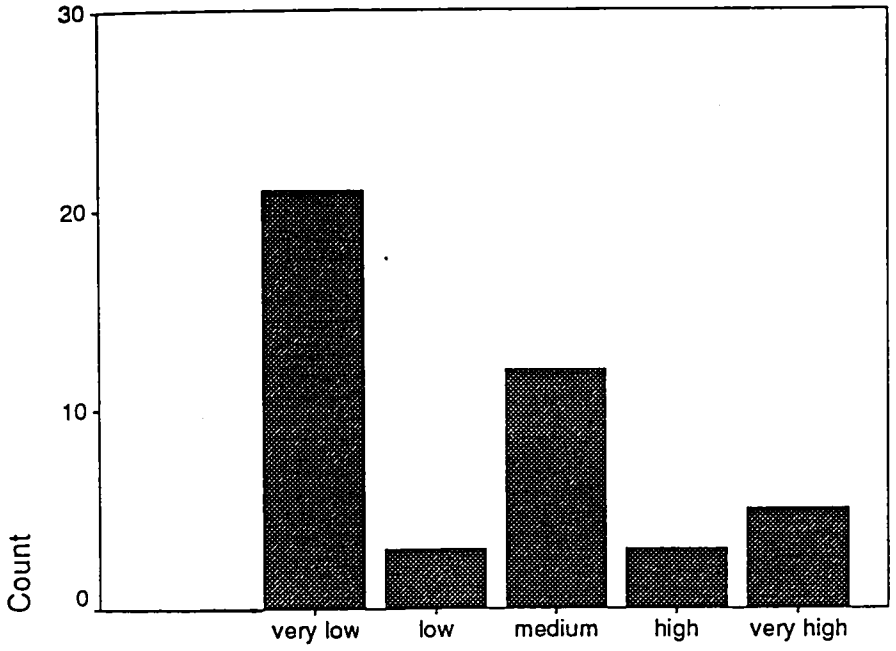
CREATING JOBS CAN HELP TO STOP POACHING



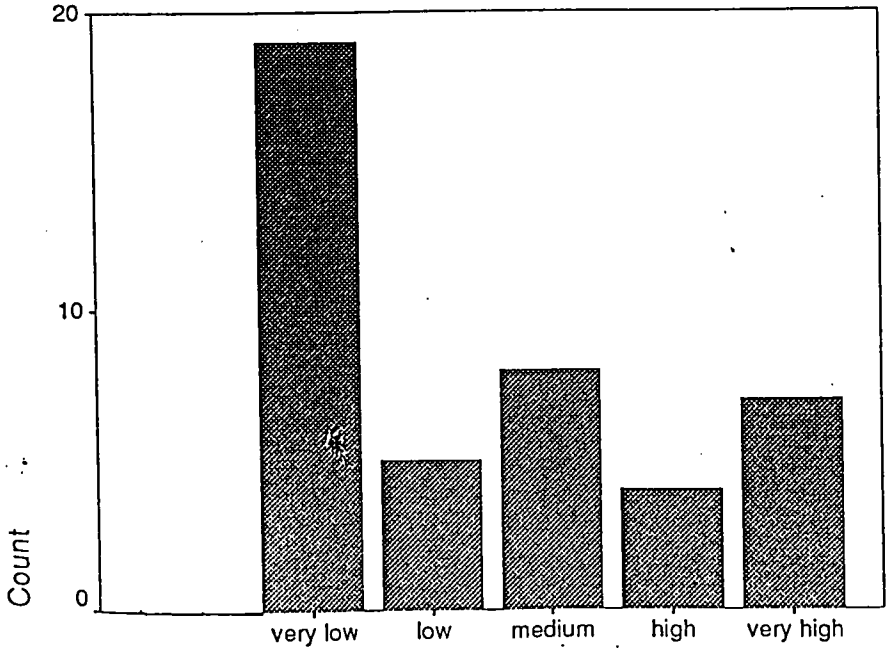
STRICTER LEGISLATION CAN HELP TO STOP POACHING



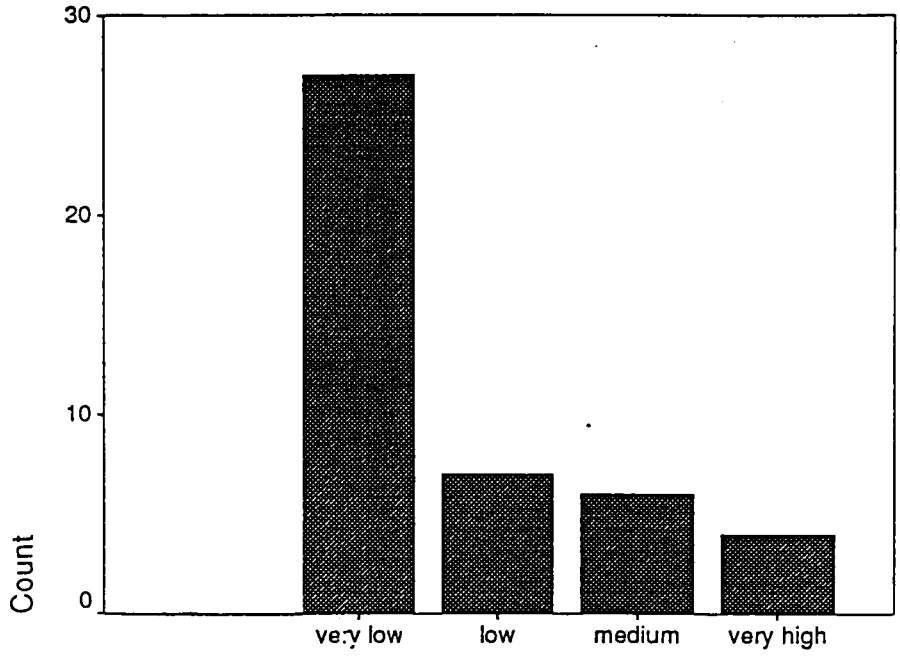
EFFECTIVENESS OF THE POLICE IN CURBING POACHING



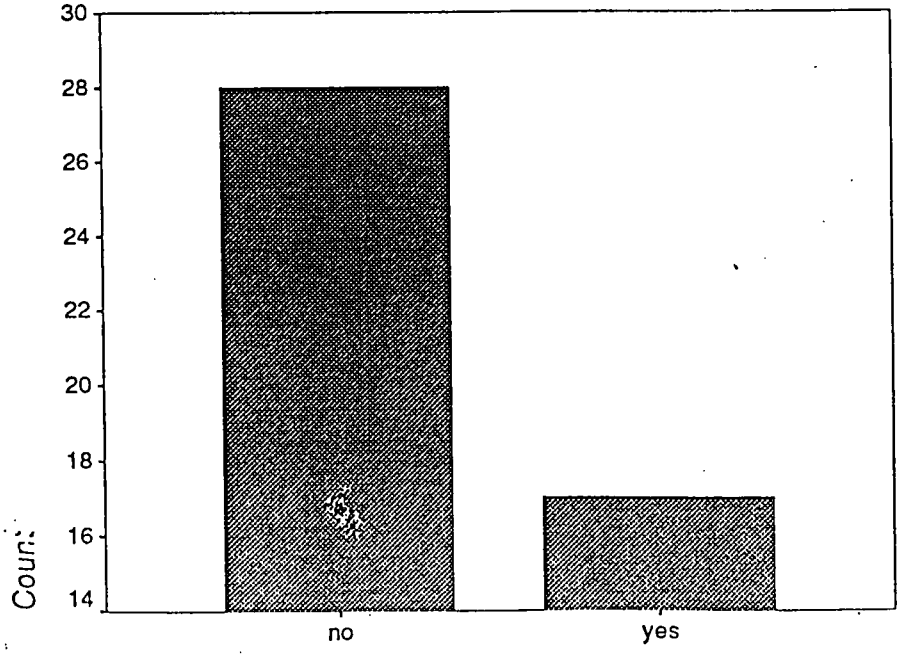
