Water supply in the Central Namib Region: A socio-economic study

Richard Moorsom

R 1997: 4

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Summary

This study provides an empirical report and analysis of the results of a June/July 1995 household sample survey of the four towns (Walvis Bay, Swakopmund, Arandis and Henties Bay) located in the central west coast region of Namibia. It also draws on other primary data sets, in particular 1991 census enumeration area returns and 1994/95 municipal account databases. Its aim is to establish the socioeconomic context of domestic and small business water supply for urban communities in a desert environment and a social structure deeply divided by racially based inequality. Key issues are the present rates and patterns of water consumption; water usage patterns in house and garden; watersaving practices, awareness and attitudes; and likely water consumption responses to increases in charges. The study also assesses respondent's views on policy questions of equity and payment, in particular price and non-price methods of reducing water consumption and how to assign the cost burden of additional bulk supply infrastructure.

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PREFACE

This study was commissioned by GKW Consult from the Social Sciences Division (SSD), Multidisciplinary Research Centre, University of Namibia, as an input into the Central Namib Water Supply Feasibility Study for the Department of Water Affairs. SSD appointed Richard Moorsom as project leader under contract with Chr Michelsen Institute, Bergen. This document, a CMI/SSD co-publication, reproduces with only minor formatting changes the final report submitted to GKW Consult in May 1996.

The study provides a detailed empirical report on the results of a major household sample survey of the four central west coast towns, Walvis Bay, Swakopmund, Arandis and Henties Bay. The survey was undertaken during June/July 1995 and covered all residential suburbs, the single quarters in Walvis Bay and small- and medium-sized businesses in the Central Business Districts, suburban shopping centres and industrial zones of Swakopmund and Walvis Bay. Other data sets were also analysed to deepen the insights of the study, the principal databases being the 1991 Namibian and South African censuses covering the area and the 1994/95 monthly water meter readings from the municipal accounts.

The aim of the study is to establish the socioeconomic context of domestic and small business water supply. Key issues are the size, distribution and socioeconomic characteristics of the coastal communities, the present rates and patterns of water consumption; domestic water fixtures and water-using equipment; water usage patterns in house and garden; water-saving practices, awareness and attitudes; water consumption responses to possible future increases in charges; and opinion on policy questions of equity and payment, in particular price and non-price methods of reducing the propensity to consume and the assignment of the cost burden of additional bulk supply infrastructure.

The carrying out of this study relied heavily on extensive cooperation from people and institutions in the coastal towns. Such cooperation was readily given and has contributed materially to both extending the data coverage and a deeper understanding of the local contexts. Particular thanks are due to:

- Walvis Bay Town Council:
  - Town Engineer's Department (Mr Muller, Mr Brummer, Mr Stewart)
  - Housing Department (Mr de Smit)
  - Computing (Mr du Preez, Mr van Zijl)
  - Narraville Office (Ms Muller, Ms de Wee)
- Swakopmund Town Council:
  - Town Engineer's Department (Mr Lester, Mr Köllmann)
  - Finance Department (Mr Nel, Mr Witte)
  - Mondesa Office (Mr van Zyl)
- Arandis Town Council (Mr Mwapangasha, Mr McClune)
- Henties Bay Town Council (Mr Taljaard, Mr Armstrong)
- Namport (Mr Raw)
- Swakopmund Chamber of Commerce (Mr McDonald)
- RUL Housing Office, Arandis (Ms Menjono)
- Parish priests and pastors of Swakopmund and Walvis Bay
- City of Windhoek (Mr van der Merwe, Mr Brinkman)
- NCR, Windhoek (Ms Visser)
- Central Statistical Services, Pretoria
- Bicon, Swakopmund (Mr Dichtl)
- Parkman Namibia, Windhoek (Mr Cashman)

Many others assisted and this list by no means exhausts the extensive local assistance from which the team benefited. Our thanks above all are due to the residents and businesspersons of the coastal towns

for their patience and ready cooperation with the interviewers in supplying a detailed schedule of information. On that cooperation in large measure rests the quality of the data supporting the analysis presented in this study.

The field phase of this study was an intensive exercise involving three teams of interviewers covering all suburbs and the CBDs and industrial zones of the four towns. The enthusiasm and professionalism of the SSD interviewers was a key factor in the successful completion of a survey schedule which returned some 1100 completed and validated questionnaires over a three-week period. The members of the teams were:

- Supervisors:
  - George Eiseb
  - Plentina Kazapua
  - Kavee Hekemo[2]
  - Moses Isaaks
- Interviewers:
  - Kavee Hekemo
  - Irene Gowases
  - Patrick Keramin
  - Abraham Vatileni
  - Boleslaus Biwa
  - Charles Rooi
  - Bartholomew Kauahuma
  - Sonia Links
  - Sara Oarum
  - Fritz Shikesho
  - Bianca Katuuo
  - Petrina Mbome
  - Matti Nghikembua
  - Ghana Witbooi
  - Adnan Boois

Other members of SSD's professional staff played key roles at the mobilisation, fieldwork and analysis phases of the study:

- Ben Fuller, researcher and field coordinator
- Joepie Mouton, financial administrator
- Christa Schier and the data entry staff of the SSD Data Processing Unit

Finally, credit is due to the helpful advice and criticism received from the Department of Water Affairs at the design stage of the study (Mr Drews, Mr Harris, Mr Heyns), from participants at the consultative workshop on 27 July 1995 and from the GKW Consult project leader Mr Wilfried Rammler.

Richard Moorsom
Project leader

2. Stepped in when Ms Kazapua was taken ill and forced to withdraw.

ABBREVIATIONS

CBD	Central Business District
CSO	Central Statistics Office
CNWSFS	Central Namib Water Supply Feasibility Study
DWA	Department of Water Affairs
HIES	Household Income and Expenditure Survey
NHE	National Housing Enterprise
RUL	Rössing Uranium Ltd
SSD	Social Sciences Division, Multidisciplinary Research Centre, University of Namibia

l	litre
l/p/d	litres per person per day
m^3	cubic metre

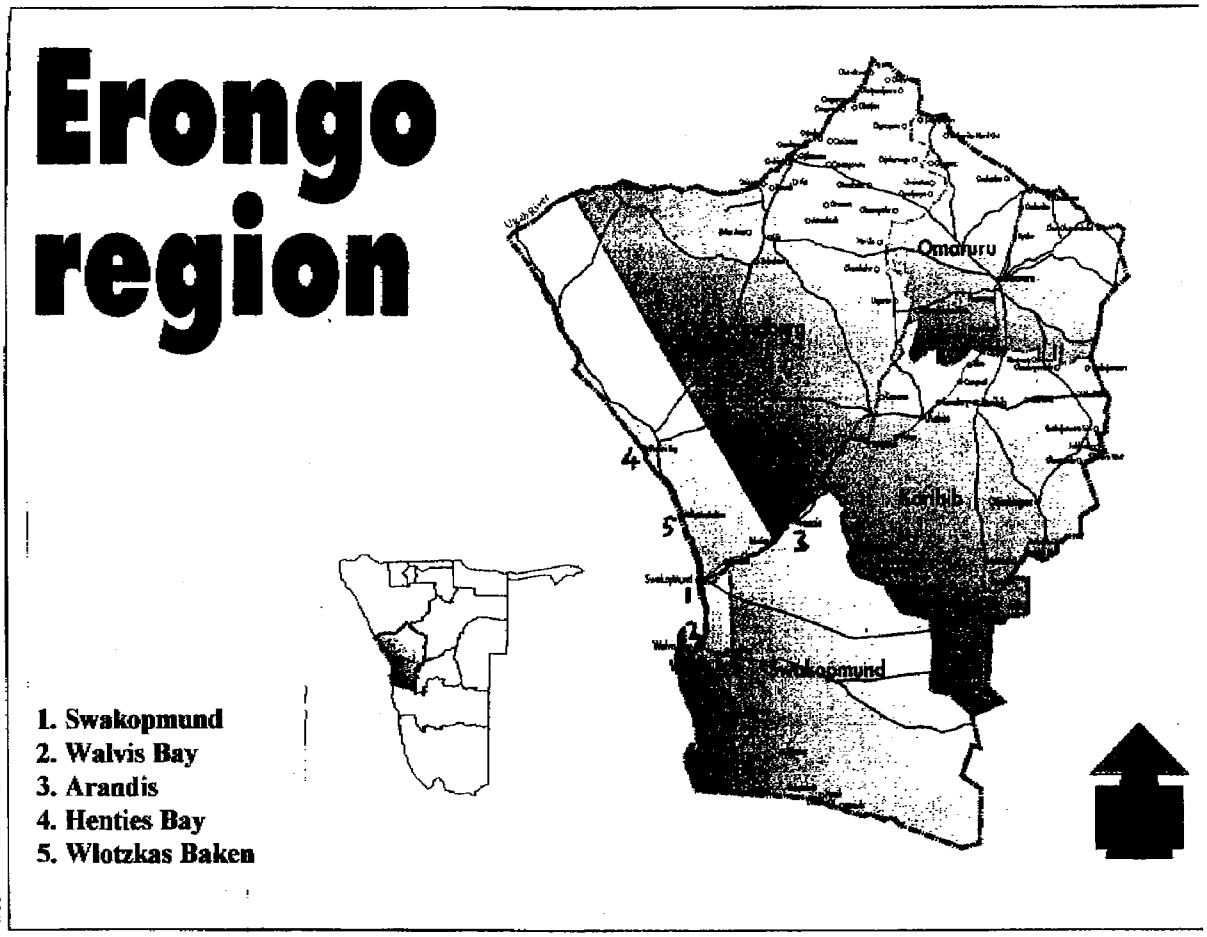
Boundaries of Major Areas and Suburbs

Area & Suburb	Code	Description
Swakopmund		
Mondesa:	1	
Central	11	5th St - 11th St - 12th St - 3rd St
East	12	1st St - 7th Ave - 3rd St - 5th St - 10th Ave E
Jabulani	13	12th Ave- 13th St - 12th St - boundary
Mahetago	14	12th Ave - 10th St - boundary
Single quarters	15	3rd St - 7th Ave - boundary
Tamariskia:	2	
North	21	North of Silwer Laan
South	22	South of Silwer Laan
Town:	3	
Vineta north *	31	Dr Schwietering St - Fischreiher St - midway Turmalin/Flamingo Sts - coast
Vineta coast *	32	'V' survey area: Flamingo/Turmalin - S. Frieda/Seeadler - Hajo Brauer/2nd - Dr Boss St
Vineta east	33	Fischreiher - Dr Schwietering - Main - Dr Boss - boundary of 'V' survey area
Central	34	Dr Boss - Main - Nordring - Südring - boundary - coast (excluding CBD)
Kramersdorf	35	Südring - Kaiser Wilhelm - boundary
CBD	36	Approx.: Rhode - Moltke - Brücken - Otavi - Bahnhof - Schlosser - Garnison - coast
Industrial zone	37	Nordring - Knoblauch - Kolonnen - Winter - Schlosser - railway
Walvis Bay		
Kuisebmond:	4	
Central	41	Kabeljou - Dune - Sardyn - Khomas Hochland - Agaat
South	42	Boundary - Marlyn - Kabeljou - 20th Ave - Kuiseb - Agaat - Khomas Hochland - Sardyn
West	43	20th Ave - Dune - 16th Ave - single/quarters/compound - Springbuck - 14th Ave - Kuiseb
North	44	Agaat - northern boundary
Single quarters	45	Old and new sections
Compound	46	Walled area
Narraville:	5	
Central	51	Namib - Strand - Kruis
East	52	Namib - Kruis - Tamarisk - Dolphin/boundary
West	53	Kruis - Neptune/boundary - Tamarisk
Town:	6	
Meersig	61	Esplanade - boundary
South	62	Esplanade - 5th Rd - Diaz
Central	63	5th Rd - 10th St - CBD - harbour boundary
North	64	18th Rd - 11th St E - CBD - harbour boundary; area 1st St E - 3rd St E
East	65	18th Rd - 11th St E - 13 Rd - 12th St - 11th Rd - 10th St - 5th Rd - Union St
CBD	66	Approx.: 15th Rd - 8th St - 13 th Rd - 10th St - 14th Rd - 11th/10th St - 10th Rd - 6th St
Industrial zone	67	Harbour - railway - 18th Rd - Swakopmund road - Kuisebmond boundary - Bluefin - coast
Langstrand	68	Settlement area excluding caravan park
Arandis		
Arandis:	7	
Houses	71	All except single quarters
Single quarters	72	Individual blocks
Rössing mine	73	Mine area
Henties Bay		
Henties Bay:	8	
Omdel	81	Township including reception area
North	82	North of Duineweg/golf course
South	83	South of Duineweg/golf course
Wlotzkas Baken	84	Settlement area
Rural		
Kuiseb Valley	91	River valley from Walvis Bay boundary to boundary of Namib/Naukluft Park
Rooikop	92	Military base and airport
Camp sites & facilities	93	All sites outside municipal areas plus Langstrand caravan park
Farms & smallholdings	94	Mainly along the Swakop River
Mines	95	All mine sites except Rössing

* Results combined as 'Vineta west' because there were too few returns from Vineta north for separate analysis.

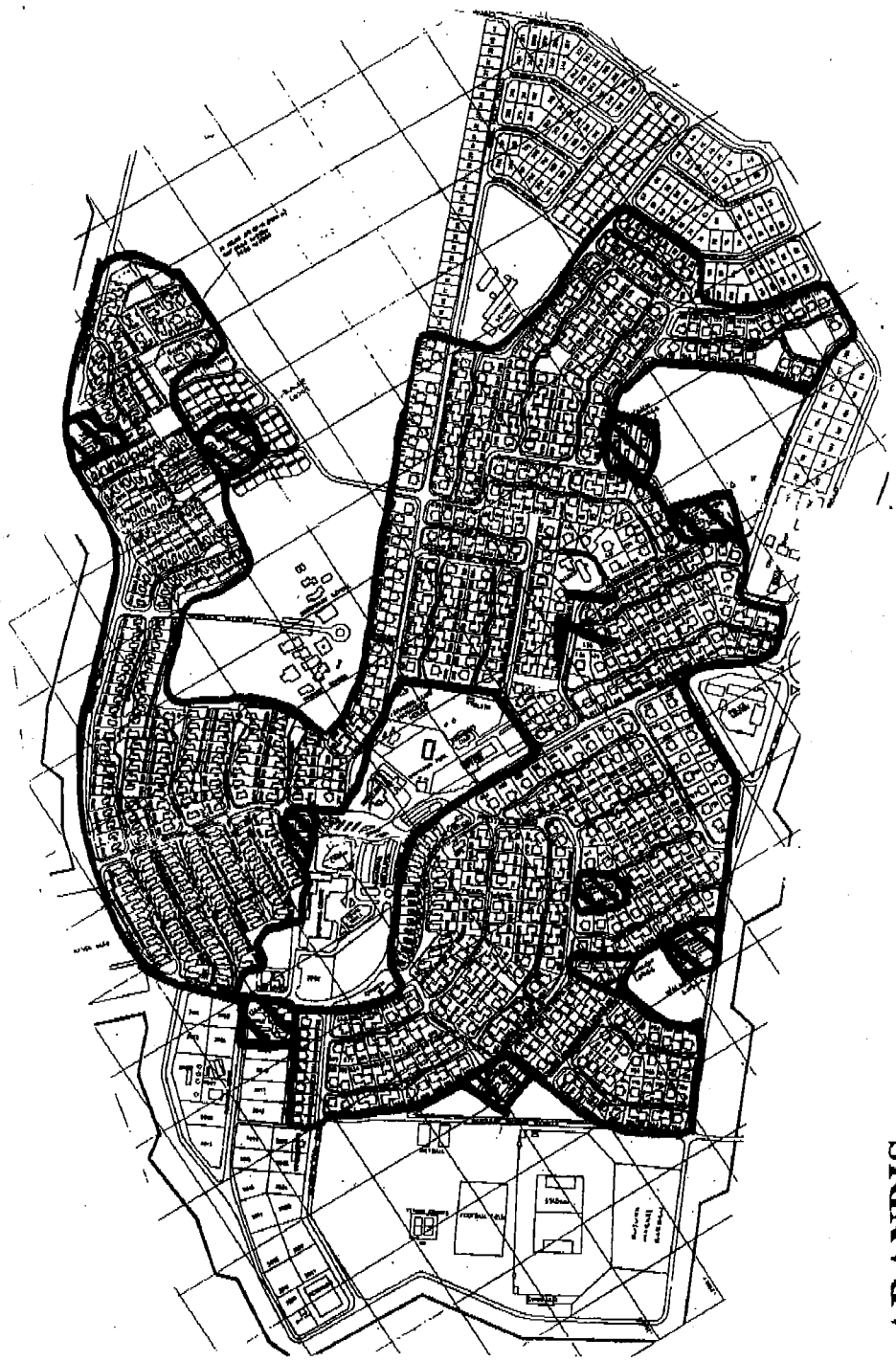
MAPS

1. Central Namib Area and Locations of Urban Areas

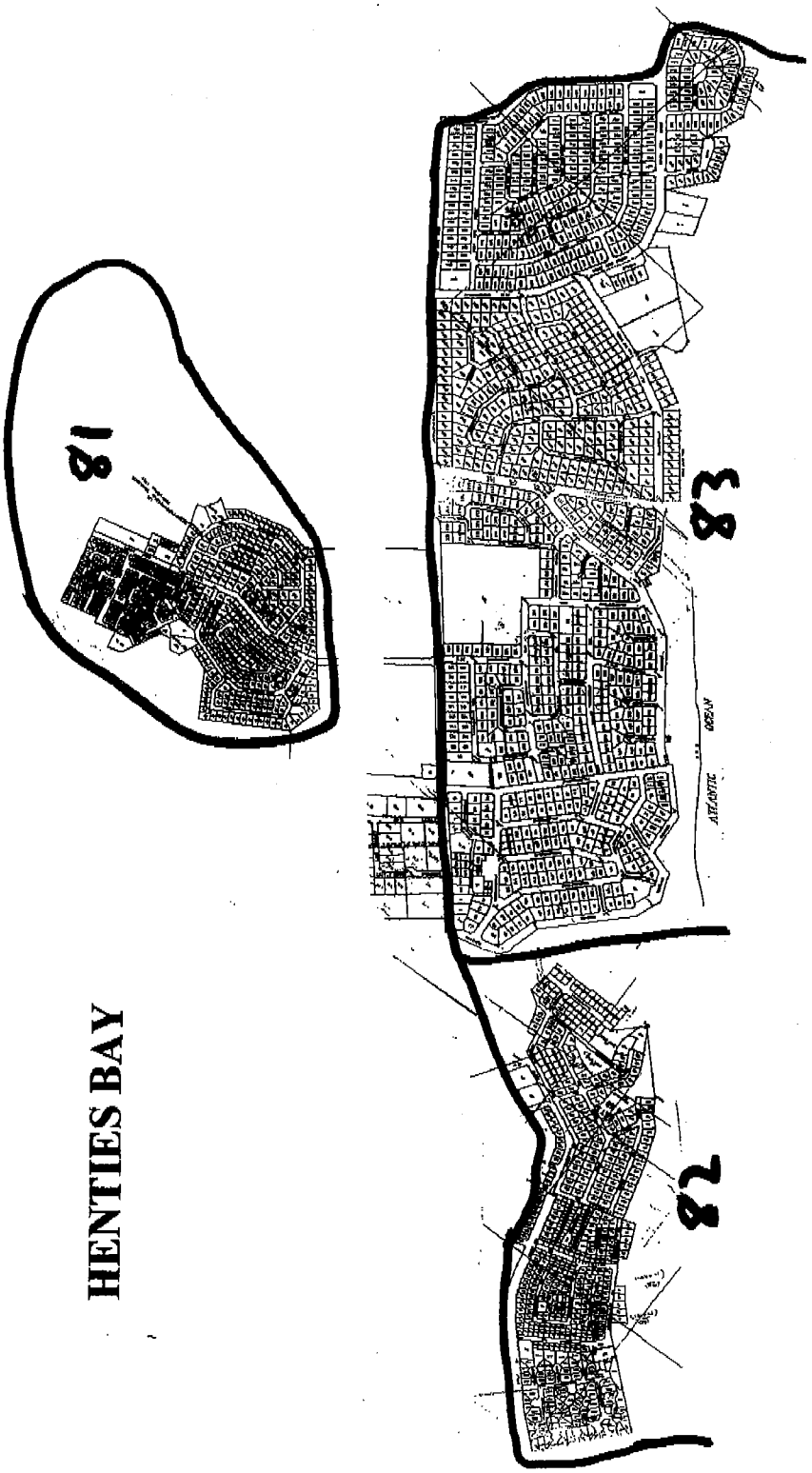


Reproduced from the *Namibia Regional Resources Manual* (Friedrich Ebert Stiftung, 1994).