EFFECTIVENESS OF SEA FISHERIES IN CURBING POACHING



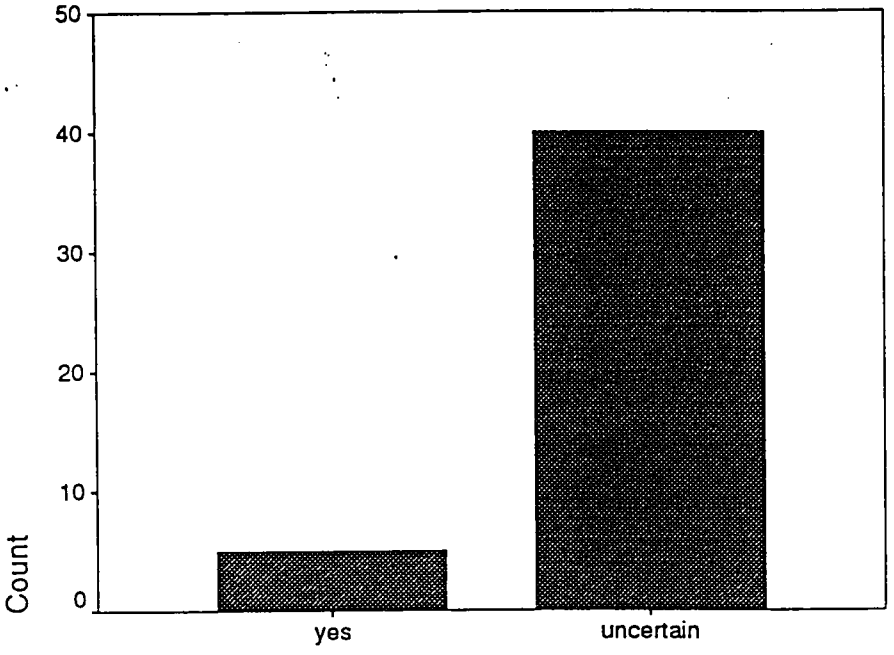
EFFECTIVENESS OF THE MAGISTRATE COURT IN CURBING POACHING



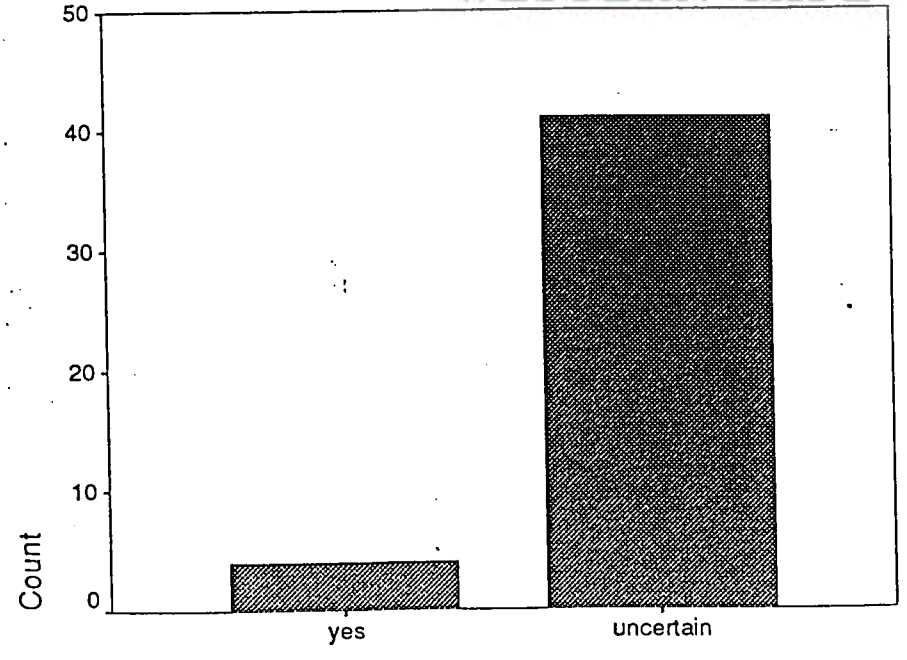
EFFECTIVENESS OF THE COMMUNITY LEADERS IN CURBING POACHING



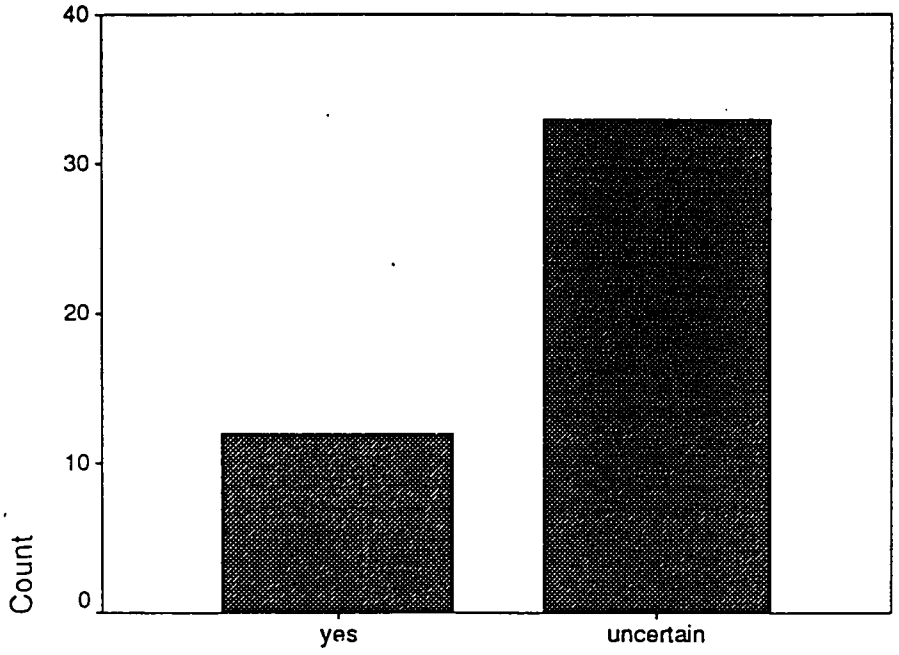
KNOWLEDGE OF CO-MANAGEMENT