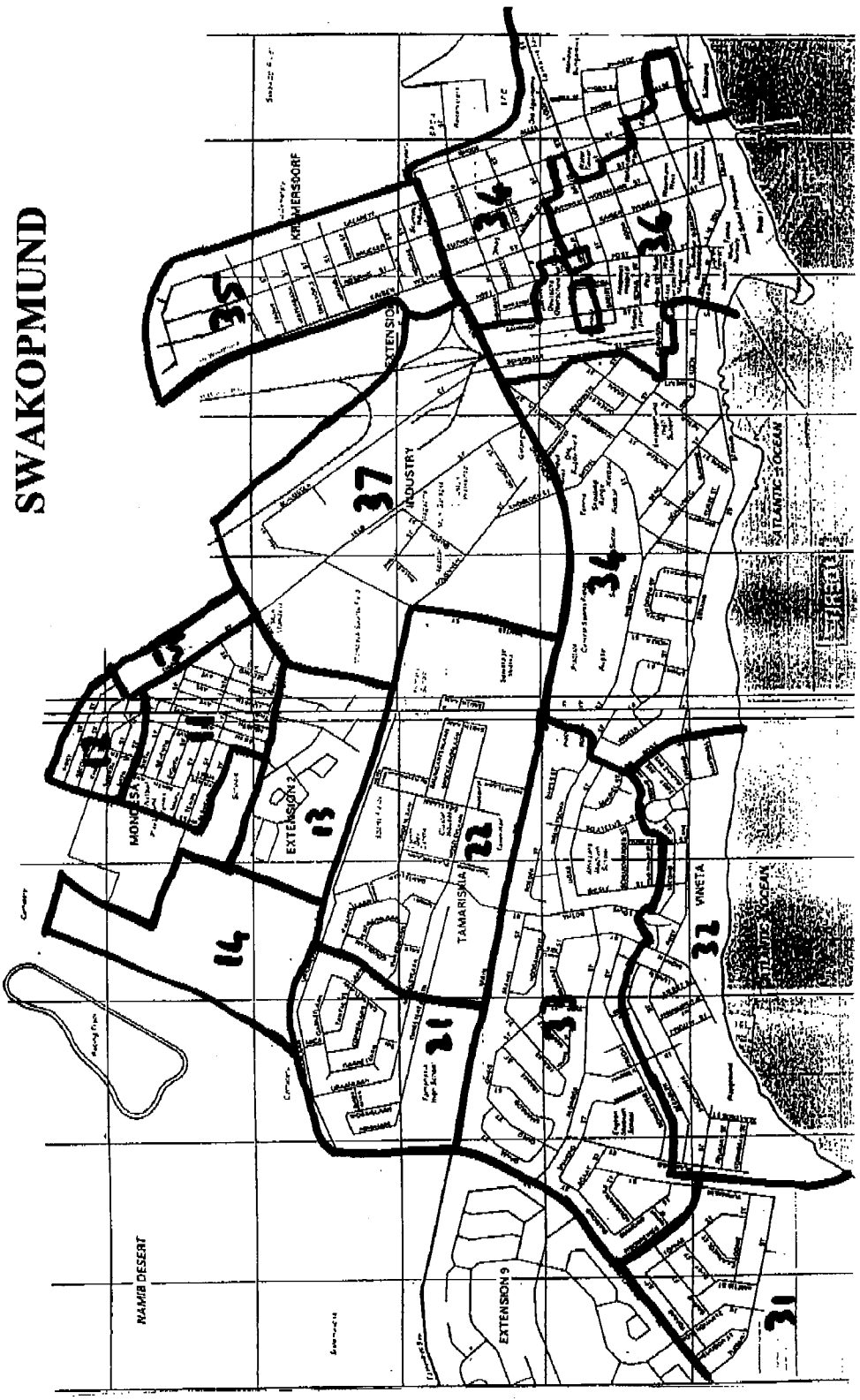
2. Arandis



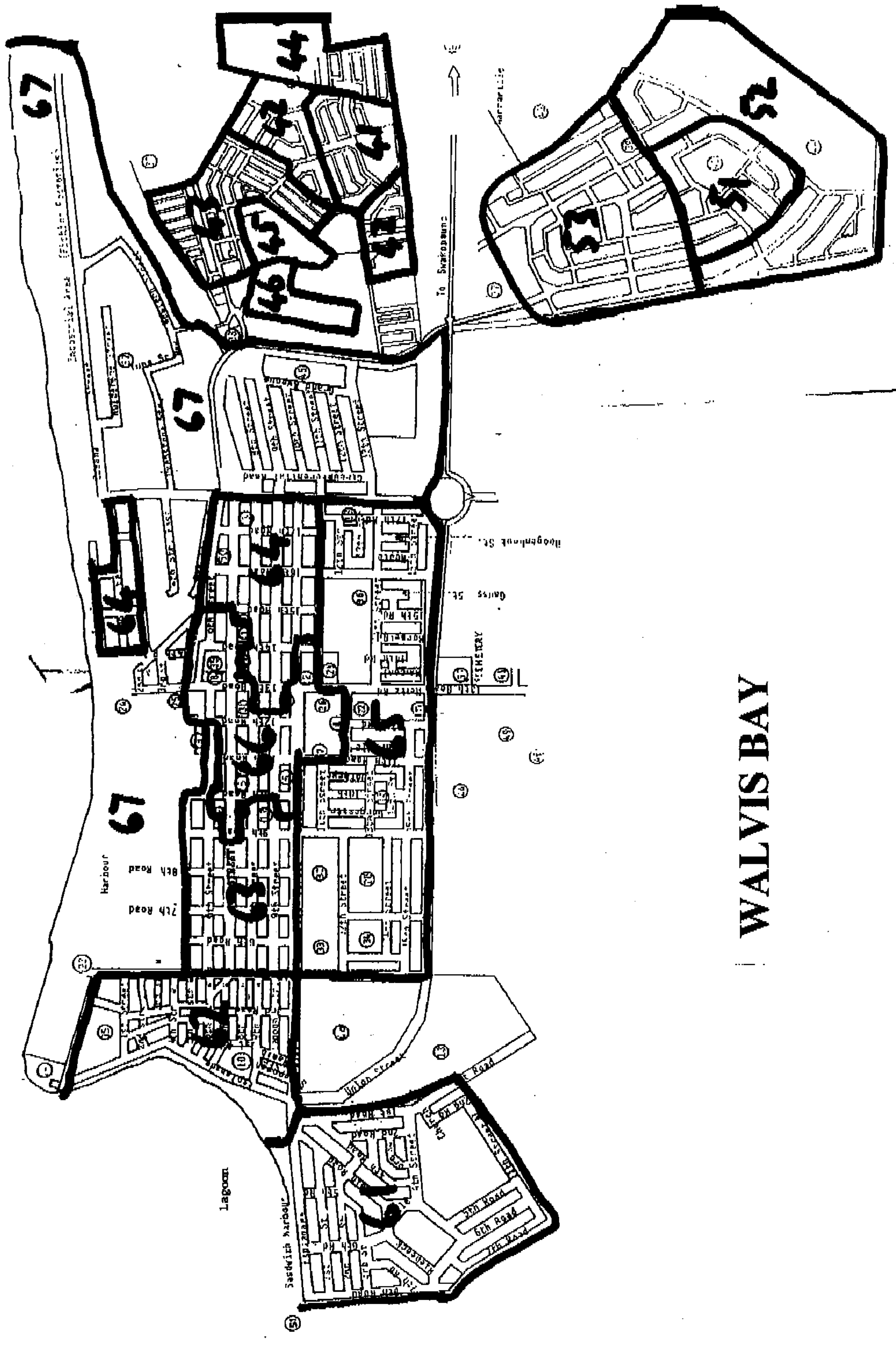
3. Henties Bay



4. Swakopmund



5. Walvis Bay



1 METHODOLOGY AND DATA SOURCES

1.1 Objectives and Scope

The project's terms of reference call for the present level of water demand in the study area to be established and for 20-year demand forecasts to be prepared covering a range of three projection scenarios. This study addresses the socioeconomic context of water use patterns and of the affordability of water amongst end users, concentrating in particular on domestic consumers.

The study undertakes an analysis of existing water demand patterns amongst residential consumers. It sets out to assess both geographic and socioeconomic dimensions in order to differentiate groups of consumers, including quantities of water consumed, housing standards, household income, population density and types of access to water.

An important objective of the study is an assessment of the scope for water tariff reform aimed both at a reduction in unit water demand by raising tariffs to the marginal cost level and at possible cross-subsidisation of low income consumers by full cost recovery from large consumers. In this study the presentation and analysis of a range of socioeconomic data are designed to establish a reliable foundation for evaluating different propensities of water consumption amongst private and small business consumers and for modifying scenario projections on the basis of the calculated propensities, taking account of changing demographic and socio-economic structures. The data analysis bears on key aspects of feasibility and sensitivity analysis in the study, including possible trade-offs between higher levels of industrial water charges and economic growth, affordability and basic needs amongst low income consumers, and the impact upon profitability of reductions in consumption by heavy residential consumers in the upper bands of a graduated charging scheme.

1.2 Data Sources

The analysis draws on a number of studies, statistical reports and databases, the interpretation and use of which is discussed in more detail at the appropriate sections of the study. They include:

- Namibian Housing and Population Census 1991 (region except Walvis Bay)
- South African Population Census 1991 (Walvis Bay)
- Past population censuses
- Municipal estimates of population
- Employment estimates for particular sub-sectors
- Fisheries and mine production statistics
- Tourism statistics
- Municipal consumer water accounts (water meter readings)
- Plot sizes and valuations (Walvis Bay)
- Town plans and erf boundary maps
- Aerial photography (Swakopmund, Walvis Bay)

- Socioeconomic sample survey (residential housing, single quarters)
- Business survey (small and medium businesses)

The socioeconomic analysis drew extensively on the results of the 1991 censuses for demographic, social and economic data. The Namibian Central Statistics Office has published the results of the 1991 Population and Housing Census at the district, regional and, for a limited range of variables, enumeration area levels. The text files of the published volumes are also made available made available on diskette and were converted to data delimited format for analysis. The census did not include Walvis Bay which was then still under South African rule; however, the South African Central Statistical Services made available raw data records on Walvis Bay from the South African 1991 population census, which were then compiled for statistical analysis.

The results of the national Household Income and Expenditure Survey (HIES) were in preparation during the period of this study and unfortunately neither data nor published results were completed in time for use in the analysis.

All four local authorities in the region cooperated in giving access to their consumer accounts databases. These are all run on the same SAMRAS software accounting system and although the range and selection of data variables differs it was possible to download and compile comparable sets of monthly records of water meter readings for the financial year June 1994 to May 1995. Henties Bay however does not maintain historical files and no consumer data was therefore available.

1.3 Sample Survey

The principal primary socio-economic data were generated by a sample survey of private households in the four towns. The survey covered all residential suburbs having metered water connections. A subsidiary survey covered the single quarters at Walvis Bay, whose tenants are charged a flat rate for their water. Attempts to extend this survey to the Walvis Bay compound and the Swakopmund single quarters encountered conditions which were judged to put the interviewers at risk and the teams were accordingly pulled out. A separate survey was undertaken of small and medium sized businesses. It covered the CBDs and suburban shopping centres as well as the industrial areas and was based not on sampling but on visits to all street-level businesses in the commercial zones.

The initial target was a sample size of approximately 900 for the main survey and 300 for the subsidiary surveys. This relatively large sample was specifically intended to allow spatial analysis of the results by town and suburb. In the event the residential survey achieved 775 validated returns, the Walvis Bay single quarters survey 57 returns and the business survey 263 returns. Sampling was undertaken on a geographically stratified basis with the towns divided into nine major socioeconomic areas as follows:

Swakopmund	Mondesa
	Tamariskia
	Town
Walvis Bay	Kuisebmond
	Narraville
	Town
Arandis	Arandis
Henties Bay	Omdel
	Town

Within each area the primary sampling unit was the erf or plot, for which noting plans from the Surveyor-General's Office and town plans from the local authorities were used for the purposes of

selection. These plans give reasonably up to date maps of all legally defined urban property boundaries. Since the overwhelming majority of residential buildings comprise single houses on individual plots with one water connection, it was considered that plots afforded the best approximation available for sampling residential consumers. The plans do not differentiate however between developed and undeveloped plots, which meant that at the outset both developed and vacant plots were included.

The survey therefore used a method of sampling which allowed for variable numbers within each area. A random number was generated within the range of the plot count for each area and starting from the selected plot a list of plot (erf) numbers was derived from the map using a set interval. The interval for each area varied approximately with the density of the 1991 census population; thus in densely populated Kuisebmond and Mondesa interval was set at 1 in 4 and in the lowest density areas of the Town suburbs it was set at 1 in 15. This approach ensured that all built-up parts of the area were evenly covered while excluding undeveloped plots in partly and wholly empty sections.

The survey was undertaken over four weeks during June and early July 1994. The completed questionnaires were checked in the field; data entry and validation was undertaken by SSD's data processing unit in Windhoek using SPSS. The SSD researchers undertook the data analysis using SPSS and MS Excel.

The coverage of the main survey is regarded as satisfactory in most of the survey area. Response rates were surprisingly good and with minor exceptions the anticipated reluctance to cooperate in certain suburbs did not materialise. The exceptions were, as already noted, the compound in Walvis Bay, where seasonal workers live in overcrowded and degraded conditions, and the single quarters in Swakopmund, where the residents were preparing for a major protest demonstration on housing issues at the time of the survey. In addition, at Henties Bay interviewers found, as expected, that most houses were empty in the trough of the winter season and the returns are therefore heavily biased towards the small number of year-round residents. In Omdel, for operational reasons, in particular the lack of adequate maps, the survey covered the more established section of permanent housing and did not extend to the shanty structures in the so-called reception area.

Considering the residential suburbs, that is excluding the single quarters and multi-unit sites (townhouse complexes, blocks of flats and institutions), the demographic distribution of the survey achieved a reasonable balance (see table H2). Compared to the overall estimated sampling ratio of 9,4 per cent of the residential population, the sample proportions were fairly close for Walvis Bay, Swakopmund and Arandis (8,8, 11,1 and 12,4 per cent respectively) and only Henties Bay fell seriously short (3,7 per cent). The low and especially the middle income suburbs had higher than average sampling ratios (10,2 and 12,3 per cent) with a lower but nevertheless adequate ratio applying in the high income suburbs (5,9 per cent).

The spatial ratios are similar. Comparing addresses visited to the estimates of developed plots, Swakopmund was over-represented in the sample by some 14 per cent and Walvis Bay under-represented by 5 per cent. Arandis was over by 44 per cent and Henties Bay seriously under by 56 per cent as explained above. Disaggregated further, except for Henties Bay all major areas and most suburbs were between 75 per cent above and 50 per cent below the sample mean of 8,6 per cent of all developed residential plots, the exceptions being Tamariskia north (242 per cent over) and Narraville west (52 per cent under). Because shorter sampling intervals were adopted in high density areas, the low and middle income suburbs were generally over-represented in the sample (12 and 40 per cent) and the high income suburbs under-represented (by 31 per cent).

The sampling was stratified in order to enable testing for local variations in the responses, which it was considered might be significant given the very recent reintegration of Walvis Bay into Namibia and in particular given the extreme and sharply demarcated income disparities between the major residential

zones. The survey results are therefore grouped into nine geographical sections, three each for Walvis Bay and Swakopmund, two for Henties Bay and one for Arandis.

These major areas or townships are broken down further into 26 suburbs: 10 in Swakopmund, 12 in Walvis Bay, 3 Henties Bay and 1 in Arandis. To these should be added another 8 not covered in the household survey: the single quarters and compound in Walvis Bay, the single quarters in Swakopmund, the central business districts (CBDs) and industrial zones on both towns, and the coastal satellite of Langstrand which falls within the municipal area of Walvis Bay. For full details of the geographical breakdown of the survey areas, see the map section and definition of boundaries at the front of this report.

Taking account of the sharp socioeconomic residential boundaries, the major areas were also classified by income as follows:

Low income	Mondesa, Kuisebmond, Omdel
Middle income	Tamariskia, Narraville, Arandis
High income	Town areas of Swakopmund, Walvis Bay and Henties Bay

Since the household survey aggregated nine sub-samples weights were calculated for each of the major areas and suburbs based on the differences between the distributions of the sample and of developed residential plots. The resulting raising (reducing) factor was applied to the survey data to derive regional totals and extrapolations. The distribution of residential plots was taken rather than population as the closest yardstick to the sample, which was selected from plots and covered all people residing on sampled plots whether or not they were members of a single family.