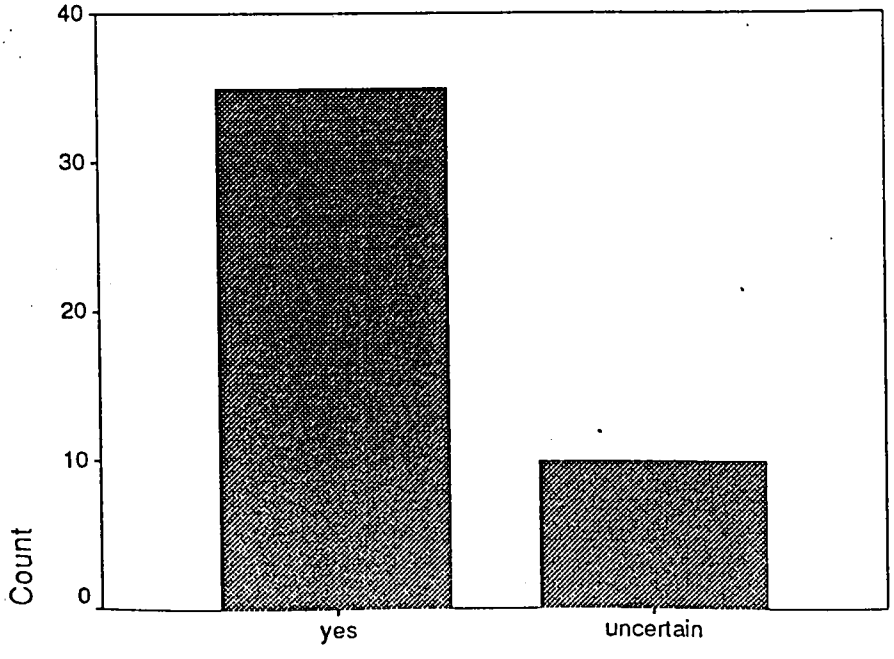
CO-MANAGEMENT FOR EVERYONE



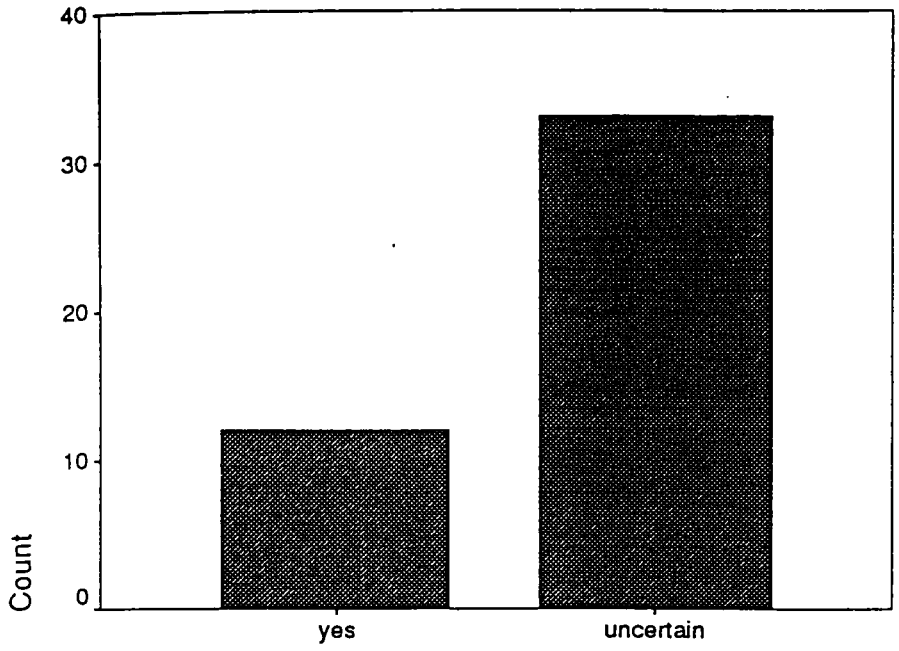
CO-MANAGEMENT FOR ALL FAMILIES



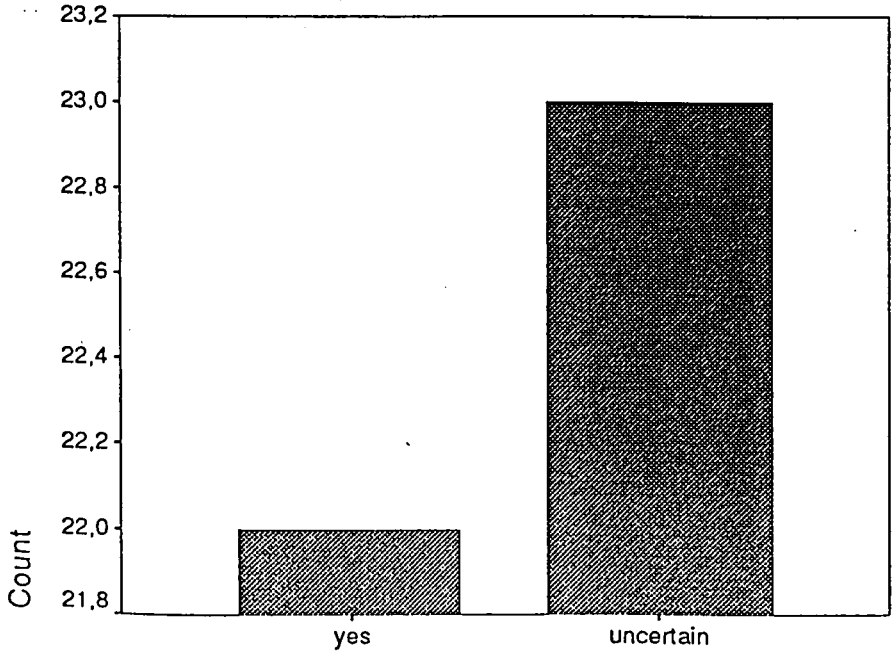
EXCLUDE RECREATIONAL DIVERS FROM CO–MANAGEMENT



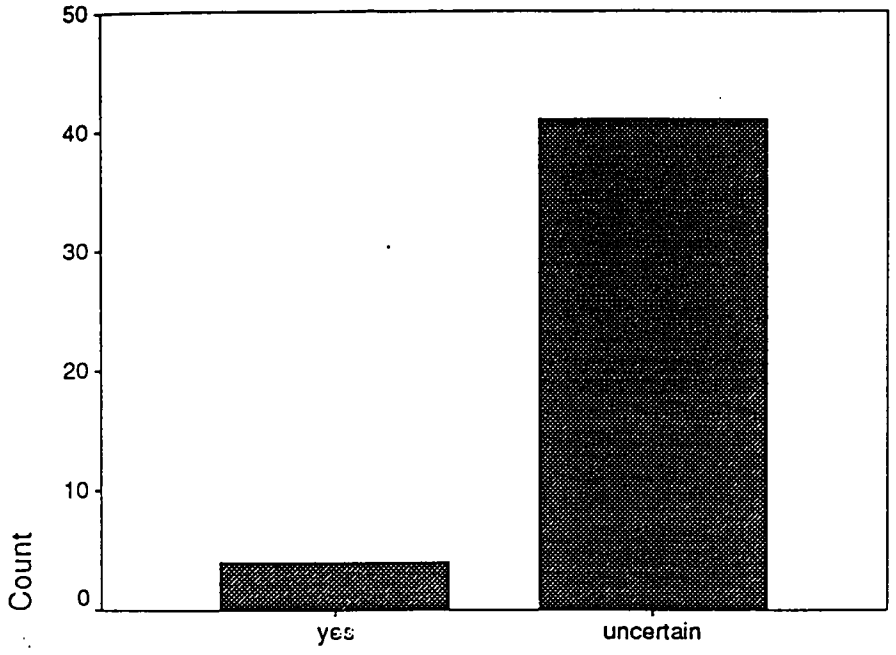
EXCLUDE MIGRANT DIVERS FROM CO–MANAGEMENT



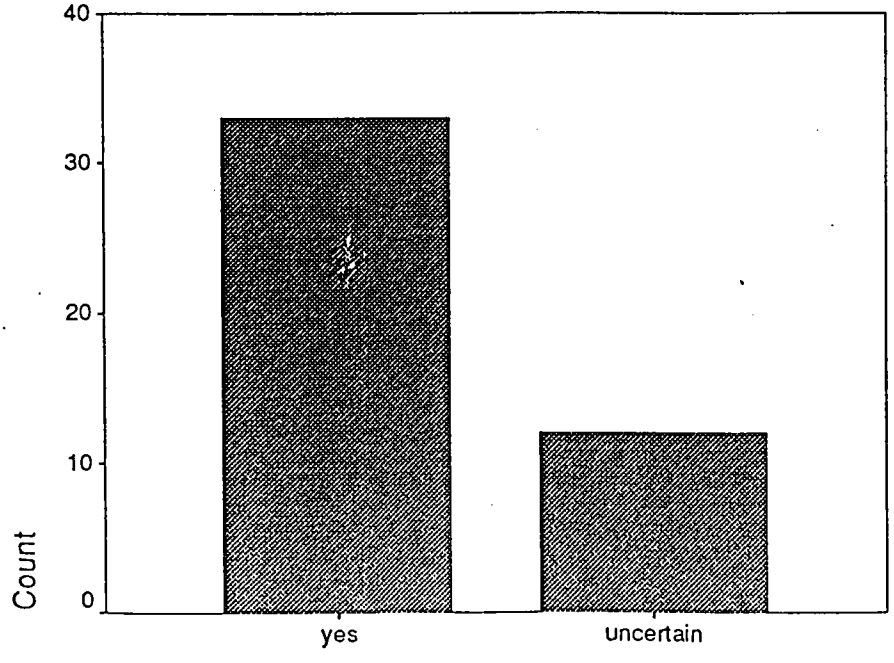
EXCLUDE WOMEN FROM CO-MANAGEMENT



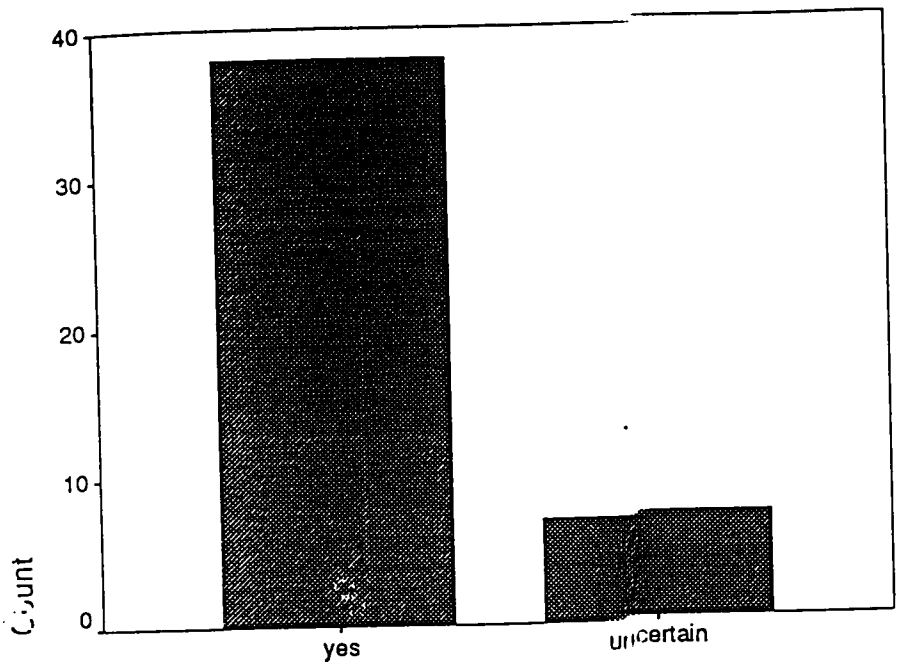
EXCLUDE CHILDREN YOUNGER THAN 18YRS FROM CO-MANAGEMENT



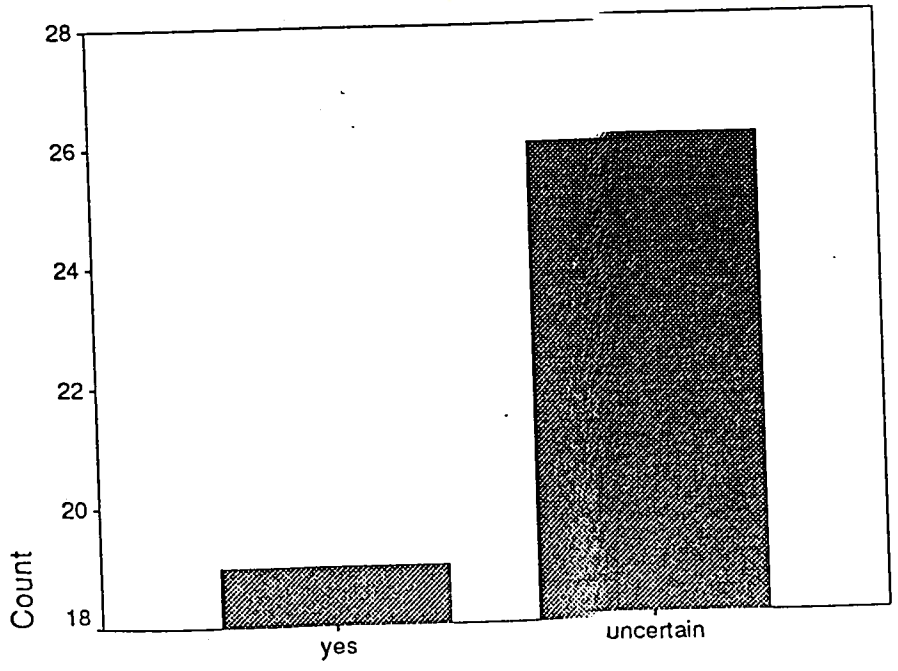
EXCLUDE NO ONE FROM CO-MANAGEMENT



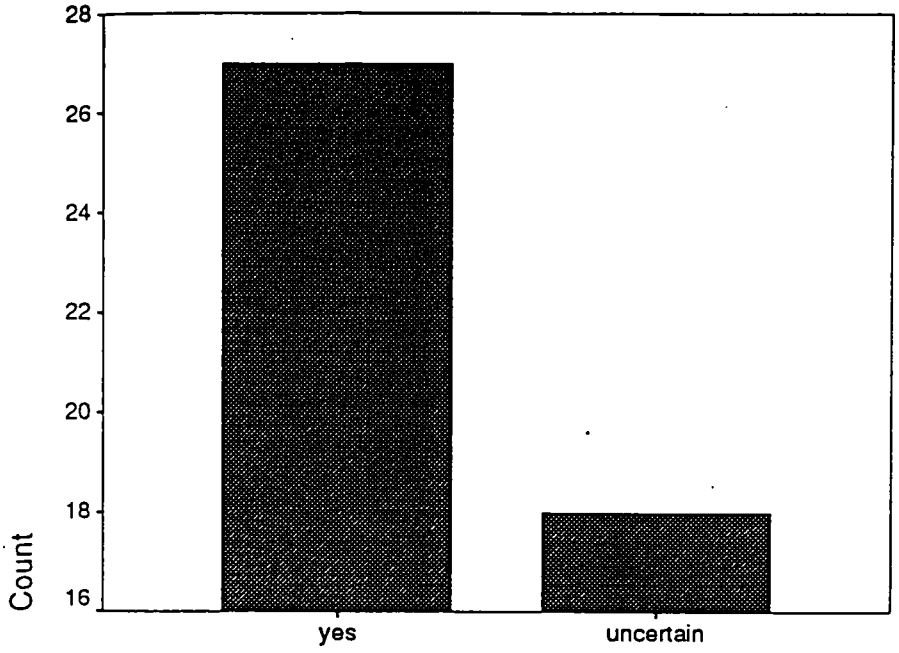
EXCLUDE THOSE WHO ARE IN ACTIVE EMPLOYMENT FROM CO-MANAGEMENT



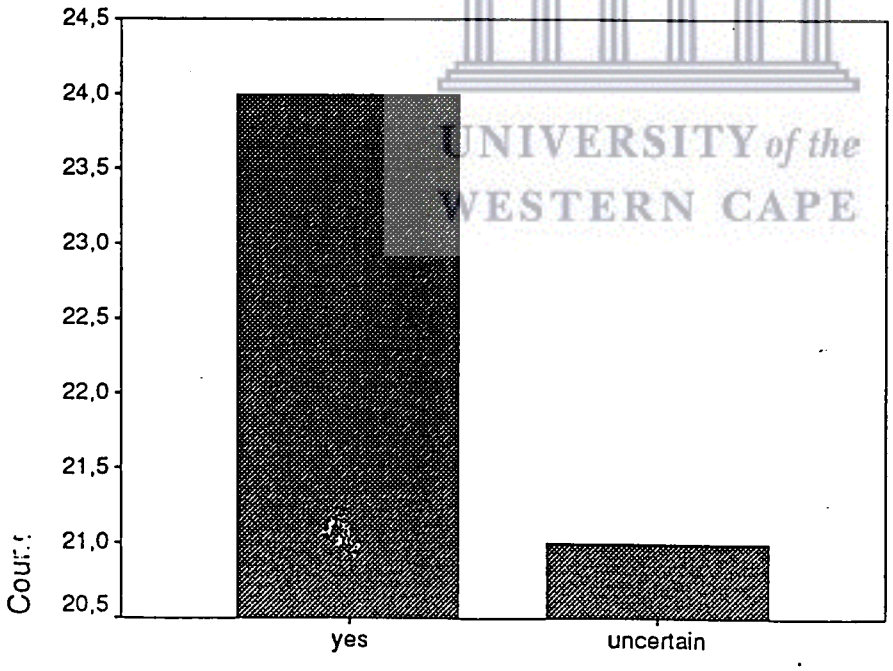
COMMITTED LEADERSHIP ESSENTIAL FOR CO-MANAGEMENT



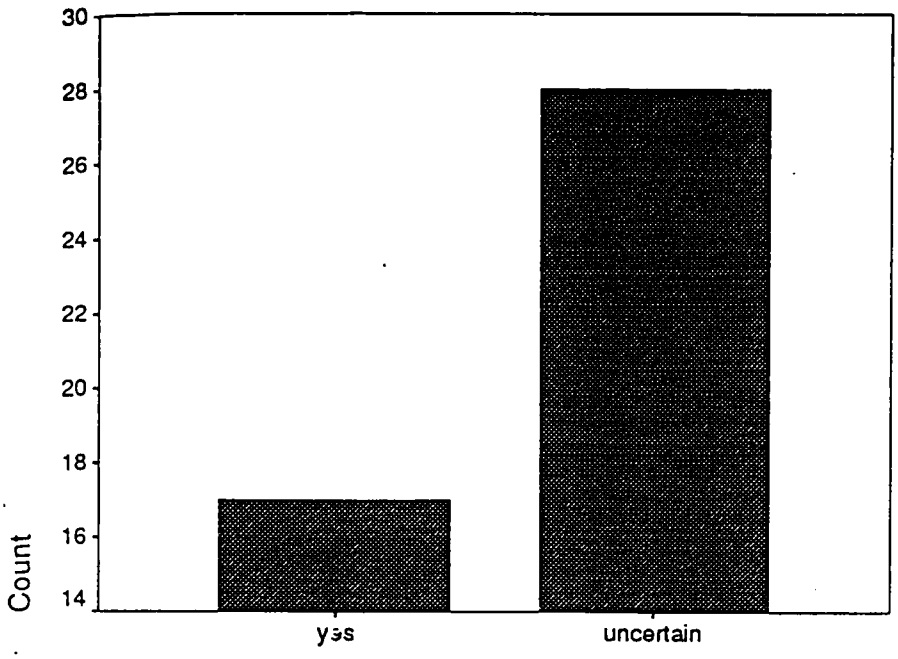
EXCLUSIVE RIGHTS ESSENTIAL FOR CO-MANAGEMENT



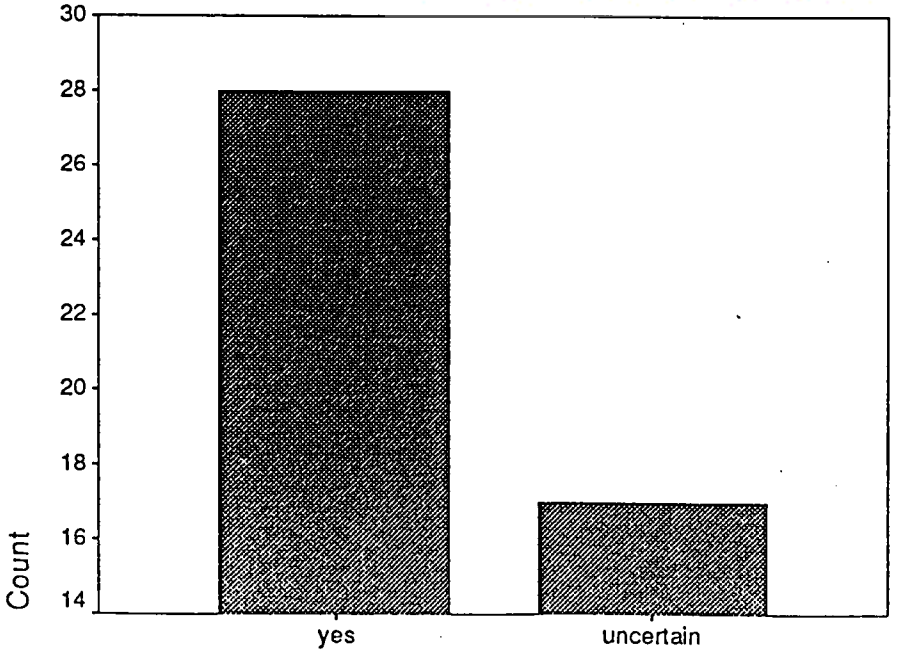
EFFECTIVE ENFORCEMENT ESSENTIAL FOR CO–MANAGEMENT



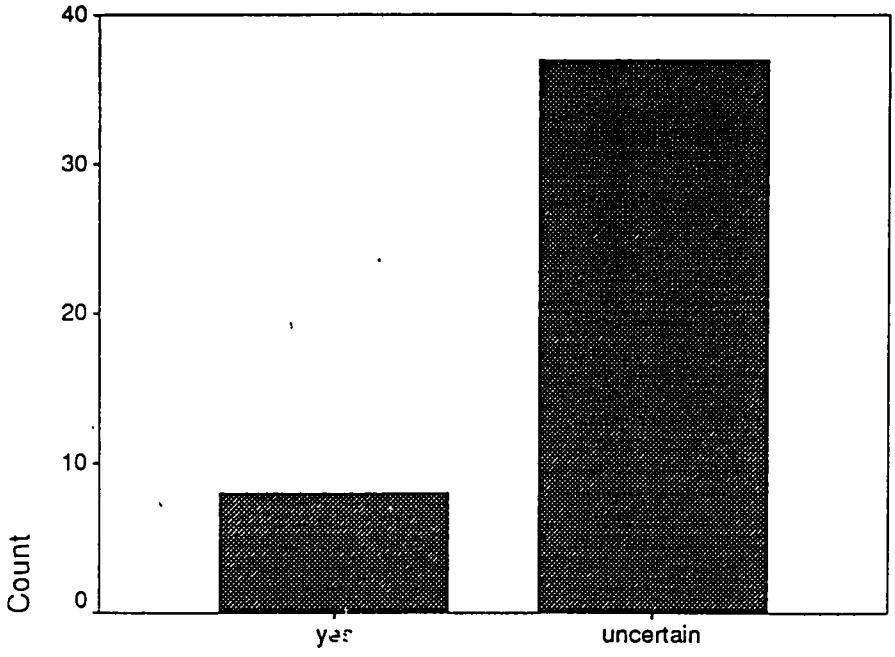
DEMOCRATIC ELECTION ESSENTIAL FOR CO–MANAGEMENT



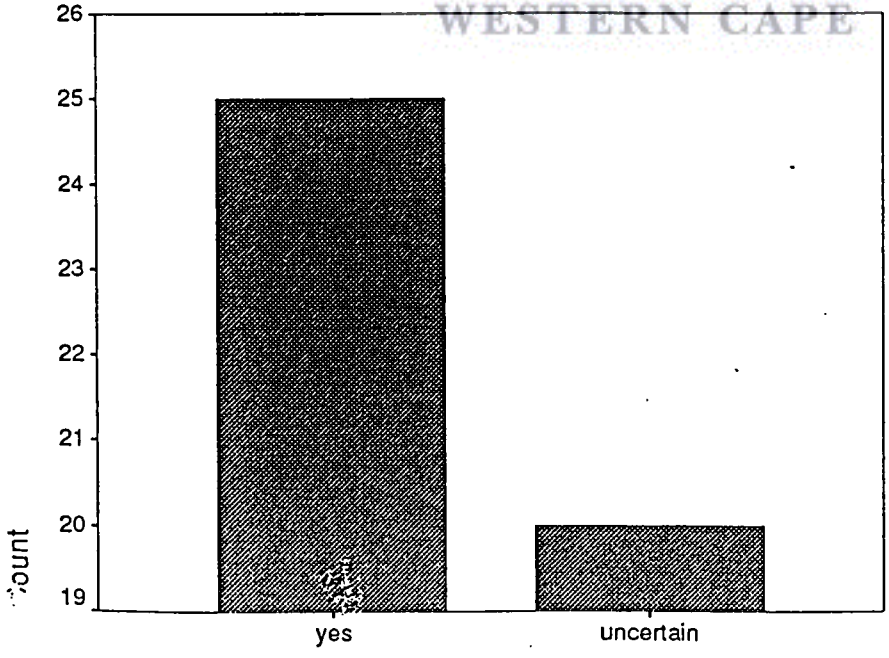
EQUITABLE PROFIT DISTRIBUTION ESSENTIAL FOR CO-MANAGEMENT



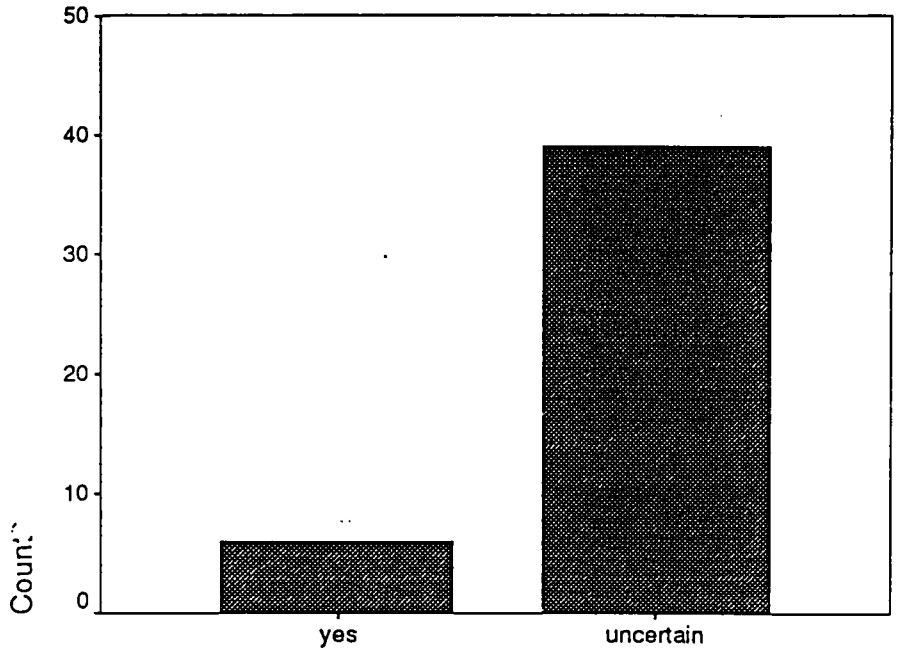
EXPORT RIGHTS ESSENTIAL FOR CO-MANAGEMENT



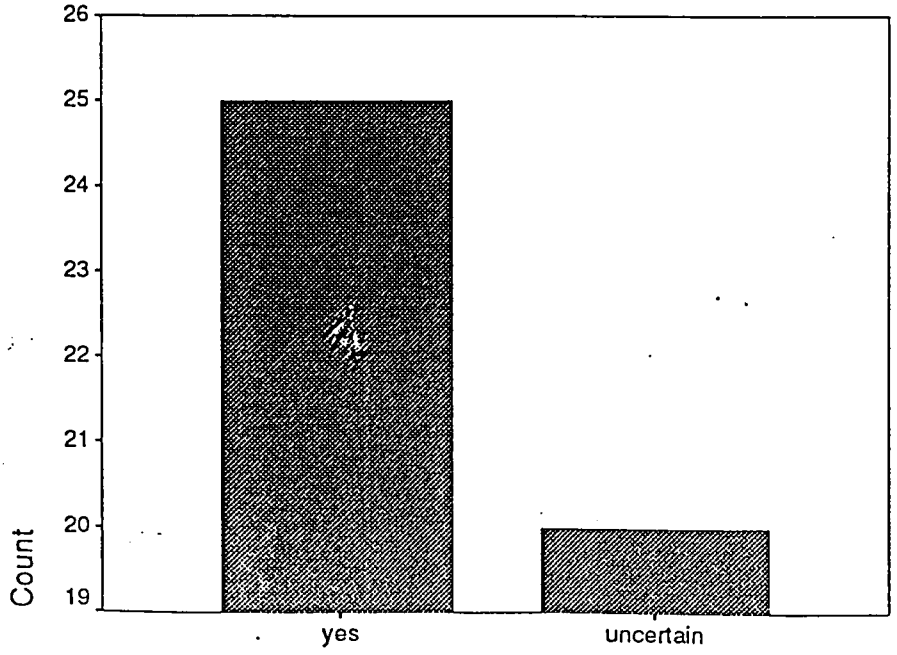
POSSIBLE REASON AGAINST CO-MANAGEMENT IS THAT THE BOARD WILL GAIN MORE



POSSIBLE REASON AGAINST CO-MANAGEMENT IS THAT IT IS IMPOSSIBLE TO STOP POACHING



POSSIBLE REASON AGAINST CO-MANAGEMENT IS THAT THERE WILL BE MORE BENEFIT WITHOUT CO-MANAGEMENT



POSSIBLE REASON AGAINST CO-MANAGEMENT IS THAT IT IS DIFFICULT TO ENFORCE

income source * is poaching okay * income Crosstabulation