Two distinct distributions are thus employed: of respondents according to the unweighted aggregate of the nine area sub-samples; and of plots or households weighted by the overall distribution of all developed plots. As used in this study the terms 'respondent' and 'household' refer respectively to the unweighted and weighted distributions. Household is defined as all the inhabitants of one plot rather than the more usual social definition employed in the population census.

The household survey covered an estimated population of 48 800 in the residential suburbs[3] out of a total mean urban population in 1995 of 63 400 plus another 1 500 in rural areas. The results can thus be regarded as representative of about three-quarters of the average urban population. Nearly all the remainder live in single quarters since multi-unit residential buildings such as townhouse complexes are as yet small in number. The results from the survey of the Walvis Bay single quarters can be regarded as giving only a rough indication of conditions in the Swakopmund single quarters while the Walvis Bay compound stands apart from the rest. It must also be remembered that although the data from the Omdel returns have been generalised for the whole of that suburb, conditions in the shanty settlement of the reception area are likely to be even worse than in the older section which supplied the survey data. Finally, since most of the occupiers of houses in the Town area of Henties Bay reside elsewhere and visit episodically, the survey results reflect only the thinly scattered resident population, which has very different age and income profiles to those of the seasonal occupants.

The small/medium business survey concentrated on street-level businesses in the CBDs and industrial zones of Swakopmund and Walvis Bay. Suburban shopping centres were also included but they form a small proportion of the total number. The small numbers of businesses in Arandis and Henties Bay were not targeted. The coverage extends to probably the majority of publicly accessible retail and light industrial enterprises in the two major towns but excludes most commercial office establishments.

---

3. This total is slightly above the mean urban population of 48,800 which is adjusted by several factors to give a best overall estimate for the year.

The household survey questionnaire aimed to gather five main categories of data:

- household profile (numbers, ages, economic activity status, education, average overnight weekday population, seasonality, main house/outside structures, rooms).
- household incomes and water bills.
- water consumption (last water bill, water outlets, water-consuming appliances, main household and garden uses, frequencies, length of time per activity, pool, vegetation, size of cultivated garden, irrigation system, use of external water points and reasons).
- water saving (knowledge of water-saving practices, actions taken, reasons for acting/not, water leaks and responses, awareness of government/municipal publicity).
- attitudes towards possible policy changes (priorities for reducing consumption, responses to differing rates of tariff increase, cross-subsidisation/full cost charges).

The single quarters survey was confined to Walvis Bay and, as explained, could not be extended to the Walvis Bay compound or the Swakopmund single quarters. It covered both old and new sections of the Walvis Bay single quarters and applied a revised set of questions adapted to circumstances in which residents had limited or no in-house water fixtures, had access to communal facilities and paid fixed water bills or had their bills incorporated into their rental payments.

The small/medium business survey questionnaire concentrated on establishing any significant commercial water uses and if so, the technology applied. It also covered water use by staff and attitudes towards water saving and increases in water charges.

1.4 Outline of the Study

The main sections of this study address seven principal topics:

- Demographic characteristics at the area and household level, including population estimates for 1995, seasonal factors affecting the size and composition of the resident and transient population, residential and housing densities, age distribution, and dependency ratios.
- Residential water demand, including household and per capita consumption levels.
- Domestic water usage inside and outside the house, covering water infrastructure, access ratios and usage patterns and devoting particular attention to gardens, with breakdowns of the distribution of large vegetation and of lawns and cultivated beds.
- Household income, the main sources of income, water bills, measures of the ability to pay present and future increases in water charges, and indicators of affordability.
- General attitudes towards water saving, promotional publicity and water supply agencies, knowledge of water-saving methods, domestic water-saving priorities, and policy preferences for reducing general water consumption and paying for new bulk supply infrastructure.
- The single quarters, in particular analysis of the results from the Walvis Bay single quarters survey.
- The survey of small and medium sized businesses, covering numbers, staff, distribution, water consumption, use of process water, and attitudes towards water saving and higher charges.

The report is presented in two main sections: the text of the report with supporting figures; and tables and survey questionnaire forms, which have been grouped together in an annex in order not to overburden the flow of the text. A full list follows the table of contents and the discussion in the text is cross-referenced to the relevant tables.

2 POPULATION AND HOUSEHOLD COMPOSITION

2.1 Population in the Base Year 1995

The distribution of population and economic activity in the central Namib region is strongly influenced by the desert climate, the absence of perennial rivers and the restriction of exploitable groundwater to the sandy river beds of the two main seasonal rivers, the Swakop and the Kuiseb, which experience a surface flow to the coast from interior runoff on average about once a decade.

The rural population is small in both relative and absolute numbers. Small farming communities extend up the Kuiseb and Swakop families, in the former the Topnaars farming on customary tenure and in the latter commercial farms and smallholdings using boreholes and irrigation. There are also a few small mining settlements and the former South African military base, now commercial airport, at Rooikop. Along the coast from Walvis Bay to Henties Bay are several day facilities and caravan parks for visitors.

The great majority of the region's population is concentrated in four main towns: the fishing and industrial centre of Walvis Bay; the tourist centres of Swakopmund and Henties Bay, and the dormitory mining town of Arandis. Two other small coastal settlements should be noted: the fast expanding upmarket holiday home complex at Langstrand halfway between Walvis Bay and Swakopmund; and the more basic holiday village at Wlotzka's Baken between Swakopmund and Henties Bay serving mainly sport anglers.

To support the demographic and household analysis of this study an attempt was made to estimate a base population for 1995 together with salient socio-economic characteristics. The two principal data sources were the 1991 population censuses and the sample survey carried out for the purposes of this study during June/July 1995. The most comprehensive demographic data derives from the 1991 national population censuses, conducted separately for Walvis Bay by South Africa in March 1991 and for the rest of the region by Namibia in October/November 1991. The Central Statistics Office has published the results of the Namibian census at the district, regional and, for a limited set of variables, enumeration area levels of disaggregation (see tables H1 and H3). The CSO also provides text files of the publications on diskette. These were obtained and the area data for the west coast region was extracted and converted into delimited format for statistical analysis. For Walvis Bay, the South African Central Statistical Services provided data files of the raw census records. In the absence of compiled area-specific tables, data on a limited set of demographic variables was aggregated for the enumeration areas.

Differences in timing, data categories and definitions make proper integration of the two data sets difficult. Further problems arise from large influxes since the censuses were taken, in particular of jobseekers into Walvis Bay after its reintegration into Namibia in March 1994. The large-scale clearance raids by the police on the compound and single quarters in Walvis Bay and Swakopmund during 1994-95 led to a modest outflow from the region, but mainly to a redistribution of the floating population between the two towns and from the single quarters into backyard shacks in Mondesa and Kuisebmond.

In these circumstances of rapid demographic change straight-line projections from past population growth trends may turn out to give seriously inaccurate estimates of the current population. The other main data source, the results of the sample survey, was therefore used to make an independent calculation of the mid-1995 population by multiplying the number of developed plots in each suburb by the mean household size for that suburb (see table H3 and figure 1). The age structure and dependency ratios of the 1991 population were taken into account. For comparison, the enumeration area aggregates from the 1991 Namibian census were assigned by suburb and mean household sizes were

calculated, 'households' for this purpose being all the residents on a single plot. Since the survey took place at the seasonal low point, a 'seasonality' factor was applied to adjust the results towards an annual mean. This approach enabled detailed cross-checking at the suburb level and achieved reasonable consistency. The results were presented at three levels of spatial disaggregation: town, major area and suburb.

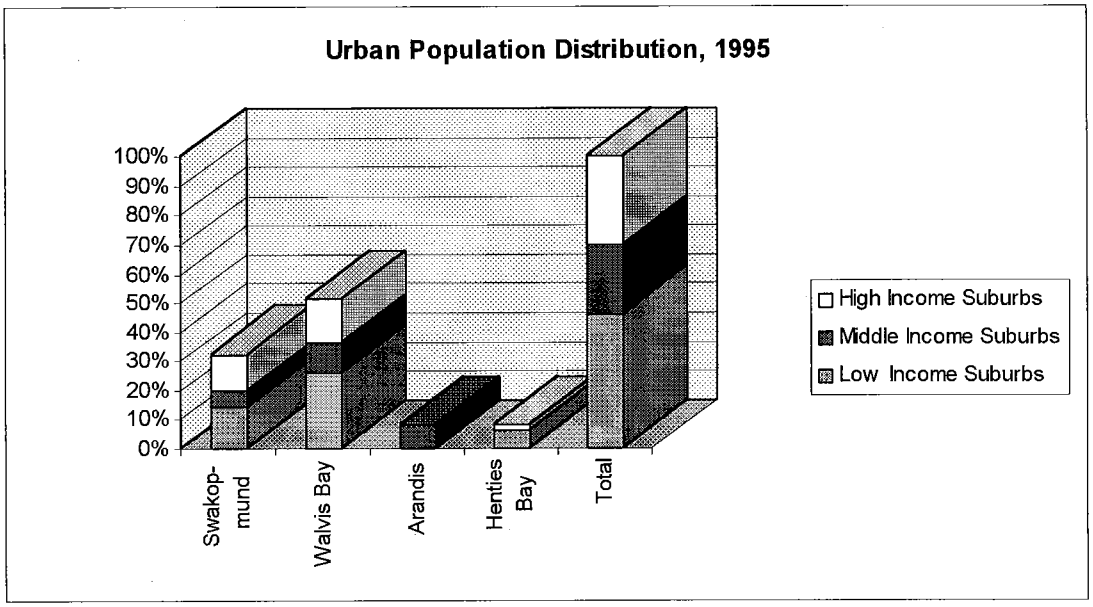


Figure 1

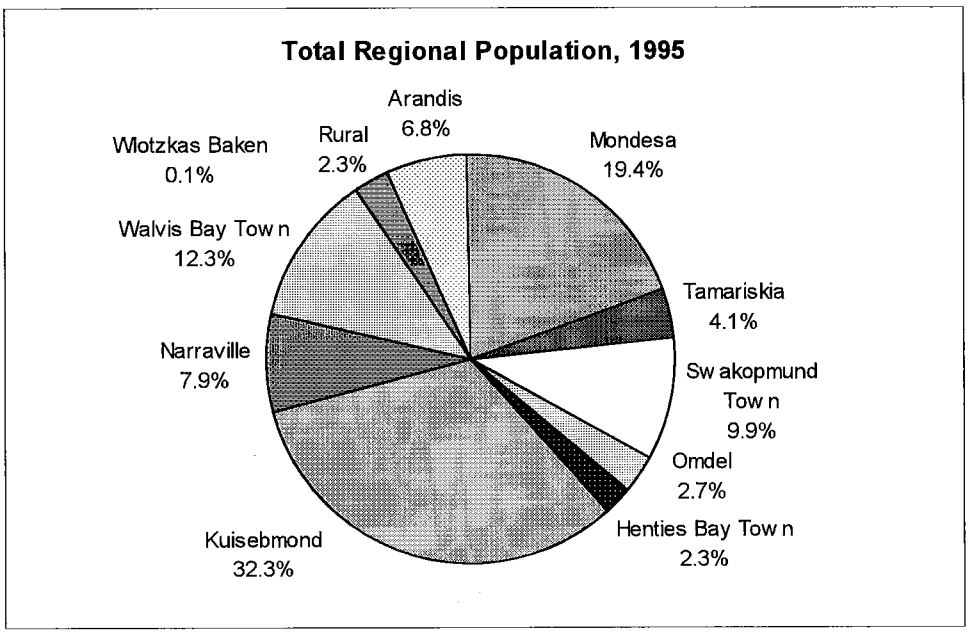


Figure 2

The overall result estimates the mean population for 1995 in the study region at 64 887, with a seasonal peak of 70 931 early in the year and a seasonal low of 61 034 around September. These totals include seasonal movements in and out of the region by residents, short-term contract workers, visitors and

tourists. The mean figure compares with a census-based 1991 regional total of 47 634 and represents a 38 per cent increase over four years (see tables H3 and H4).

The recent population increase is large by any yardstick but is nevertheless well below the aggregate of informal estimates by the various local authorities in mid-1995. One estimate for Walvis Bay put the population of Kuisebmond alone at 40 000 and the town total at about 55 000. In Swakopmund at the time of the police raid in late 1995 a senior police officer estimated the number in the single quarters alone at about 25 000. In Henties Bay a peak population of more than 20 000 was anticipated with the holiday influx at the turn of the year. Taking together, these figures would result in a coastal population in excess of 100 000 at the top of the holiday season.

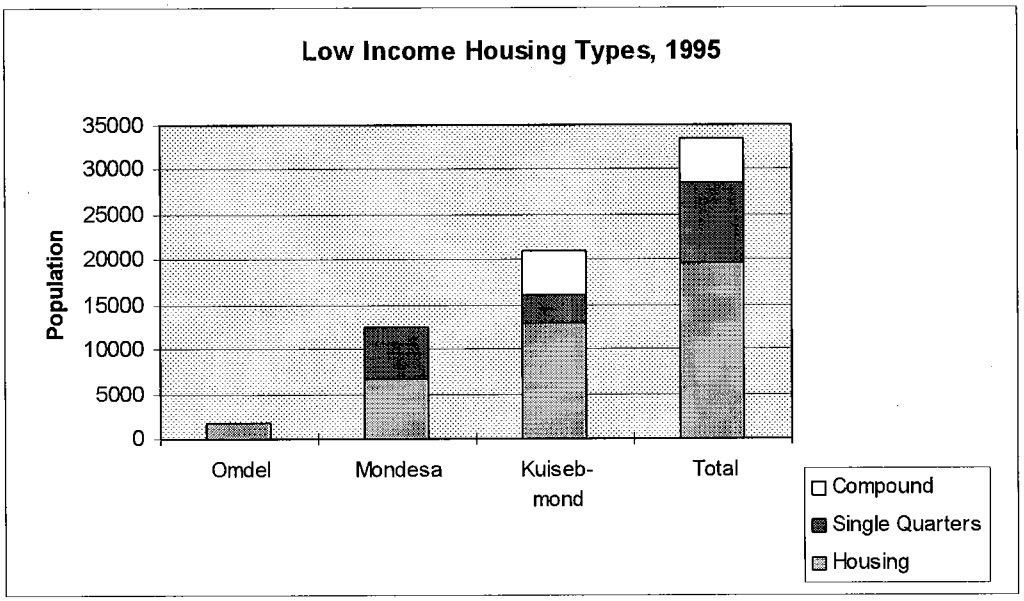


Figure 3

Such large numbers would appear to be well above any reasonable calculation of what the existing housing, hostel and hotel infrastructure can sustain even if severe overcrowding is assumed in the low income suburbs and single quarters. In the case of Walvis Bay, the difference of 15,000 between the estimated town total for 1995 of 55,000 and Kuisebmond would imply an increase of a third in the population of the Town suburbs and Narraville since the 1991 census, or 8 per cent a year, which contradicts the general observation that growth in these suburbs has been slow. A resident population of 40,000 in Kuisebmond would imply a fourfold increase within four years at a compound rate of more than 40 per cent a year. Excluding the compound, which after the removal of non-entitled persons in 1994 would accommodate 5,500 residents at maximum, the population of the rest of Kuisebmond would have risen from 5,500 in 1991 to 34,500 in 1995, an increase of 29,000 within four years at an annual compound rate of 64 per cent. The population density would have averaged 16-17 persons per household or more than four persons per house room.

Even allowing for the proliferation of backyard shacks, these Kuisebmond figures are extreme: such densities would be barely sustainable within the present housing infrastructure and do not conform to the visual observations of the survey teams, which visited all sections of the township. The survey results, based on random sampling and a house count, are therefore preferred as more reliable and do in fact expose residential densities in the main suburbs that are high by any standard. Between 1991 and 1995 the Kuisebmond population excluding the compound is estimated to have increased by 10,500 to 16,000 at a compound annual rate of 32 per cent.

The estimated mean total population of the west coast region for 1995 was thus just under 65 000. The total urban population, which includes Langstrand as part of Walvis Bay but excludes Wlotzkas Baken, was 63 300 or close to 98 per cent of the region's total. The small rural population of about 1 500 (2.3 per cent) is divided between about 500 in the Topnaar community of the Kuiseb valley, another 500 at small mine sites and the remainder scattered between smallholdings, coastal facilities and institutions.

Breaking down the urban population, Walvis Bay accounts for 53 per cent, Swakopmund for 33 per cent, Arandis for 7 per cent and Henties Bay for 5 per cent (see table H3 and figure 1). The two major towns thus accommodate the great majority of the region's urban population (86 per cent).

Although the 1991 census-based and 1995 survey-based estimates are not strictly comparable, the increases give a broad indication of the differing rates of growth. The overall increase in the urban population was 38 per cent (see table H4 and figure 4). However, Walvis Bay expanded much faster than Swakopmund (66 to 11 per cent), mainly as a result of the influx after reintegration into Namibia in 1994. Henties Bay doubled its size, although from a low starting base and less from the growing number of year-round rather than seasonal residents in the Town suburbs than from the rapid expansion of Omdel. Arandis, which suffered major job losses in 1991 as Rössing Uranium Ltd (RUL) contracted its workforce, has been more or less static over the period.

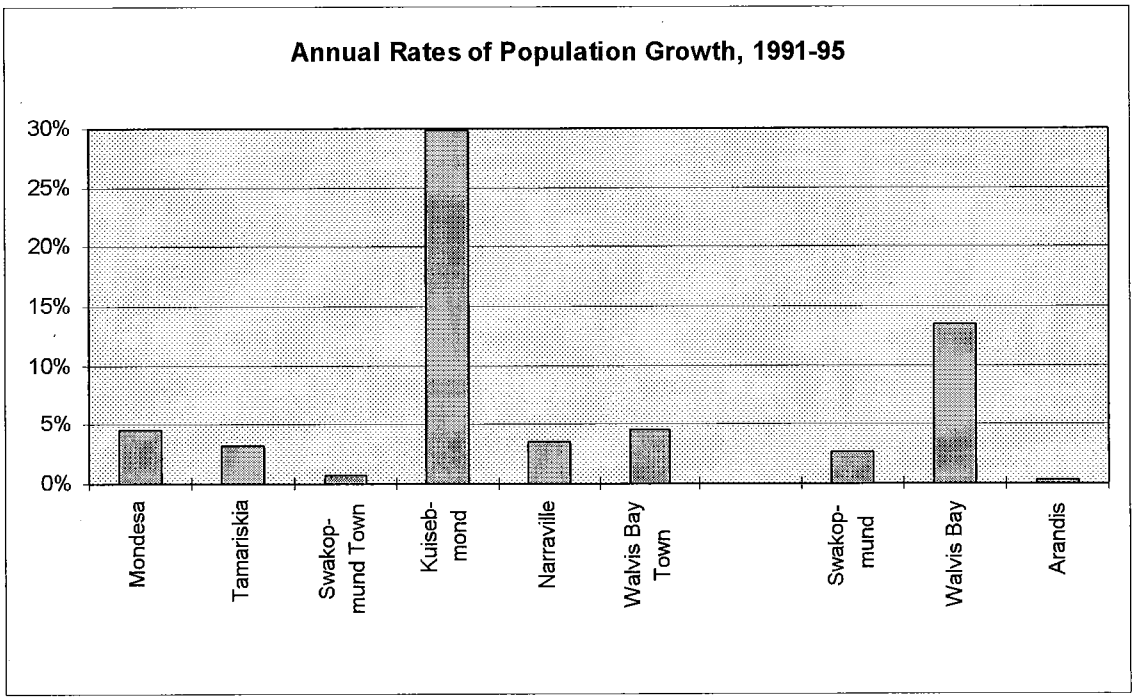


Figure 4

Within the towns the low income suburbs have expanded much faster than the rest, by 38 per cent in Mondesa and by double in Kuisebmond. In Swakopmund the single quarters probably absorbed more of the influx than the residential housing (69 to 19 per cent), but the reverse was the case in Walvis Bay after the mass police raids of 1994 and 1995 to clear shanty structures from the single quarters and unauthorised residents from the compound. Many have gone into houses and backyard shanties in the residential quarters of Kuisebmond, which may now be accommodating more than double their 1991 population. Excluding the single quarters, the residential low income suburbs expanded by 89 per cent

overall. At the other end of the scale the high income suburbs tended to expand slightly faster than their middle income counterparts (19 to 10 per cent), the bulk of the increase being in Walvis Bay.

The former colonial suburban hierarchy, previously based on race but now increasingly on income and wealth, still dominate residential life. The two big towns have a three-tier structure, Henties Bay two and Arandis, still predominantly a company town, has a fairly uniform middle income profile. Residents of the low income suburbs (Mondesa, Kuisebmond, Omdel) form the majority of the urban population with 56 per cent; although numbers fluctuate seasonally, roughly 34 per cent live in residential sections and 21-22 per cent in single quarters. Residents of middle income suburbs (Tamariskia, Narraville, Arandis) comprise another 19 per cent while the high income or Town suburbs accommodate 25 per cent, mostly in detached houses.

If the single quarters are excluded, the breakdown was 43, 25 and 32 per cent respectively, providing a reference point for the household survey results. The total residential population, averaged over 1995, was 49 395 (see table H4). For the survey period of mid-1995, with some variations in the assumptions and a slightly different area distribution, the residential population was estimated at 49 426 (see table H5).

2.2 Main and Additional Languages Spoken

The household survey included a question on main and second languages spoken in the household. At just under 60 per cent the most frequently spoken languages were European with Afrikaans alone at 45 per cent of all households. English was the most frequently spoken language in 8 per cent of households, German in 6 per cent and Portuguese and Spanish in only 0,4 per cent. In the 40 per cent of households using indigenous languages Nama/Damara was the highest at 18 per cent and OshiWambo was 17 per cent. Apart from OtjiHerero at 5 per cent no other European or indigenous language was above the 1 per cent level.

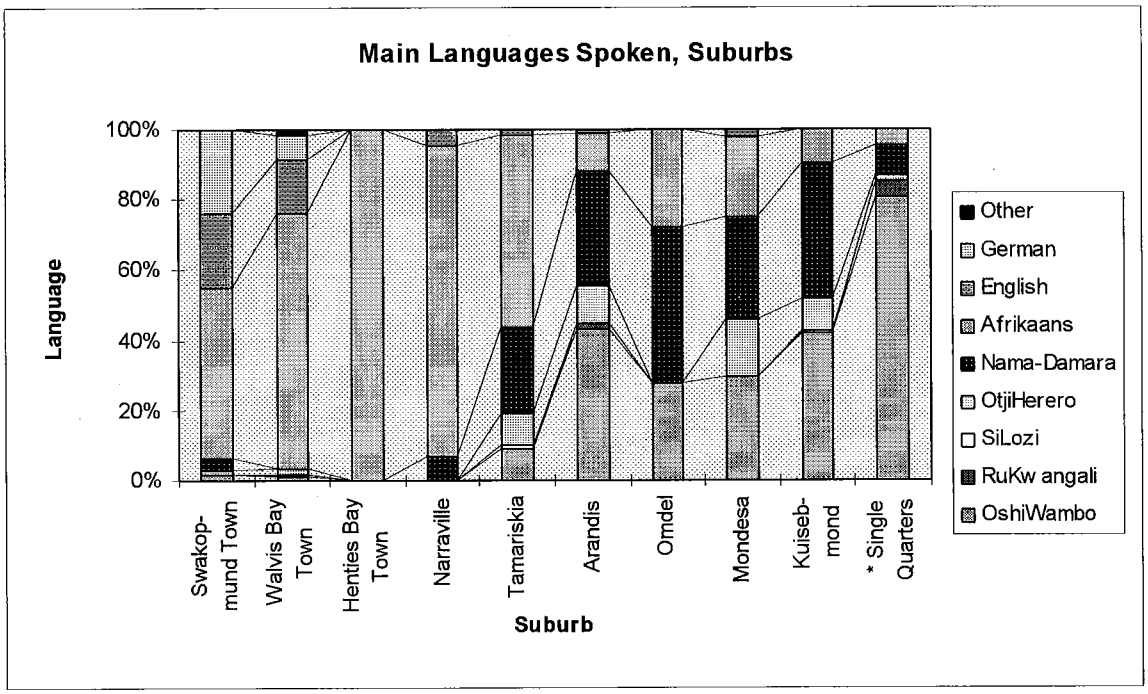


Figure 5

This distribution reflects the position primarily in the main house of the residential suburbs and as will be seen later (see section 7) the language pattern is very different in the single quarters. As might be expected there were strongly marked differences at the income and area levels (see table H6 and figure 5). In the low income suburbs OshiWambo and Nama/Damara each accounted for more than a third of households. Afrikaans and OtjiHerero also featured (16 and 9 per cent) but no other language exceeds 1 per cent. In the middle income suburbs Afrikaans was dominant (55 per cent) but both Nama/Damara and OshiWambo were also significant (19 and 16 per cent). In the high income suburbs European languages predominated (94 per cent) with Afrikaans again in the lead but English and German also significant (62, 17 and 14 per cent). Only small numbers spoke the main indigenous languages. Of the main European languages Afrikaans was the only one to straddle the income divides and was even then a minority first language in the low income suburbs. English and German were exclusively concentrated in the high income suburbs.

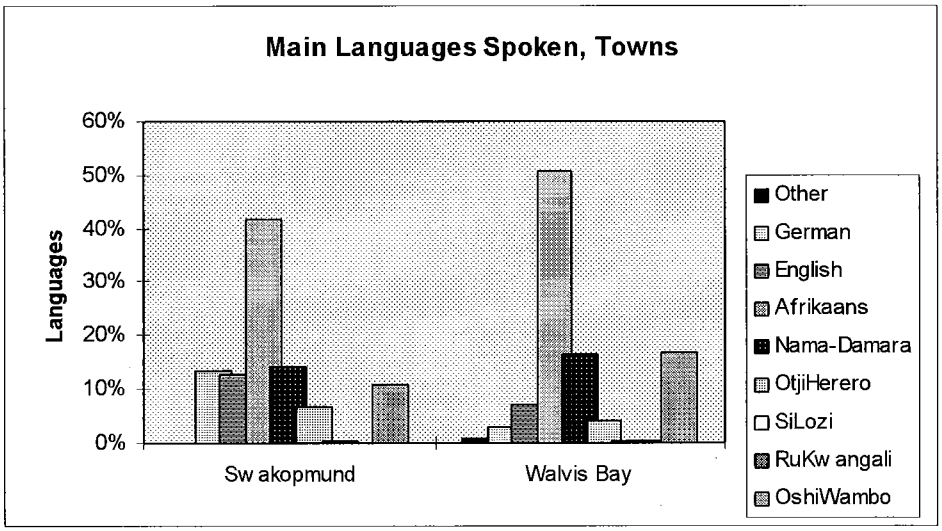


Figure 6

At the area level (see figure 6) it is noticeable that both OshiWambo and Nama/Damara were more prominent in Kuisebmond and Arandis than in Mondesa, where Afrikaans and OtjiHerero were also more common as the main language. Greater diversity was also evident in Tamariskia (Nama/Damara, OtjiHerero and OshiWambo) than in Narraville where Afrikaans was universal. Nama/Damara was the dominant language in Omdel with Afrikaans and OshiWambo also prominent. In the town suburbs Afrikaans was the main language in three-quarters of households in Walvis Bay and Henties Bay and half of households in Swakopmund. Here German was spoken in a quarter of households and especially in Swakopmund Central and Kramersdorf (50 and 39 per cent). English was a fairly steady 10-25 per cent across the Town suburbs but below 10 per cent everywhere else.

Many households were multilingual (see table H7). Of other languages sometimes spoken in the household English was the commonest at 68 per cent and Afrikaans not far behind at 53 per cent. No other language exceeded 10 per cent. European rather than indigenous languages were thus by far the commonest secondary means of communication.

Only 15 per cent of households said that no second language was sometimes used in their households. (see table H8). More than half used one additional language and a quarter used two. Smaller numbers used three and four second languages (5 and 1 per cent).

2.3 Seasonal Influences on Population and Water Demand

Seasonal factors exert a major influence on the size of the urban population at the coast over the year and from one year to the next. There are two large seasonal influxes: of migrant workers to the pilchard canning season (currently March to May or June); and of tourists and visitors during the summer season (December-January). There is also a significant exodus, mainly from the low income communities, over the summer holiday. Secondary influxes of visitors and tourists affect mainly Swakopmund and Henties Bay during Namibian and South African school holidays and during peaks in the sport angling cycle. Overseas tourism also peaks in December and January.

Since the peaks and troughs do not all coincide, the net effects over the year are somewhat attenuated. However, variations in the net totals do not tell the whole story. Most of the influx over the holiday season of December/January comprises high water consumers - tourists, visitors and periodic residents. Associated increases in water consumption are also likely in garden watering activity and in the catering and tourist trades. The extra seasonal demand is concentrated in Swakopmund and especially Henties Bay, which experiences a short, extreme peak of demand as the population swells to perhaps three times its permanent level. Walvis Bay is relatively unaffected since tourism is as yet in its infancy and the net balance of private visitor flows is probably fairly neutral.

Walvis Bay has its peak 3-4 months later when thousands of short-term contract workers arrive for the pelagic fish processing season. They are amongst the lowest unit consumers of water and generate little associated demand since most of their daily cycle is located inside the fish factories and the dormitory compound. Water consumption by the large canning and fishmeal factories follows the same time-cycle. The year-on-year scale of human and factory demand in the pelagic fish processing industry is volatile in a sector depending on fish quotas subject to sudden large increases and cuts. Typically the canning season, source of most of the employment and water demand, lasts only 2-4 months. If pilchard quotas are low, companies may pool their operations in one factory, extending the season but reducing the number of workers and processing throughput. If all are put into production, the incidence of water demand hits a much higher but more shortlived seasonal peak.

Arandis experiences no significant seasonal influences and fluctuations elsewhere are fairly minor. In general, the pattern is gradually becoming more complex. Tourism is expanding in Walvis Bay. Growth in the sector as a whole has been steady if unspectacular and sources of tourists have diversified with a greater proportion coming from overseas and on higher spending budgets. The secondary peaks of demand have been diversified by the divergence of Namibian and South African school holidays. There is also a significant second angling peak centred on Henties Bay in March and April, where the growing number of houses occupied for most or all of the year has been gradually stabilising the population of the Town areas. Generally, the impact of proliferating seasonal influences will be to smooth the net volume of water demand on the supply system; however, the two major seasonal peaks, turn-of-year summer tourism and the March-June pelagic fishing season, will remain large components of water demand for the foreseeable future.

2.4 Population and Housing Densities

Urban population and housing densities vary enormously across the region, less between the towns than with household income levels. Generally, the poorest residential households have the smallest plots, the smallest houses and the highest population densities. More than a fifth of the entire urban population still live in what are euphemistically called 'single quarters', barrack-like accommodation designed to implement the segregationist policy of urban 'influx control' by providing dormitory sleeping shelters for supposedly temporary single workers from the rural reserves.

The size and distribution of residential plots is discussed in more detail in another section (see table H29). Comparing the suburban areas of the two principal towns, the mean sizes of residential plots are

fairly similar except for the Town suburbs where at a mean of 1540 m^2 Swakopmund is 20 per cent larger than Walvis Bay (see figure 7). But the socio-economic contrasts are stark. Excluding the single quarters, the low income areas (Mondesa and Kuisebmond) have a mean plot size of 494 m^2, which falls below 400 m^2 in western Kuisebmond; the middle income areas (Tamariskia and Narraville) have a mean twice as large at 1028 m^2; and in the high income Town areas plots are larger still at 1466 m^2 and between 1800-2000 m^2 in the most affluent suburbs of Kramersdorf and Meersig.

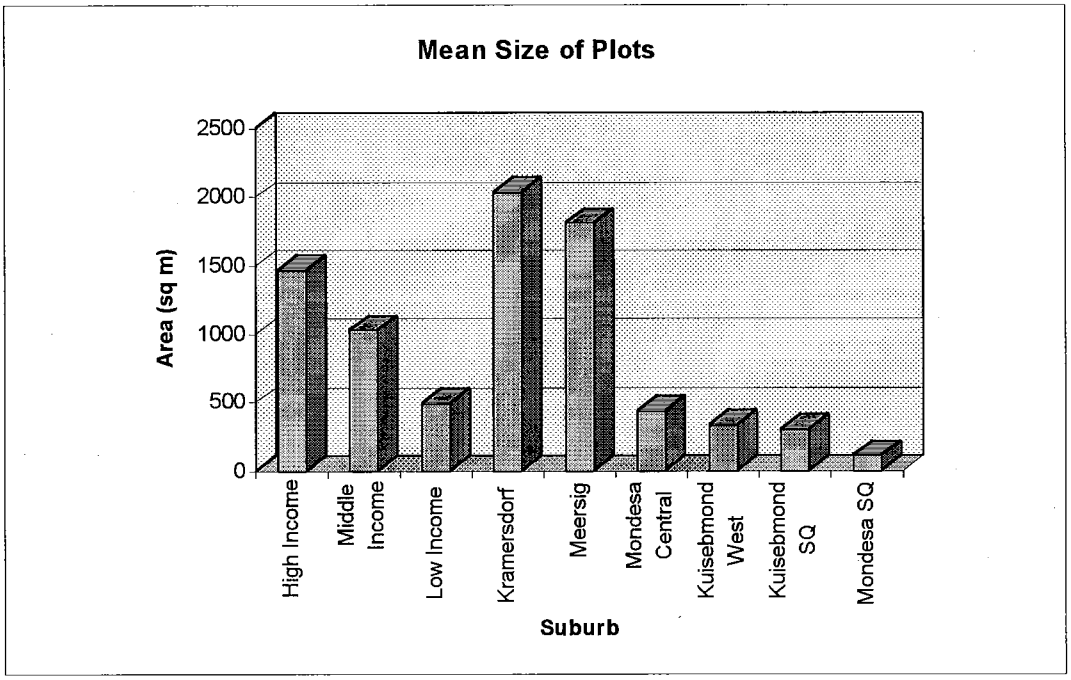


Figure 7

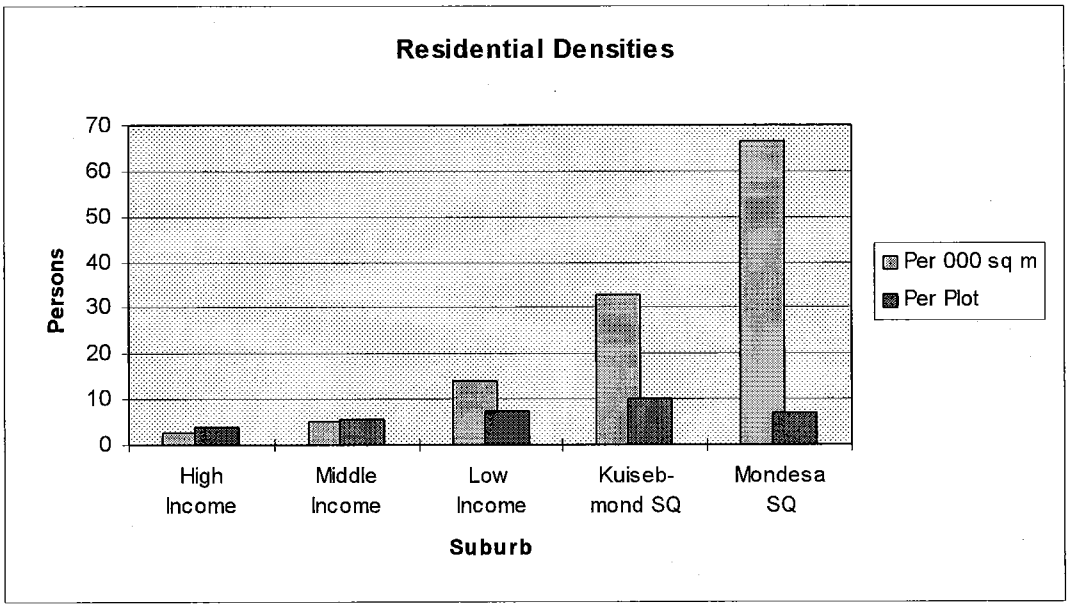


Figure 8

The distribution of population densities is in reverse order (see table H30 and figure 8). The high income suburbs have a persons per plot ratio of 4,0, which is little more than half the 7,6 persons/plot

of the low income suburbs and two-thirds the 5,7 persons/plot of the middle income suburbs. In Kramersdorf and Meersig the ratio is lower still at below 3,5 persons/plot. In other words, the smaller the plot size, commonly the more people live on it. The result is an extremely steep gradient of population density. Although they should be taken as very approximate, the mean number of persons per 1000 m^2 reaches as high as 14,1 in the low income areas, three times the density of 5,1 in the middle income areas and six times the density of 2,5 in the high income areas (see table H29). To illustrate the contrast of extremes, if the prevailing densities of old central Mondesa and western Kuisebmond were applied to a plot of average size in Kramersdorf, it would accommodate not the present mean of 3,3 persons but between 35-45 persons.