income			is poaching okay		Total
			no	yes	
< 1000	income source	none of the above	1		1
		poacher	3	4	7
		boat assistant	3		3
		artisan	2		2
	Total		9	4	13
1000 to 2999	income source	none of the above	2		2
		poacher	5	2	7
		commercial diver	5		5
		boat assistant	2		2
		artisan	3		3
	Total		17	2	19
3000 to 4999	income source	poacher		1	1
		informal diver	1		1
		commercial diver	3		3
		artisan	1		1
	Total		5	1	6
5000 to 9999	income source	none of the above	3	1	4
		poacher	1		1
		commercial diver	2		2
	Total		6	1	7

income source * income Crosstabulation

		income				Total
		< 1000	1000 to 2999	3000 to 4999	5000 to 9999	
income source	none of the above	1	2		4	7
	poacher	7	7	1	1	16
	informal diver			1		1
	commercial diver		5	3	2	10
	boat assistant	3	2			5
	artisan	2	3	1		6
Total		13	19	6	7	45

education * income source * is poaching okay Crosstabulation

s poaching kay			income source				
			none of the above	poacher	informal diver	commercial diver	boat assistant
no	education	primary school	2		1	2	2
		secondary school	4	6		2	1
		matric		3		4	1
		diploma				2	1
	Total		6	9	1	10	5
yes	education	primary school		1			
		secondary school		5			
		matric		1			
		diploma	1				
	Total		1	7			

AGE * income source * is poaching okay Crosstabulation

s poaching okay			income source				