These patterns cover suburban residents of Swakopmund and Walvis Bay living on plots with detached or semi-detached housing or apartments, who form the great majority of the region's urban population. The survey returns indicate that 80 per cent of residential households were living in detached units, 13 per cent in town houses[4] and 4 per cent in semi-detached units.

But the approximately 20 per cent still accommodated in single quarters are even more crowded. The Mondesa single quarters section has a density over 60 persons per 1000 m^2, which is exceeded in the Walvis Bay compound and old single quarters when fully occupied. In Arandis the densities approximate to those of Tamariskia and in Henties Bay Town to the Town areas of Swakopmund and Walvis Bay. In Omdel, which is a mixture of shanty and permanent structures, densities vary but are very high in the central parts of the settlement.

The size and quality of housing generally follows a similar pattern: the higher the population density, the smaller is the size of house. Most of the pre-independence housing stock in the former 'Coloured' and 'Black' townships was system-built to a uniform utilitarian style. In the older sections of Kuisebmond and Mondesa, which accommodate most of their populations, there are usually four small rooms per house. It is here that backyard shanty structures built of rough wood, plastic sheeting and corrugated iron are most common. As a company town, Arandis is also system-built but to a more sophisticated style and higher standards.

The single quarter blocks at Arandis are small and dispersed through the township, unlike Swakopmund and Walvis Bay where they are large and confined within segregated blocks. The municipal compound, used primarily to house male seasonal contract workers for the large fishing companies, is a closed prison-like structure with a control gate. The rooms have either 16 or 28 sleeping bunks and very little else, with virtually no private or communal social facilities inside the compound. The old single quarters blocks in Mondesa and Swakopmund do not have restricted entry and accommodate as many families as single persons, often more than one family to a small room. The same applies to the new single quarters in Kuisebmond, which are small semi-detached houses more widely spaced on open land.

In the Town suburbs on the other hand there is very little system building except perhaps in parts of eastern Vineta. In the old central suburbs around the CBDs the housing stock is an eclectic mixture of old, improved and new buildings, some of the older houses, especially in Walvis Bay, being unimproved and very basic. In the newer suburbs, mainly eastern Walvis Bay, Vineta and Henties Bay, the stock is mainly modern, to a larger size and with better infrastructure. A few medium-sized houses can be found in the top-end suburbs of Kramersdorf and Meersig but most are large and sometimes opulent in style, being often big enough to cover a half or more of their plot. Townhouse complexes, a small but growing component of the housing stock, are generally laid out to a high density plan and have much smaller units than the surrounding detached houses.

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4. Probably an overestimate which includes individual houses grouped together or behind high walls or fences. Integrated complexes on sectional title are uncommon and were not included in the survey.

The number of beds in the main house on the plot gives a reasonable indication of its accommodation capacity. Throughout Kuisebmond and Mondesa the use of all rooms for sleeping is widespread, including sitting rooms and kitchens. In many case respondents will have included them as rooms used for sleeping. In the middle and high income suburbs on the other hand the separation of room functions is well established and the count of sleeping rooms will usually refer to separate bedrooms. The town averages of bedrooms per house come out similar (2,8 in Swakopmund, 2,6 in Walvis Bay and 2,7 in Henties Bay) except in Arandis (3,5). Mondesa is much lower at 2,2 and Kuisebmond lower still at 1,8 while the Town areas average 3,0 and 3,4 respectively (see table H14). Generally, the middle and high income suburbs have similar sleeping capacity in the main houses (3,0 and 3,2 bedrooms per house) and the low income suburbs much less (1,9 bedrooms per main house), reflecting the much smaller house size.

The mean number of residents per main house is close to 6 in all the low and middle income suburbs except Narraville (5,2) and Omdel (4,7) (see table H9a and figure 9). In the high income suburbs the mean is nearly half as much at between 3,6. Generally, low income houses are severely overcrowded; middle income houses accommodate the same number of people but are larger; while high income houses are larger still but accommodate fewer people. These housing densities show up in the ratio of residents per bedroom, which is close to 3 in the low income suburbs, to 2 in the middle income suburbs and to little more than 1 in the high income suburbs (see table H14). There, the pattern is one person per bedroom; in poor households, it may often be one family per bedroom.

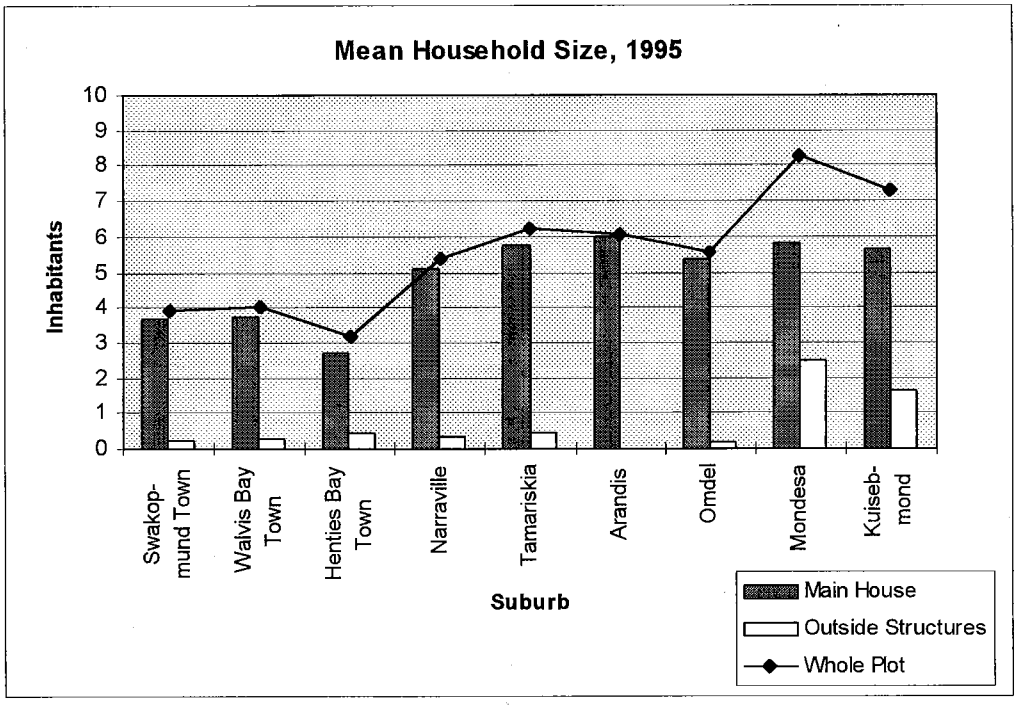


Figure 9

The majority of residential plots have a single house with one water connection. But an appreciable number in the high income suburbs have added servants quarters or flats with separate amenities while in the low income suburbs backyard shanties have proliferated whose occupants commonly rely on the already overcrowded amenities of the main house. A rough count was made of structures outside the main house which although far from comprehensive gives some indication of their type and prevalence (see table H15). In the older sections of the low income suburbs backyard shanties are very common.

The incidence in Mondesa Central and East was 42 and 53 per cent of plots and in Kuisebmond Central and North it was 25 and 28 per cent.

These incidences are probably undercounted and other outside structures are also used for sleeping quarters. In Mondesa 31 per cent of households had shanties but another 21 per cent had outhouses of more permanent construction many of which were probably used as sleeping quarters (see table H15). A third of households in the Town suburbs of Swakopmund and Walvis Bay had outhouses or detached flats and an appreciable number also had flats attached to the main house which would commonly be servant's rooms (21 and 12 per cent). A quarter of Town households had garages but few in the middle and low income suburbs except for Narraville. Few garages were therefore probably used as sleeping quarters. Mobile homes or caravans were scarce.

It is thus common on the small plots of Mondesa and Kuisebmond to build backyard rooms. Counting the number of households indicating that people slept elsewhere on the plot outside the main house, 61 per cent in Mondesa Central and 58 per cent in Mondesa East had external sleeping quarters; in Kuisebmond the proportions were lower but still substantial (33 per cent in Central and 41 per cent in West). The middle income suburbs had generally low ratios but in the high income suburbs around a quarter of households had people sleeping externally in Vineta West and in South and Central Walvis Bay.

The survey attempted to distinguish main and secondary structures, although the responses undoubtedly understate both the incidence and the numbers of those living outside the main house. By far the largest numbers are found in Mondesa and Kuisebmond (2,5 and 1,6 persons per plot respectively). In Mondesa the mean number of residents outside the main house made up 34 per cent of the total population and in Kuisebmond 22 per cent (see tables H9a and H14). By contrast Arandis, Narraville and Omdel were, for differing reasons, very low and the remaining middle and upper income suburbs were between 6-9 per cent.

The density ratios reflect the very different dominant uses of the external structures (see table H14 and figure 10). Sleeping densities appear more intense inside the main house in Kuisebmond than in Mondesa (3,2 to 2,7 persons per bedroom), but the position is reversed for outside sleeping places (2,3 to 3,3 persons per bedroom). The combined ratios are close (3,0 to 2,9) and Omdel was not far behind (2,4 persons per bedroom). About 55 per cent of outside residents were described as family or relatives and 40-45 per cent as tenants, whose numbers are probably understated (see table H13). The 'room' is commonly a small corrugated iron or cardboard and plastic shanty, placing even greater pressure on social space and amenities in the main house. In the middle income suburbs where few slept externally, tenants predominated in Tamariskia and were similar to family at about half in Narraville.

By contrast in the Town suburbs the ratio of persons per bedroom was close to one. These low use ratios tend to indicate considerable spare capacity for paying guests, visitors and relatives, absent when the survey was taken at the winter seasonal low point. Here, just over half of people sleeping outside the main house were servants, another 32 per cent were tenants and only 16 per cent were described as relatives. The lowest main house ratio of 0,8 persons per bedroom was in Henties Bay Town where also the number sleeping externally had the highest proportion of servants (80 per cent), averaging about one for every three occupied houses, many of course been empty at the time of the survey.

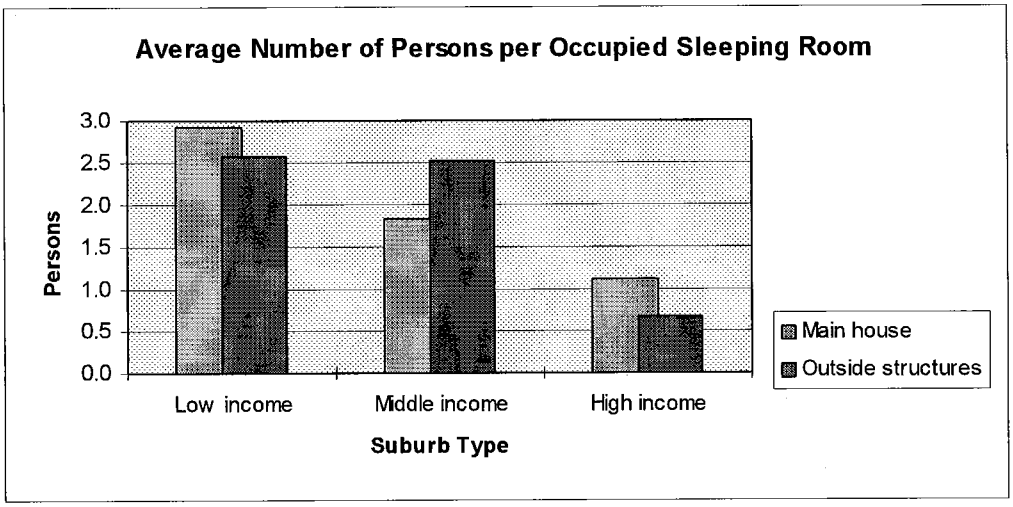


Figure 10

2.5 Age Structure and Dependency Ratios

Respondents were asked to give age information on all people usually sleeping in the main house and separately for those sleeping elsewhere on the plot. The age bands were under 14, 14-17, 18-64 and 65 and over. It is likely that the numbers sleeping outside were under-recorded, especially for large households with backyard shanties. Nonetheless the number of don't knows and no replies was very low (0,3 per cent) and the data permit a simple but reasonably representative age analysis of the urban population.

The following analysis considers the main household, excluding other residents on the plot, and takes the urban population excluding the single quarters. For the region as a whole the proportion aged under 14 years was 26,5 per cent, which is below the national average for the urban areas (see table H9b and figure 11). Both Swakopmund and Walvis Bay were close to this mean but Arandis was much higher at 34 per cent. There are more pronounced variations at the suburban level. The highest ratios were in the middle income suburbs. Tamariskia, Narraville and Arandis were all in the 29-34 per cent range and eastern parts of Narraville were as high as 37 per cent. In the low income areas the older suburbs of central Mondesa and western Kuisebmond had fairly low ratios (28 and 24 per cent) but there was considerable variation between the suburbs.

In the Town areas the ratios are generally lower. The older inner suburbs are generally around 25 per cent and the affluent suburbs of Kramersdorf, northern Vineta and Meersig lower still at 20-22 per cent. However the newer suburbs in eastern Walvis Bay and eastern Vineta are higher (27 per cent), pointing to a younger family profile. Correspondingly, Vineta West, which includes the coastal strip, was low at 18 per cent and Henties Bay Town lower still at 16 per cent.

The proportion of the urban population aged 65 and over is 3,1 per cent which is close to the national urban average of 3 per cent. On the whole those suburbs with a high proportion of children had a lower ratio of elderly. This applies in most of the newer and middle income suburbs, while the older central suburbs generally had higher ratios. But the patterns are not well defined and there are local variations. Several areas have both low proportions of children and much higher proportions of elderly. The include coastal Vineta, Kramersdorf, the northern inner suburb of Walvis Bay and Henties Bay, all of which have ratios above 10 per cent. These suburbs have a high concentration of retired people and are generally more affluent, although northern Walvis Bay is an exception with a middle income profile.

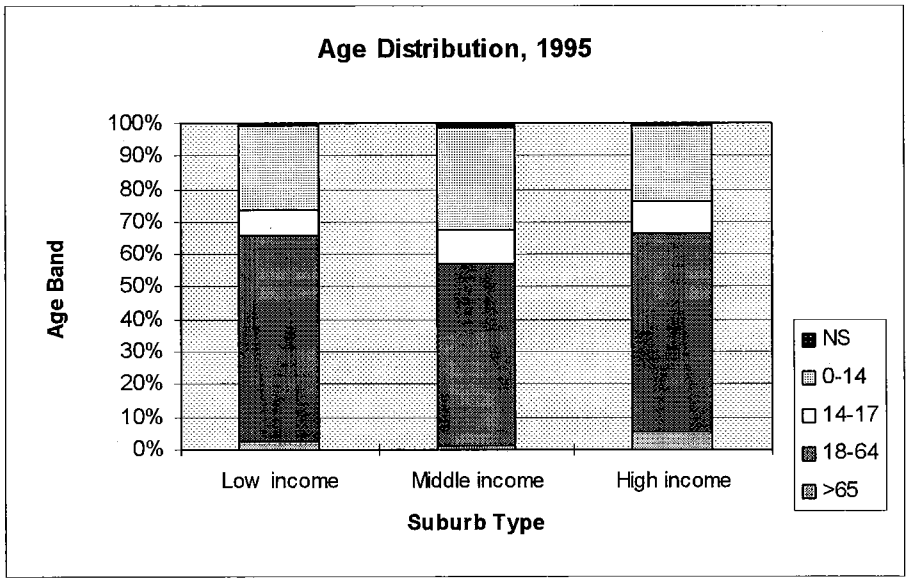


Figure 11

The analysis has to date considered residents of the main house in the residential suburbs but substantial numbers in the two principal towns reside elsewhere on the plot. They comprised 18 per cent of the residential population of Swakopmund and 16 per cent in Walvis Bay. As argued elsewhere, the survey responses probably captured more complete demographic data on the main house than on residents elsewhere on the plot and the incidence of backyard residence could be even higher. The age breakdown of the backyard population, despite probably understating the number of children, indicates that most were people of working age (18-64 years), 72 per cent in Mondesa and 82 per cent in Kuisebmond. Children were few and the elderly virtually absent.

The data are insufficient for a precise calculation of dependency ratios, which require a detailed correlation of educational, economic activity and income status beyond the scope of this sample survey. However, variations in the proportion of the population below 18 and above 65 give some indication of the work-age population (see table H9b). The rate was lowest in Walvis Bay and highest in Arandis (38 and 46 per cent), but there were much wider variations at the suburban level. Mondesa was some 5 per cent above Kuisebmond with higher proportions of both children and elderly. A similar difference, attributable largely to a higher proportion of children, applied between Tamariskia and both Narraville and Arandis, although Narraville had marked internal variations between east and west. In the Town suburbs the ratios were close (39-41 per cent). The highest ratios (45 per cent and above) were found in coastal Vineta and Walvis Bay North, where an absence of children and a high proportion of elderly were the main factors. Henties Bay provided a contrast within moderate ratios, Omdel having a high proportion of both children and young adults but few elderly, while the Town had few children but a high proportion of elderly (16 per cent).

Differences at the income level are thus not clear-cut. In both Walvis Bay and Swakopmund the Town areas have a much higher proportion of elderly and a lower proportion of children than the middle and low income suburbs. The working age populations were largest in the low income suburbs and smallest in the middle income suburbs (63 and 55 per cent), which is a fairly narrow range. But it should be remembered that the single quarters with their much more predominantly young adult population do not appear in these balances.

Although several years out of date the 1991 census tables, adapted to the suburb boundaries, allow the calculation of approximate dependency ratios. Dependency is defined here as all those not either employed or declared unemployed, excluding no answers. It thus includes not economically active

adults with children and elderly. The overall urban rate comes out at 45 per cent with quite a wide spread between the towns ranging from the lowest, Walvis Bay, at 41 per cent up to the highest, Arandis, at 57 per cent (see tables H10 and H12 and figure 12).

Differences at the area and suburb levels play a big part. In Walvis Bay the all-male compound was full at the time that the 1991 census was enumerated in March 1991 and the 4635 residents, forming 22 per cent of the town's population, were counted as all economically active and in employment. The adjacent single quarters, accounting for another 4 per cent of the population, had a dependency ratio of only 12 per cent. In the Mondesa single quarters the ratio was 23 per cent. Taken together, in 1991 the compound and single quarters accounted for 23 pr cent of the combined population of Walvis bay and Swakopmund and housed an overwhelmingly working population with a dependency ratio of only 10 per cent. Excluding the single quarters and compound, residential Kuisebmond had a dependency ratio of 57 per cent, well above residential Mondesa's 51 per cent. Residential Walvis Bay rises to 55 per cent and close to Swakopmund's 54 per cent.

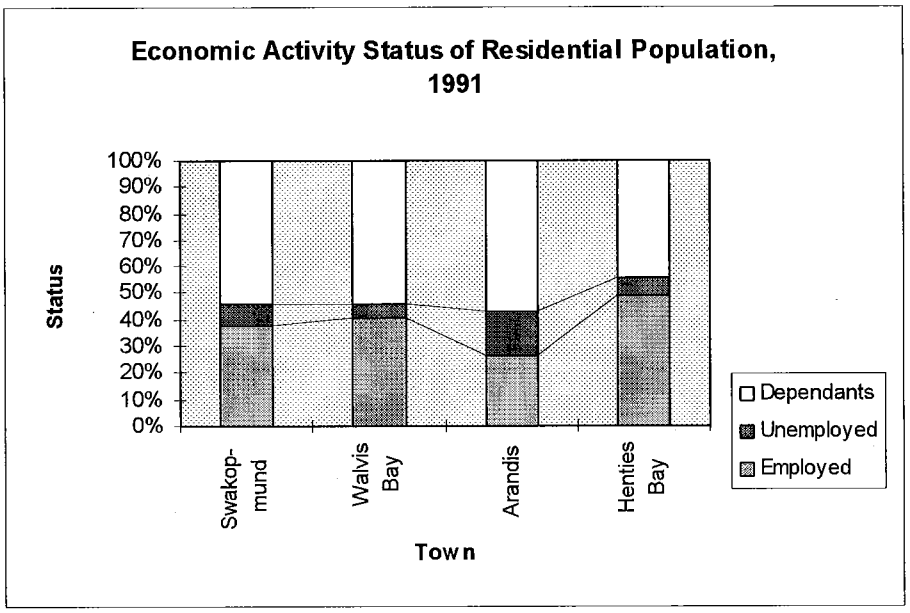


Figure 12

The middle income areas had high dependency ratios ranging between 57-61 per cent and well above the ratios for the low income suburbs. The Town suburbs are lower but more diverse: Swakopmund is substantially higher than Walvis Bay (55 to 49 per cent) but well below the region's highest ratio, 67 per cent in Henties Bay Town. Henties Bay also had the lowest residential dependency ratio of 35 per cent in Omdel, a settlement still in its formative phase and with a mainly adult population.

Both 1991 censuses gave figures for open unemployment. The definition of unemployment is fraught with problems of methodology and interpretation of responses. The census figures very probably understate the true extent of unemployment and could not of course capture the vagaries of seasonal and employment. The unemployment rates generated by the South African census for Walvis Bay are in particular suspiciously low although at the time many jobseeking Namibians preferred to base themselves outside the then South African-administered enclave. The overall rate for residential Walvis Bay (excluding the single quarters) was 5 per cent which compares with 8 per cent in residential Swakopmund, 7 per cent in Henties Bay and 17 per cent in Arandis. In the older central part of Mondesa the rate was much higher at 16 per cent and higher still at 20 per cent in the single quarters,

which compares with only 5 per cent in the Kuisebmond single quarters. In Tamariskia and Narraville the rate was moderate at 7-8 per cent and very low in the Town suburbs at 2-3 per cent.

The counterpart to the dependency and unemployment ratios is the proportion recorded as being in employment, which includes employees, the self-employed and employers. The overall urban mean in 1991 was 47 per cent of the population, reducing to 38 per cent when the single quarters are excluded. Residential Mondesa and Kuisebmond were close to the mean (36-37 per cent), Tamariskia and Narraville well below it with their high dependency ratios (31-33 per cent) and Arandis lower still with high dependency and high unemployment (26 per cent). The Town area of Swakopmund was correspondingly well above the mean and Walvis Bay higher still (42 and 49 per cent). The low employment rate in Henties Bay Town (31 per cent) reflects in particular the retirement status of an appreciable section of the small year-round population.

3 RESIDENTIAL WATER DEMAND

3.1 Municipal Water Accounts

The analysis of municipal water accounts permits a number of conclusions to be drawn regarding the present geographical and social pattern of water consumption. The data was extracted from the central computerised records of the four local authorities, Swakopmund, Walvis Bay, Arandis and Henties Bay and therefore does not cover small rural settlements or rural consumption supplied direct by the Department of Water Affairs (DWA). Water accounts are treated here as equivalent to connections.

Although all the local authorities use the same accounting software package, the coverage and quality of the data varies considerably. Henties Bay does not apparently keep historical records of water meter readings and so no direct analysis of past water consumption was possible. Arandis does keep such records but they are in considerable disarray and it proved impossible to derive a complete set of customer records; coverage is roughly 75 per cent of the total. The position is further complicated by the fact that a substantial minority of the houses are wholly or largely unoccupied, a situation confirmed by the field survey teams in mid-1995. The Walvis Bay records have large gaps before October 1994 when the system was transferred to new hardware. Swakopmund is the most complete. However, internal consistency checking exposed an appreciable number of errors in the data records from both Walvis Bay and Swakopmund. These have been ironed out as far as possible but a degree of approximation is unavoidable in the analytical results. In general, the aggregate results are close to those derived from other sources, such as DWA bulk supply, but are not identical and due caution is necessary in making cross-comparisons.

Despite the technical difficulties, the objective of preparing comparable sets of customer records for the year July 1994 to June 1995 was largely achieved in respect of Swakopmund and Walvis Bay and to a more limited extent for Arandis. Since no classification is assigned for the type of account, the records were coded individually and residential accounts were distinguished from other commercial and business accounts. The single quarters and compound in Swakopmund and Walvis Bay are handled in the database as block accounts and it was not possible to distinguish single occupation units of water consumption. The single quarters are therefore excluded from the analysis of residential accounts and separately assessed. The same applies to identifiable blocks of flats or apartments, of which there are few in Walvis Bay but more in the tourist centre of Swakopmund. Because it was often difficult to interpret the records an independent count of such apartment blocks was made by street observation.

Plot counts were undertaken for the four towns based on the respective town plans and supplemented from other map sources indicating land-use zoning and legal property boundaries. An attempt was made to identify developed and vacant plots, 'developed' being defined as having buildings of any kind. While the Walvis Bay town plan distinguishes developed from undeveloped erven the others do not and the proportion of developed plots was estimated from a variety of other information and an assessment of seasonal movements of resident population, migrant workers and visitors. The survey teams also checked the incidence of vacant plots during the fieldwork. The plots were further disaggregated between residential and non-residential uses from land-use data cross-checked by line of sight mapping of the CBDs and suburban shopping centres.

The correlation between the numbers of developed residential erven and residential water accounts is surprisingly close for Swakopmund and Walvis Bay, the account totals being respectively 8 per cent and 2 per cent higher. In the high income suburbs, labelled 'Town' for ease of reference, an appreciable number of properties have more than one water account. Some may have been sub-divided without a change of legal ownership but in many cases the additional accounts are likely to be for attached or backyard flats with either low continuous rates of usage or occupation during only limited periods of

the year. Accounts with zero water consumption, which are concentrated in the Towns, have been excluded from the count.

Arandis and Henties Bay present more difficult problems. In Arandis, a large number houses, perhaps as many as a third of the total, are empty through most or all of the year. An approximately matching number of water accounts are evidently dormant. Some named accounts show zero consumption; others marked 'vacant' indicate continuing consumption up to the final month. The residential erf count based on the town plan gives 903 developed erven, which compares with an approximate 665 residential accounts having water consumption, with another 225 either showing zero or data errors not amenable to correction by consistency checking. Taken together, the erf count and water account totals match fairly well.

For Henties Bay the water account name files give two lists, one of account-holders and the other of plot-owners. A rough count puts the number of accounts in the Town at around 1800, excluding those listed as 'erf sale', which compares with an estimated 1043 developed erven. The number of accounts seems too high given that there are few multi-apartment blocks and that the dominant housing type is one detached house per plot. The picture is complicated by the highly seasonal pattern of residence with only a few year-round residents and short periods of occupation concentrated in holidays and at weekends. A rough estimate of accounts active at mid-1995 is around 1300.

In Omdel, where residence is much more settled, the number of accounts comes to around 830 excluding 'erf sale' and including prepay meters (approx. 60), to which should be added another 180 listed as 'squatter'. Allowing for a probable large component of defunct records the number of functioning accounts may be in the region of 700. From the maps the erf count is only an estimated 351 developed plots; however, the suburb has been expanding rapidly over recent years and a sizeable number of self-built shanty houses lie outside the surveyed zone in the so-called reception area.

Based on the local authority records, the total number of residential water accounts, excluding blocks of flats and single quarters, is estimated at 10 791 for mid-1995 in the four towns of Swakopmund, Walvis Bay, Arandis and Henties Bay and comprises some 86 per cent of all connections (see table H17). The number of developed residential plots is only slightly lower at 10 156 or 10 008 excluding the small number of houses in the CBDs and industrial areas. Just under half (45 per cent) of all residential water connections are in Walvis Bay and another third (31 per cent) in Swakopmund. The remaining quarter are divided between Henties Bay (19 per cent) and Arandis (6 per cent). Swakopmund, Walvis Bay and Arandis together account for 86 per cent of developed residential plots and 81.5 per cent of residential connections.

3.2 Residential Water Consumption

Excluding Henties Bay for lack of data, the total residential consumption of water is estimated at 3,16 million m^3 in the year 1994/95, or about 48 per cent of total consumption in the three towns, excluding RUL (see table H16). The division of the total follows the pattern of connections with a slight bias towards Walvis Bay, which had 55 per cent of accounts and 58 per cent of consumption. Arandis is a relatively small factor at 7 per cent of total consumption. Thus in 1994/95 Walvis Bay consumed 1,85 million m^3, Swakopmund 1,10 million m^3 and Arandis 0,21 million m^3.

Within the towns, the distribution of consumption between the major areas is highly skewed and conforms closely to socio-economic attributes. Arandis has the housing pattern of a company town whose social uniformity is reinforced by the fact that most managerial and skilled RUL employees reside in Swakopmund. In Walvis Bay and Swakopmund, however, the socio-economic geography of housing still follows the apartheid division between low, middle and high income quarters defined largely by race, the principal exception being the longstanding establishment of eastern Vineta as a mixed coloured/white zone. There are sharp socio-economic boundaries between the suburban blocks

which serve as strong indicators of the relative affluence and poverty of their inhabitants. The current direction of social change is to loosen the racial barriers while preserving the socio-economic boundaries. Thus very few poor households are found in the Town suburbs and conversely only a handful of wealthy households are located in the black townships.

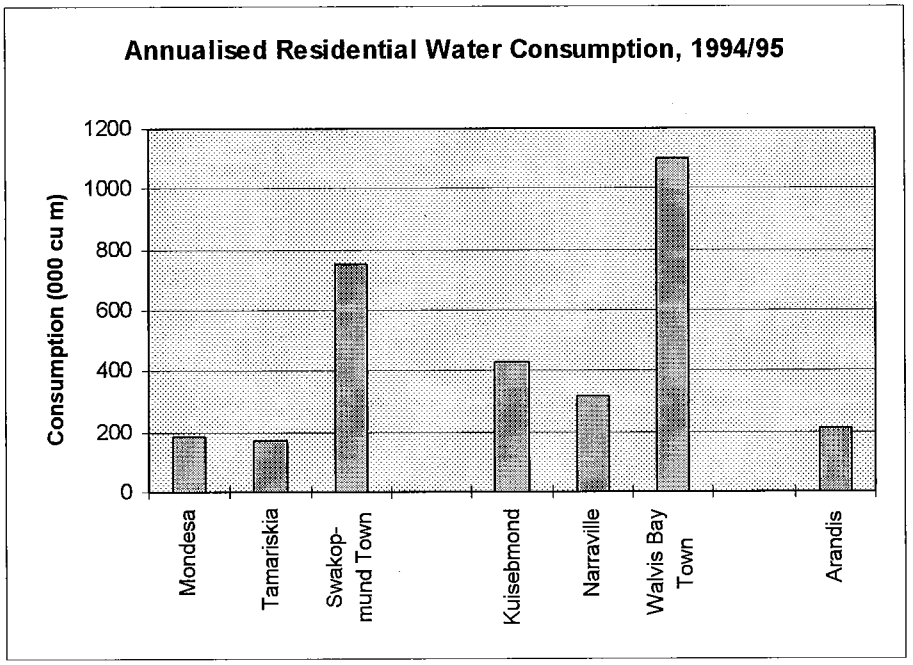


Figure 13

In 1994/95 the Town suburbs accounted for two-thirds of town consumption in Swakopmund and well over half in Walvis Bay with less than half the combined connections (see table H16 and figure 13). The skew is in fact greater since a substantial minority of Town accounts in Swakopmund are second connections to the same plot which have a much lower rate of consumption. Swakopmund Town took 0,75 million m^3 compared to 0,35 million m^3 for Tamariskia and Mondesa combined. Walvis Bay Town took 1,10 million m^3 compared to 0,74 million m^3 for Narraville and Kuisebmond. Arandis, which lies between Tamariskia and Narraville in size, consumed only 0,21 million m^3.

The pattern of suburban social hierarchy becomes clearer when areas of similar profile are grouped together (see tables H17-19). The low income suburbs (Mondesa, Kuisebmond, Omdel) had 3427 or 32 per cent of all accounts, the middle income suburbs (Tamariskia, Narraville, Arandis) had 2073 or 19 per cent and the high income suburbs 5291 or 49 per cent. The proportions are much the same when Henties Bay is excluded (31, 24 and 45 per cent respectively). By contrast, water consumption was less in the low income than in the middle income suburbs (0,62 against 0,70 million m^3) and only a third of the consumption in the high income suburbs (1,85 million m^3), which took 58,5 per cent of the total.

3.3 Household and Per Capita Rates of Water Consumption

Unit ratios demonstrate the same contrasting pattern. The mean monthly water consumption in the three towns for 1994/95 was 30 m^3 per account. The low income areas were below 20 m^3, the middle income areas in the low thirties and the upper income areas in the high thirties. The bunching of mean consumption rates within narrow ranges in the low and middle income suburbs is striking and reflects the social banding still prevalent. The relatively low rate for Swakopmund Town as against Walvis Bay (33 m^3 and 44 m^3 respectively) is at least partly explained by the higher prevalence of second connections and seasonal residence in Swakopmund, especially along the seafront and in Kramersdorf.

It must be emphasised that water consumption per plot as an indicator shows a much more muted distribution than rates per capita (see table H18 and figure 14). Using the aggregates of 1995 mean population and annualised water consumption over 1994/95, the average rate of water consumption comes out at 188 litres/person/day for residential consumers in the three towns and 170 l/p/d if the single quarters and estimated consumption at Henties Bay are included. The low income mean for residential Mondesa and Kuisebmond is only 86 l/p/d, less than half the 186 l/p/d in the middle income suburbs and less than a quarter of the 358 l/p/d in the high income suburbs.

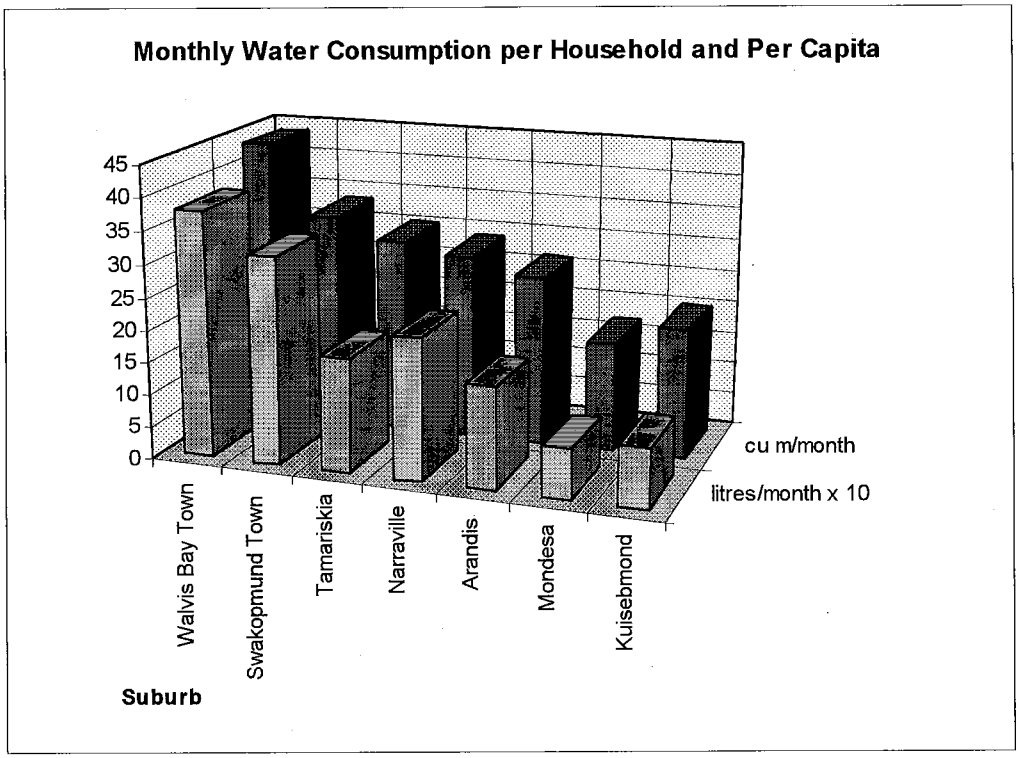


Figure 14

Extreme disparities in housing densities and dependency ratios mean that population densities per plot are much higher in the overcrowded low income townships than in the high income suburbs. These contrasts are brought out reasonably clearly when the area aggregates are broken down by rates of consumption per account. For the purposes of this analysis five monthly consumption bands were adopted: below 15 m^3, 15-30 m^3, 30-60 m^3, 60-120 m^3, and above 120 m^3. From a technical standpoint the use of bands based on the same multiple was adopted as useful for presenting the comparative results. From a socio-economic standpoint each of the bands can be seen to reflect an association of attributes, although opinions vary as to precisely which boundaries are the most appropriate for the purposes of conservation and income maximisation. Band 1, the lowest, covers basic needs consumption. A threshold of 10 m^3 is generally considered the lowest household rate avoiding real hardship and the additional 5 m^3 covers frugal additional uses. Band 2 covers the essential and reasonable discretionary needs of most poor and middle income households with at most a small or desert garden. Above 30 m^3 (band 3) and especially above 60 m^3, the proportion of discretionary consumption becomes high and commonly reflects increasingly profligate garden watering given that there are almost no garden swimming pools at the coast. Above 120 m^3 (band 5) is possible only on plots with large gardens and heavy watering unless some alternative specialised water usage comes into play.