			none of the above	poacher	informal diver	commercial diver	boat assistant
no	AGE	18-24years		4		2	1
		25-34 years	1	4	1	2	4
		35-49 years	3	1		4	
		50 and above	2			2	
	Total		6	9	1	10	5
yes	AGE	18-24years		3			
		25-34 years		4			
		35-49 years	1				
	Total		1	7			

Length of stay in Hawston * CM for all families * CM for residents only Crosstabulation

CM for residents			CM for all families		
			yes	uncertain	Total
yes	Length of stay in Hawston	< 3 years		2	2
		3-4 years		1	1
		5-9 years		1	1
		10-19 years		5	5
		> 19 years		26	26
	Total			35	35
uncertain	Length of stay in Hawston	3-4 years		1	1
		10-19 years	1	1	2
		> 19 years	3	4	7
	Total		4	6	10

income source * is poaching okay Crosstabulation

		is poaching okay		
		no	yes	Total
income source	none of the above	6	1	7
	poacher	9	7	16
	informal diver	1		1
	commercial diver	10		10
	boat assistant	5		5
	artisan	6		6
Total		37	8	45

AGE * education * is poaching okay Crosstabulation

;oaching okay			education				Total
			primary school	secondary school	matric	diploma	
:o	AGE	18-24years		2	5		7
		25-34 years	3	5	2	2	12
		35-49 years	7	5	1	1	14
		50 and above	1	3			4
	Total		11	15	8	3	37
,es	AGE	18-24years		3			3
		25-34 years	1	2	1		4
		35-49 years				1	1
	Total		1	5	1	1	8

AGE * is poaching okay Crosstabulation

		is poaching okay		Total
		no	yes	
AGE	18-24years	7	3	10
	25-34 years	12	4	16