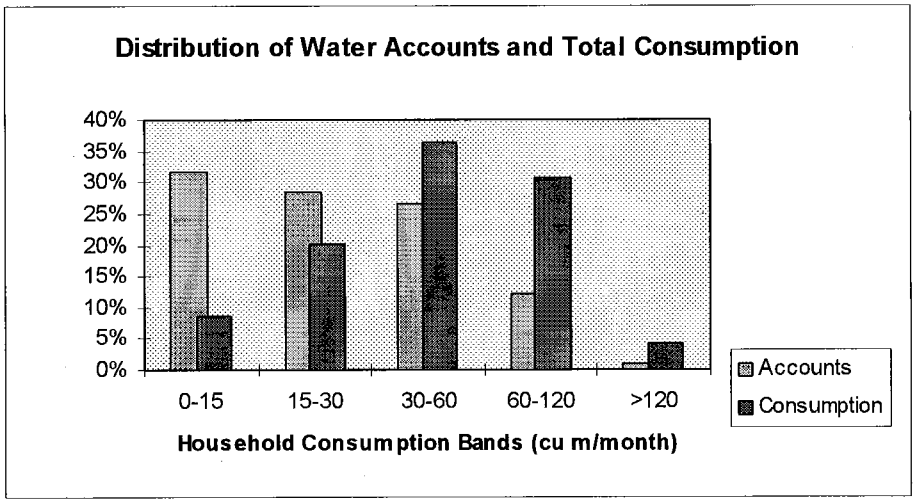


Figure 15

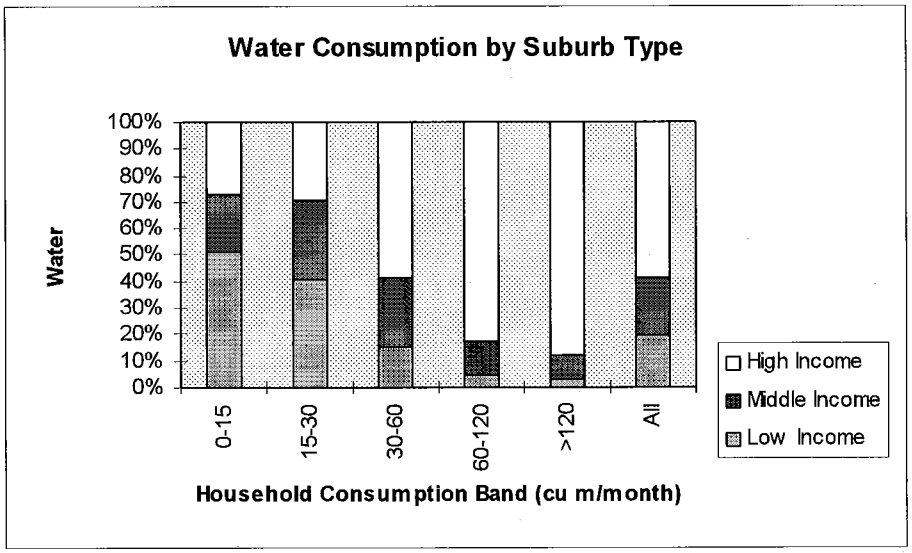


Figure 16

Taking the three towns as a whole, 73 accounts, or less than 1 per cent of all accounts, took more than 120 m^3 of water per month and consumed 4,2 per cent of all residential water during 1994/95 (see table H20 and figure 15). Another 1034, or 12 per cent of all accounts, fell within band 4 and consumed more than 60 m^3 per month, accounting for fully 31 per cent of total consumption. The large numbers in this band indicate that heavy garden watering is widespread. A quarter of the accounts came in the middle band 3 and consumed 37 per cent. A slightly larger number fell under band 4 and consumed 20 per cent. Finally, more than 30 per cent of all accounts took less than 15 m^3 per month and consumed only 9 per cent of the total. In summary, 40 per cent of accounts took more than 30 m^3 of water per month and accounted for 71 per cent of total consumption, while 60 per cent took less than 30 m^3 per month and accounted for only 29 per cent of total consumption.

A breakdown by area reveals further striking contrasts (see figure 16). In the Town suburbs of Swakopmund, fully half of total consumption was attributable to accounts in bands 4 and 5, ie above 60 m^3 per month. Band 4 was small at below 15 per cent of accounts but band 5, below 15 m^3, was

surprisingly large at nearly 30 per cent of accounts and another 10 per cent were dormant. As suggested earlier, many of these are probably second connections to guest flats or servants quarters on the plot, or else are occupied for only parts of the year. It is apparent that few resident households consume less than 30 m^3 per month and mean monthly usage would be closer to 50 m^3 if second and dormant connections were disregarded. The proportions are similar in the Town suburbs of Walvis Bay except that there are far fewer low consumers in band 5. Fully 87 per cent of residential water is taken by households consuming above 30 m^3 per month.

At the other end of the scale, in Mondesa there were very few high consumers; less than 10 per cent consumed more than 30 m^3 per month. The great majority of households fall under band 4 (39 per cent) and band 5 (45 per cent). 7 per cent of accounts had zero consumption which points to disconnections rather than dormancy given the severe overcrowding. Few households do any garden watering and the exceptions do so only on a small scale. There is little discretionary water usage that can be reduced and conversely extensive suppressed demand imposed by the cramped living conditions and limited water infrastructure. Again the proportions in Kuisebmond are very similar[5]

The middle income areas (Tamariskia, Narraville, Arandis) show a pronounced concentration in the middle bands. Tamariskia had 74 per cent of accounts and 81 per cent of consumption in bands 3 and 4 in the range 15-60 m^3 per month, with 52 per cent of consumption in band 3 (30-60 m^3). Hardly any accounts were above 60 m^3 and only 12 per cent below 15 m^3, although 7 per cent were zero accounts. In Narraville there was a similar pattern with 70 per cent of consumption in bands 3 and 4 but a slightly larger number of accounts below 15 m^3 (19 per cent). In Arandis consumption in bands 3 and 4 was also 70 per cent but the number of accounts below 15 m^3 was large at 32 per cent, perhaps reflecting the impact of unemployment and seasonal outmigration.

The area distribution within each consumption band sheds further light on the social pattern of water consumption. In band 5 the high income suburbs accounted for 88 per cent of consumption and their share was scarcely lower in band 4 at 82 per cent. In other words, at above 60 m^3 per month the middle and low income areas hardly figure. In band 3, the 30-60 m^3 bracket, the high income areas still took more than half the water but the middle income suburbs were also prominent with 27 per cent. In bands 4 and 5 the low income suburbs featured strongly with 41 and 51 per cent of consumption respectively. In both bands the middle and upper income suburbs retained a 20-30 per cent share for reasons discussed above.

5. Note that dormant (zero) accounts were counted only in Swakopmund.

4 DOMESTIC USES OF WATER IN HOUSE AND GARDEN

4.1 Inside the House

We have seen that wide disparities prevail in per capita water consumption between the major urban areas. A substantial component of the differences, probably most, are attributable to water used outside the house, mainly on gardens. This topic is taken up in the next section. But differences in patterns of usage inside the house are also probable although more difficult to determine.

The disposition of internal water infrastructure has a major bearing on rates of consumption. Mechanical water-using appliances such as washing machines and dishwashers will commonly take more water than equivalent hand processes. Baths also take substantially more water on average than showers. Hot water on tap tends to encourage lengthier use at each instance. Some appliances, such as flush toilets, are largely inflexible in the per capita frequency and volume of usage but others are more strongly influenced by intensity of usage and thus conditions of access. This particularly applies to taps where severely overcrowded conditions may deter both the average number of uses per person and the volumes actually drawn.

4.1.1 Toilets

The survey attempted to count all water-using fixtures and appliances on the plots visited. Nearly all had access to flush toilets (see table H21). The regional average was 1,52 toilets per main house, 0,19 outside toilets per plot and thus 1,71 per plot. But there were extreme area disparities. The high income suburbs had 2,19 toilets per main house, the middle income suburbs 1,24 and the low income suburbs only 0,89. The latter ratio implies that a number of plots in the low income suburbs lacked any toilet at all; very few plots had toilets outside the main house (an average of 0,06 per plot) and the combined plot average was still below one.

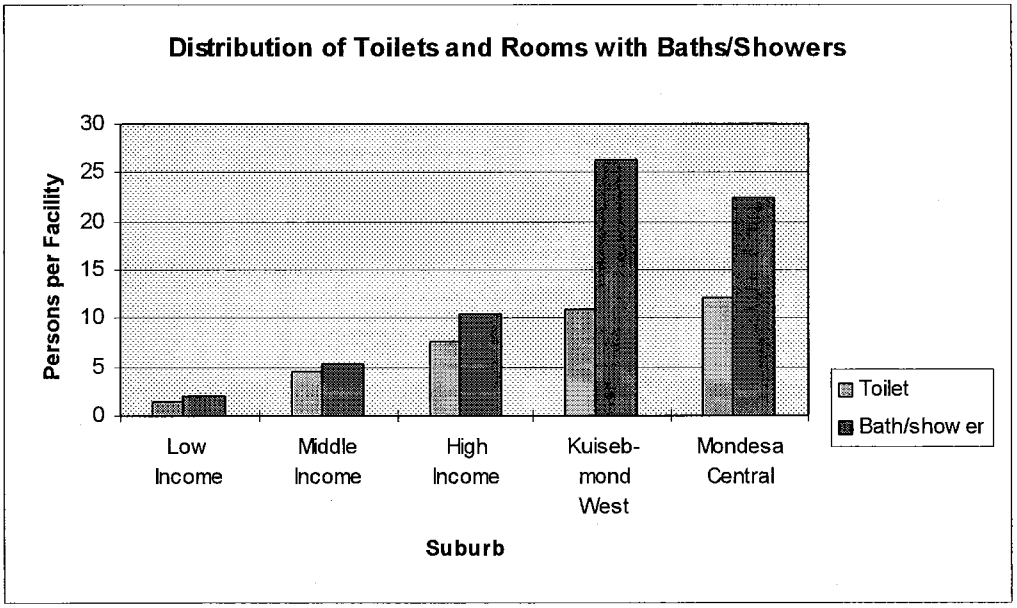


Figure 17

When plots with and without toilets are counted it turns out that virtually all plots in the middle and upper income areas had one or more toilets, and many as 24 per cent in the low income suburbs had none. The most deprived suburbs appear to be the older sections: Mondesa Central and East (34 and 32 per cent) and Kuisebmond West (26 per cent), where 22 per cent of the plots have their only toilet outside the house. Omdel, in this case the established section covered by the survey, had 33 per cent of plots without toilets and the incidence was undoubtedly much higher in the makeshift squatter housing of the reception area. Except in Omdel, it is unlikely that many houses even in these cramped old sections of the low income suburbs lack toilet fixtures, in which case the survey results indicate a high rate of disrepair. If at all accurate, they imply that a good many households must rely entirely on neighbours or public facilities for a primary water-based need.

4.1.2 Baths and Showers

Rooms with baths and showers, taken together, were even scarcer in the low income suburbs; the mean was 0,69 per plot which compares with 1,28 in the middle income suburbs. Both had very few toilets outside the main house. In the high income suburbs the proportion was much higher at 2,57 per plot and there were significant numbers of both baths/shower rooms and toilets outside the main house (0,37 and 0,26 per plot).

When combined with the differences in population density the disparities of access become even more sharply accentuated. The high income suburb mean of 1,5 persons per toilet and 2,0 persons per bath/shower room compares with 4,5 and 5,4 in the middle income suburbs and 7,6 and 10,5 in the low income suburbs (see table H22 and figure 17). Once again by far the worst ratios are found in the old sections of Mondesa (12,2 and 22,4 in Central) and Kuisebmond (10,9 and 26,2 in West). Here it appears that whole households had to depend on toilet and bath/shower facilities outside their plots. Furthermore almost all backyard dwellers depended on toilets or showers inside the main house. The intensity ratios were very high in these suburbs and were sufficient to force major reductions in water consumption through sheer difficulty of access in living space that was already severely overcrowded.

Turning from rooms to fixtures, generally houses in the high and middle income suburbs had one bath per plot and more than one in a good number of affluent houses. Showers numbered 1-1,5 per plot in the high income suburbs and 0,5-0,7 per plot in the middle income suburbs (1 in Arandis). Many households therefore had a choice of bath or shower and few were without either. In the low income suburbs the ratios are commonly well below 1 for both baths and showers but slightly above 1 for baths and showers together. This is an overall mean and some houses would have both baths and showers while others had none. But the latter were probably a minority. The exceptions were Mondesa Central and Kuisebmond West (bath 0,1 and 0,2, shower 0,3 and 0,2), where baths and showers were scarce and many households lacked either. Omdel houses were also severely deficient, recording no baths and 0,6 showers per plot.

Looking at intensity ratios, the high income suburbs were generally in the range 2,5-4,0 persons per bath and 2,5-5,0 persons per shower (see tables H24 and H25). The middle income suburbs were higher at 4,5-6,5 persons per bath and 8-13 persons per shower (Arandis 5,8) and the low income suburbs higher still at 10-15 and 20-30 respectively. The old sections of Mondesa and Kuisebmond had very high bath and shower ratios: 39 persons per bath and 41 per shower in Kuisebmond West and 77 per bath and 32 per shower in Mondesa Central. At this level of deprivation only a minority of house residents could expect to bath or shower regularly if at all. Most would have to use washtubs in extremely cramped living space. A high level of suppressed demand for washing water is implied. But the newer housing in such areas as Jabulani, Mahetago and Kuisebmond South is better provided with intensity ratios close to middle income suburb norms. As people move from the old sections and single quarters into new housing it can be anticipated that much of the suppressed demand for domestic water will be released regardless of changes in incomes.

4.1.3 Taps

Similar considerations apply in the case of taps (see table H22 and figure 18). In the low income suburbs plots had an average of only 2,1 taps in the main house, virtually none in other buildings on the plot and 1,0 outside taps, making 3,1 taps per plot overall. In the middle income suburbs there were also very few taps in other buildings and 1,2 outside but a rather better endowment of 5,5 taps per main house. By contrast, plots in the high income suburbs had 1,1 taps in other buildings, 2,3 taps outside and 8,8 taps in the main house, making 12,2 per plot in all. Half the main house taps in the middle and upper income suburbs delivered hot water, whereas in the low income suburbs the mean was 0,4 taps per house, making piped hot water an uncommon experience for most residents. These ratios, based on interview data rather than comprehensive onsite inspections, may well understate the actual number of taps but probably not by much and if anything with proportionally more taps missed on affluent sites with their much more complex water infrastructure.

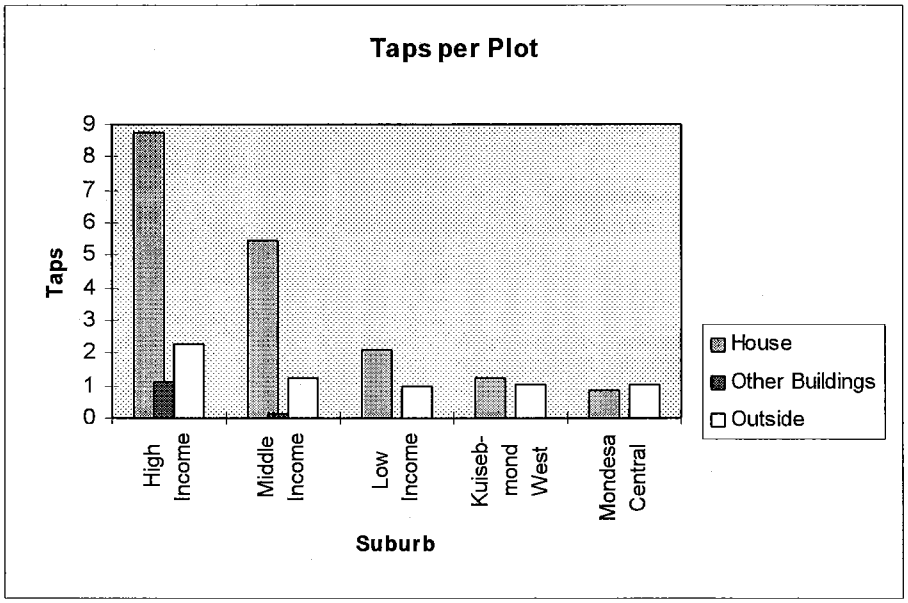


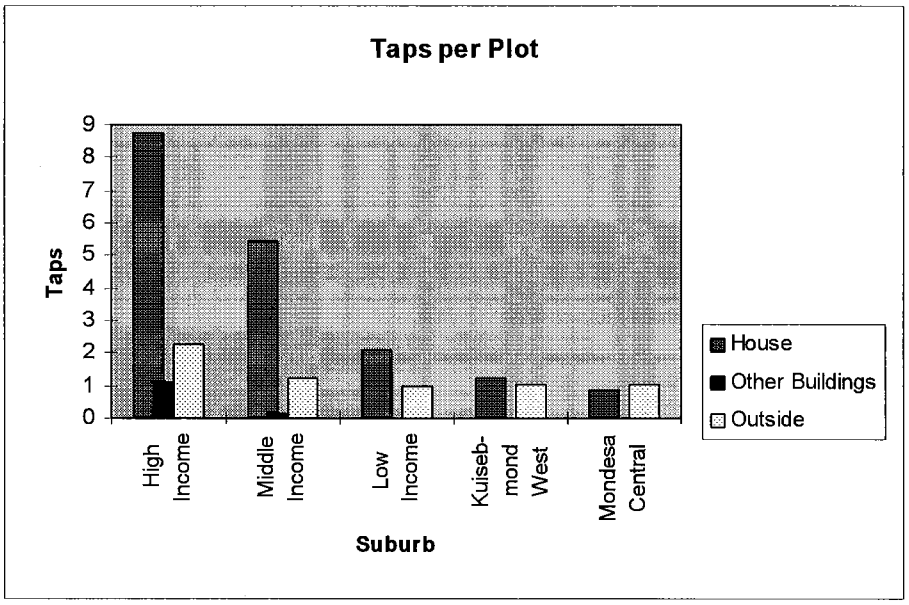
Figure 18

Between the suburbs there was a fair degree of uniformity in the Town areas: Swakopmund averaged 11-16 taps per plot and Walvis Bay slightly fewer at 10-12,5 taps per plot. The middle income suburbs were also within a narrow range of 6,5-8,5 taps per plot except for the old Central section, a low income enclave, where the average was only 3,4 taps per plot. In the low income suburbs the more recently built housing was better provided although generally not up to middle income suburb norms: Kuisebmond South, a small pocket, was 7,3 taps per plot and Jabulani and Mahetago in Mondesa were 4,6 and 5,4 taps per plot. But the old sections were more poorly provided: Kuisebmond East and Mondesa Central had 3-4 taps per plot, Kuisebmond West 2,3 taps per plot and Mondesa Central only 1,9 taps per plot. Omdel too, even the more developed central section, had only 2 taps per plot.