	35-49 years	14	1	15
	50 and above	4		4
Total		37	8	45

education * is poaching okay Crosstabulation

		is poaching okay		Total
		no	yes	
education	primary school	11	1	12
	secondary school	15	5	20
	matric	8	1	9
	diploma	3	1	4
;otal		37	8	45

AGE * poaching causes crime Crosstabulation

		poaching causes crime		
		yes	no comment	Total
AGE	18-24years	1	9	10
	25-34 years	1	15	16
	35-49 years		15	15
	50 and above		4	4
Total		2	43	45

AGE * poaching affects the community Crosstabulation

		poaching affects the community		
		yes	no comment	Total
AGE	18-24years	1	9	10
	25-34 years	3	13	16
	35-49 years	1	14	15
	50 and above	1	3	4
Total		6	39	45

AGE * poverty justifies poaching Crosstabulation

		poverty justifies poaching		
		yes	no comment	Total
AGE	18-24years	3	7	10
	25-34 years	4	12	16
	35-49 years		15	15
	50 and above		4	4
Total		7	38	45

AGE * unemployment justifies poaching Crosstabulation

		unemployment justifies poaching	
		no comment	Total
AGE	18-24years	10	10
	25-34 years	16	16
	35-49 years	15	15
	50 and above	4	4
Total		45	45

AGE * is poaching okay * poverty justifies poaching Crosstabulation

poverty justifies			is poaching okay		
			no	yes	Total
yes	AGE	18-24years	1	2	3
		25-34 years		4	4
	Total		1	6	7
no comment	AGE	18-24years	6	1	7
		25-34 years	12		12
		35-49 years	14	1	15
		50 and above	4		4
	Total		36	2	38

AGE * poaching damages resources Crosstabulation

		poaching damages resources		
		yes	no comment	Total
AGE	18-24years	3	7	10
	25-34 years	9	7	16
	35-49 years	13	2	15
	50 and above	3	1	4
Total		28	17	45

education * knowledge of co-management * income Crosstabulation

income			knowledge of co-management		Total
			no	yes	
< 1000	education	primary school	2	1	3
		secondary school	8	1	9
		matric		1	1
	Total		10	3	13
1000 to 2999	education	primary school	4	2	6
		secondary school	5	1	6
		matric	4	1	5
		diploma	1	1	2
	Total		14	5	19
3000 to 4999	education	primary school		1	1
		secondary school	2		2
		matric		3	3
	Total		2	4	6
5000 to 9999	education	primary school		2	2
		secondary school	2	1	3
		diploma		2	2
	Total		2	5	7

education * knowledge of co-management * AGE Crosstabulation

AGE			knowledge of co-management		Total
			no	yes	
18-24years	education	secondary school	5		5
		matric	3	2	5
	Total		8	2	10
25-34 years	education	primary school	1	3	4
		secondary school	5	2	7
		matric	1	2	3
		diploma	1	1	2
	Total		8	8	16
35-49 years	education	primary school	5	2	7
		secondary school	4	1	5
		matric		1	1
		diploma		2	2
	Total		9	6	15
50 and above	education	primary school		1	1
		secondary school	3		3
	Total		3	1	4

income source * police Crosstabulation

		police					
		very low	low	medium	high	very high	Total
income source	none of the above		2	4	1		7
	poacher	5	3	2		5	15
	informal diver				1		1
	commercial diver	1	4	4	1		10
	boat assistant	1	2	1		1	5
	artisan	2	1	3			6
Total		9	12	14	3	6	44

income source * want to stop poaching * sea fisheries Crosstabulation

sea fisheries			want to stop poaching			
			no	yes	2	Total
very low	income source	none of the above		1		1
		poacher	3	3		6
		commercial diver	1	5	1	7
		boat assistant		4		4
		artisan		3		3
	Total		4	16	1	21
low	income source	none of the above		2		2
		commercial diver		1		1
	Total			3		3
medium	income source	none of the above		4		4
		poacher	1	1		2
		informal diver		1		1
		commercial diver		2		2
		artisan	1	2		3
	Total		2	10		12
high	income	poacher	1	2		3
	Total		1	2		3
very high	income source	poacher	1	2	1	4
		boat assistant		1		1
	Total		1	3	1	5

income source * magistrate court Crosstabulation

		magistrate court					Total
		very low	low	medium	high	very high	
income source	none of the above		2	2	2		6
	poacher	6	1	2		6	15
	informal diver				1		1
	commercial diver	7	1	1		1	10
	boat assistant	3	1		1		5
	artisan	3		3			6
Total		19	5	8	4	7	43

income source * sea fisheries Crosstabulation

		sea fisheries					Total
		very low	low	medium	high	very high	
income source	none of the above	1	2	4			7
	poacher	6		2	3	4	15
	informal diver			1			1
	commercial diver	7	1	2			10
	boat assistant	4				1	5
	artisan	3		3			6
Total		21	3	12	3	5	44

income source * want to stop poaching * magistrate court Crosstabulation

magistrate court			want to stop poaching			Total
			no	yes	2	
very low	income source	poacher	3	3		6
		commercial diver		6	1	7
		boat assistant		3		3
		artisan		3		3
	Total		3	15	1	19
low	income source	none of the above		2		2
		poacher	1			1
		commercial diver		1		1
		boat assistant		1		1
	Total		1	4		5
medium	income source	none of the above		2		2
		poacher	1	1		2
		commercial diver		1		1
		artisan	1	2		3
	Total		2	6		8
high	income source	none of the above		2		2
		informal diver		1		1
		boat assistant		1		1
	Total			4		4
very high	income source	poacher	1	4	1	6
		commercial diver	1			1
	Total		2	4	1	7

income source * want to stop poaching * community leaders Crosstabulation

community leaders			want to stop poaching			Total
			no	yes	2	
very low	income source	none of the above		1		1
		poacher	2	6	1	9
		commercial diver		7		7
		boat assistant		4		4
		artisan	1	5		6
	Total		3	23	1	27
low	income source	none of the above		4		4
		poacher	1	1		2
		boat assistant		1		1
	Total		1	6		7
medium	income source	none of the above		2		2
		poacher	1	2		3
		commercial diver		1		1
	Total		1	5		6
very high	income source	poacher	2			2
		informal diver		1		1
		commercial diver			1	1
	Total		2	1	1	4

education * acceptance of co-management * income source Crosstabulation

income source			acceptance of co-management			Total
			no	yes	uncertain	
none of the above	education	primary school		2		2
		secondary school		4		4
		diploma			1	1
	Total			6	1	7
poacher	education	primary school		1		1
		secondary school		8	3	11
		matric		4		4
	Total			13	3	16
informal diver	education	primary school			1	1
	Total				1	1
commercial diver	education	primary school		2		2
		secondary school		2		2
		matric	1	3		4
		diploma		2		2
	Total		1	9		10
boat assistant	education	primary school		2		2
		secondary school			1	1
		matric		1		1
		diploma		1		1
	Total			4	1	5
artisan	education	primary school		4		4
		secondary school			2	2
	Total			4	2	6

education * acceptance of co-management * income Crosstabulation

ncome			acceptance of co-management			Total
			no	yes	uncertain	
< 1000	education	primary school		3		3
		secondary school		6	3	9
		matric		1		1
	Total			10	3	13
000 to 2999	education	primary school		6		6
		secondary school		5	1	6
		matric		5		5
		diplo.na		2		2
	Total			18	1	19
3000 to 4999	education	primary school			1	1
		secondary school		1	1	2
		matric	1	2		3
	Total		1	3	2	6
5000 to 9999	education	primary school		2		2
		secondary school		2	1	3
		diploma		1	1	2
	Total			5	2	7

Length of stay in Hawston * exclude migrant divers * exclude no one Crosstabulation

exclude no one			exclude migrant divers		
			yes	uncertain	Total
yes	Length of	> 19 years	3	1	4
	Total		3	1	4
uncertain	Length of stay in Hawston	< 3 years	2		2
		3-4 years	2		2
		5-9 years	1		1
		10-19 years	6	1	7
		> 19 years	21	8	29
	Total		32	9	41

Length of stay in Hawston * want to stop poaching * is poaching okay Crosstabulation

poaching			want to stop poaching			
			no	yes	2	Total
no	Length of stay in Hawston	< 3 years		2		2
		3-4 years		1		1
		10-19 years		7		7
		> 19 years	2	24	1	27
	Total		2	34	1	37
yes	Length of stay in Hawston	3-4 years	1			1
		5-9 years			1	1
		> 19 years	5	1		6
	Total		6	1	1	8

Length of stay in Hawston * CM for everyone Crosstabulation

		CM for everyone		
		yes	uncertain	Total
Length of stay in Hawston	< 3 years		2	2
	3-4 years	1	1	2
	5-9 years		1	1
	10-19 years	1	6	7
	> 19 years	3	30	33
Total		5	40	45