Translated into intensity ratios (see figure 19), the yawning divide between affluence and poverty is starkly evident. Taps per capita ratios of 0,3, the general figure for the high income suburbs, can be regarded as comfortable provision. Only one of these suburbs (Walvis Bay Central) had a main house ratio higher than 0,5. In the middle income suburbs the ratio was 0,7-0,9, which with the exception once again of Narraville Central (1,7) is adequate. But in Kuisebmond Central it fell to 1,7, in Omdel to 2,7 and in Kuisebmond West and Mondesa Central and East as low as 3,8-4,6. In these older parts of the low income townships, where the bulk of the population is concentrated, households are severely

4.1.3 Taps

Similar considerations apply in the case of taps (see table H22 and figure 18). In the low income suburbs plots had an average of only 2,1 taps in the main house, virtually none in other buildings on the plot and 1,0 outside taps, making 3,1 taps per plot overall. In the middle income suburbs there were also very few taps in other buildings and 1,2 outside but a rather better endowment of 5,5 taps per main house. By contrast, plots in the high income suburbs had 1,1 taps in other buildings, 2,3 taps outside and 8,8 taps in the main house, making 12,2 per plot in all. Half the main house taps in the middle and upper income suburbs delivered hot water, whereas in the low income suburbs the mean was 0,4 taps per house, making piped hot water an uncommon experience for most residents. These ratios, based on interview data rather than comprehensive onsite inspections, may well understate the actual number of taps but probably not by much and if anything with proportionally more taps missed on affluent sites with their much more complex water infrastructure.



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deprived in terms of water infrastructure and access to the use of tapwater for essential daily functions is difficult.

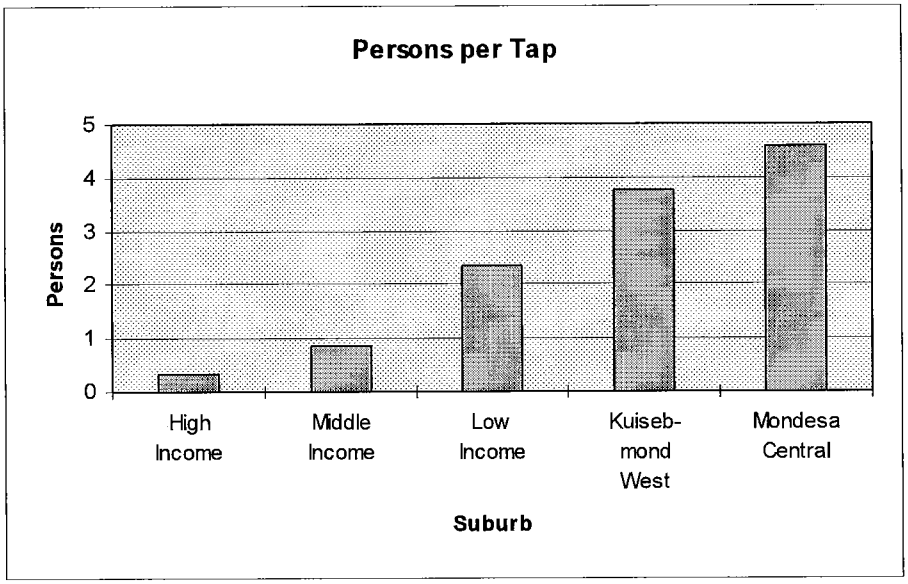

Figure 19

Hot tapwater was virtually unobtainable for most residents of the older sections: the ratio was generally above 20 persons per hot tap. Nearly all high income and most middle income but few low income houses had hot tanks (98, 78 and 17 per cent respectively). The proportion was below 10 per cent in Mondesa Central, Kuisebmond Central and West and Omdel.

4.1.4 Other Fixtures

The survey gathered information on other water-using equipment (see figure 20). Not even hand basins were universally fitted in the most deprived areas, the ratios ranging from 0,1 per plot in Omdel through 0,4 in Kuisebmond West to 0,5-0,6 in Mondesa Central and East. Tamariskia South and Narraville Central were also low at 0,7-0,8 but elsewhere the ratio was generally close to or above a mean of 1 basin per plot. It is noticeable that moveable basins or tubs were much commoner in the sections most deprived of washing fixtures and many residents would have had access only to a tub for washing.

Washing machines averaged around one per plot across the Town suburbs and parts of Narraville but rather fewer in Tamariskia and especially Arandis (0,6 and 0,2), where the apparently low incidence is surprising in an otherwise adequately endowed household infrastructure. The ratios once again fell very low in the old sections of Mondesa and Kuisebmond, where most clothes washing is done by hand.

Dishwashers were more or less confined to the high income suburbs and appeared in numbers only in the affluent suburbs. Ratios of 0,2-0,3, or about one household in four, were found in Meersig, Walvis Bay South, Kramersdorf, Swakopmund Central and Vineta West.

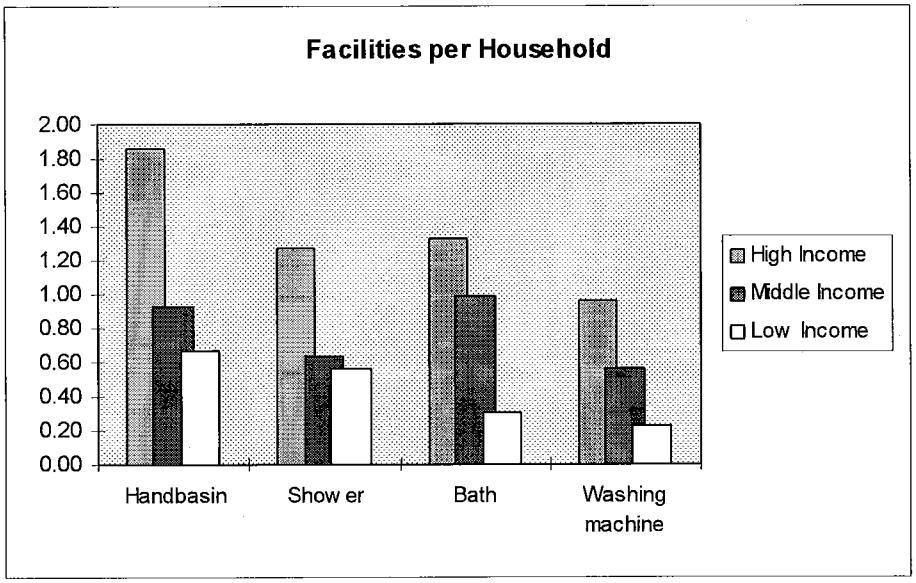

Figure 20

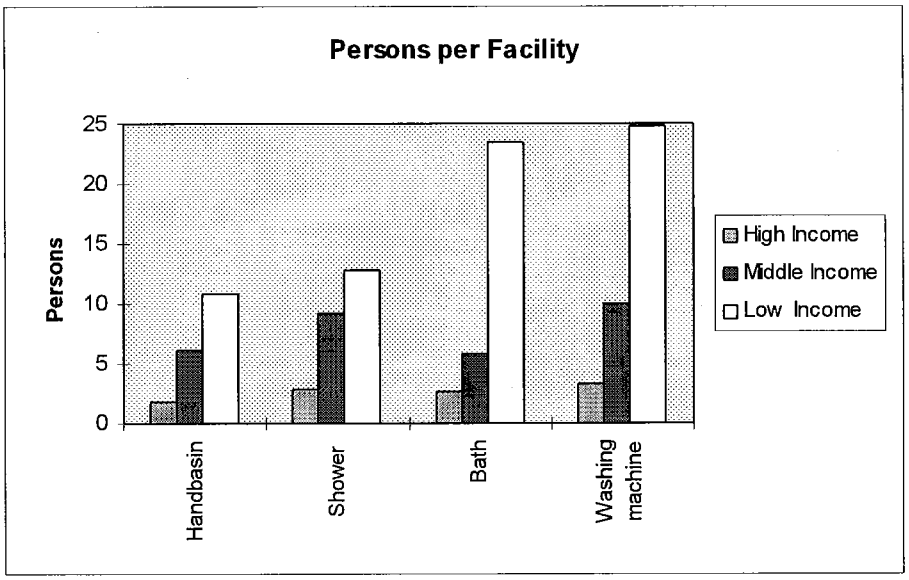

Figure 21

Per capita intensity ratios follow a similar pattern to other fixtures (see figure 21). At ratios of 1,9 persons per handbasin (the high income mean) residents have access at will; at 6,2 persons (the middle income mean) all have access with difficulty; but at 15-25 persons (the old low income quarters) all face difficulties and some may get very occasional access. The equivalent ratios for washing machines were 3-5, 6-11 and from 25 upwards. Clothes washing in the high income households is mainly mechanical, in the low income suburbs largely by hand. All high income houses and most middle income houses had hot water tanks; so too did the newer sections of the low income suburbs. But in the older sections where the great majority live, hot tanks were scarce. Here, hot water for washing can be had only by heating on stoves or fires, an unrealistic option for most.

4.1.5 Leaks and Wastage

There was little sign of water wastage in any of the suburban areas covered by the survey. Interviewers were instructed to record obvious visible signs of leaks and wastage. They found leakages inside the house in only 4,2 per cent of households and outdoors on only 4,7 per cent of plots. Instances of wasteful practices were even fewer at 2,0 per cent (see table H25).

The incidence of recent leaks reported to interviewers was nonetheless quite high (see table H26). Asked whether they had experienced any leaks over the last three months, 23 per cent of households said that they had. The commonest instances selected from a list of five options were leaking toilets, slow tap leaks and broken pipes (5,5, 6,7 and 4,3 per cent). In 7 per cent of cases the problem had not yet been fixed and was awaiting attention without a temporary repair.

The biggest number of problems originated in the middle income suburbs and especially the old section of Narraville where more than half the households had experienced leaks. Several high income suburbs also reported quite high instances but generally in both high and middle income suburbs the problems had already been fixed. The lowest clearup rate appeared to be in Kuisebmond, notably the old Central section (20 per cent). Arandis also had a high incidence of leaks and non-repairs (35 and 13 per cent). Although the pattern is far from uniform, in general a high number of leaks and a lower repair rate were both associated with low income households, older housing stock and rented municipal property. Conversely, most high income suburbs reported that their problems had already been fixed.

4.2 Domestic Use of Water outside the House

4.2.1 Gardens

The use of tapwater on residential land outside the buildings of habitation is a major component of domestic water consumption. Some is used in a variety of activities located on residential plots but the great bulk of such water goes to garden use. The principal components of garden watering are lawns, flower and vegetable beds, and trees, shrubs and hedges.

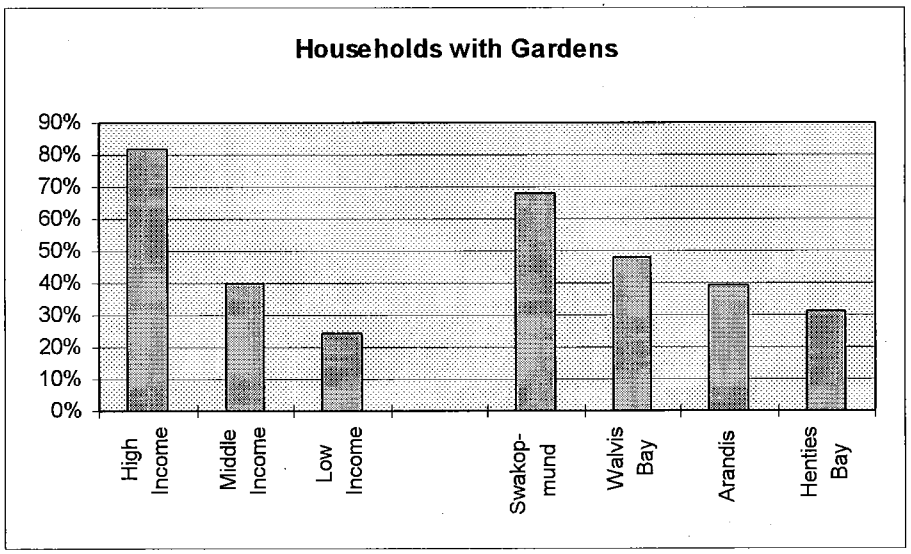

Figure 22

Garden watering accounts for most of the outdoors domestic use of water. Short of the separate metering of outdoor taps or a detailed household water budget survey, it is not possible to generate reliable data on the quantities of household water consumed in different uses. However, the type, density and coverage of garden vegetation can give a rough indication of the relative amounts of water used.

Respondents were asked whether they had gardens which they watered. The numbers of plots with gardens is somewhat greater than plots without gardens across the region: 52 per cent had gardens and 43 per cent did not, with 5 per cent not answering (see table H30).

As might be expected the area and socio-economic distributions show strong contrasts (see figure 22). Of the four towns Swakopmund stands out as some way greener than the rest with 68 per cent of households keeping gardens compared to 48 per cent in Walvis Bay 39 per cent in Arandis and 32 per cent in Henties Bay. The socio-economic contrasts are more pronounced. Whereas only a quarter of households in the low income suburbs and two-fifths in the middle income suburbs had gardens, the figure was above four-fifths in the high income suburbs (24, 40 and 82 per cent).

It is thus very much the norm for affluent households to have watered gardens with trees and bushes and for poor households to have no garden at all. Just over half of all gardens in the region are located in the high income suburbs and only a fifth in the low income suburbs.

At the local level the pattern is not very uniform. In Mondesa the crowded central area, the oldest section with many backyard structures, a third of the households have gardens of some sort, which is a high ratio. In its Walvis Bay counterpart, the western section of Kuisebmond, the ratio is by contrast very low at only 9 per cent. Central Narraville is also well below the middle income suburb mean at 26 per cent. In the Town suburbs of Walvis Bay nearly all Meersig and southern households have gardens but in the older central and northern as well as the newer eastern suburbs the ratio is in a lower range of 67-72 per cent. Generally, Walvis Bay appears to have more pronounced local variations than Swakopmund.

4.2.2 Suburban Distribution of Trees and Large Bushes

For the third component of garden water use, a separate count was made of trees and shrubs above 2m high on residential plots, using one street transect per suburb in areas judged typical of the suburb as a whole. This method is imprecise because not all backyard vegetation was visible from the street. There were also differences of interpretation in doing the count, which may in particular lead to differences in the results between Walvis Bay and the other three towns; so far as possible such anomalies have been adjusted.

The tree/bush count indicates that between Swakopmund and Walvis Bay as a whole there is no great difference; both average about 2 trees/shrubs per developed plot (see table H29 and figure 23). The mean for Arandis is rather lower at 1.5 per plot and higher in Henties Bay at 2.2 per plot. The higher count in Henties Bay is attributable in part to the predominance of palms, whereas the tree and shrub vegetation elsewhere is more diversified. At these ratios the aggregate number of trees and bushes are approximately 18 000 in total, of which Swakopmund has some 34 per cent, Walvis Bay 47 per cent, Arandis 6 per cent and Henties Bay 13 per cent.

The contrasts between the suburbs are much more extreme. Some areas have virtually no green vegetation at all on residential plots. They include the long established single quarters in Swakopmund and Walvis Bay and the compound in Walvis Bay. Areas where very recent or current residential building has predominated also have no or little perennial vegetation as yet although such areas are likely to reach the patterns and densities of established suburbs of similar housing type within roughly 10-20 years. They include new zones of National Housing Enterprise (NHE) and self-built housing in

northern Kuisebmond and northern Mondesa, the northernmost section of Vineta, and eastern and southern parts of Meersig.

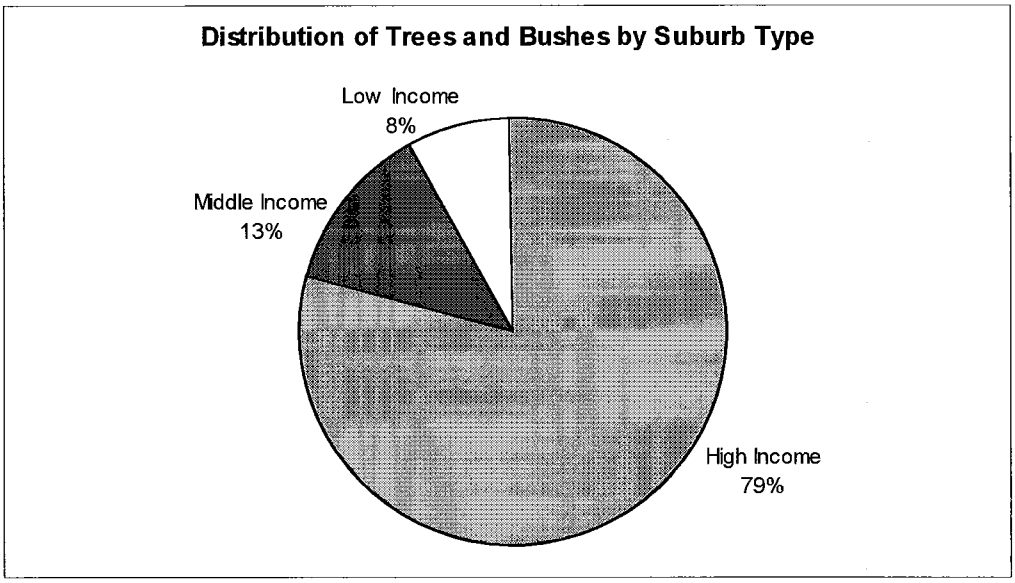

Figure 23

In the older established suburbs plot size, population densities and household income are key factors in the sharp disparities that emerge. Generally, the low income suburbs, including the single quarters, average only 0,4 trees/bushes per plot, the middle income suburbs 1,3 per plot and the high income suburbs 3,7 per plot. In other words, there are nearly ten times as many trees and bushes per plot in the high income suburbs as in the low income suburbs. These sharp differences in the ratios strongly influence the geographic distribution of large vegetation on residential land. Whereas the low income suburbs have only 8 per cent of the trees and shrubs with 56 per cent of the population and the middle income suburbs 13 per cent with 19 per cent of the population, the high income suburbs have 79 per cent of the trees and shrubs with only 25 per cent of the population. Even the exclusion of the treeless single quarters does little to reduce the disparities: the residential population distribution is 44, 24 and 32 per cent respectively.

The contrasting densities of population extend the disparities further (see figure 24). Excluding the single quarters, the ratio of people to trees and shrubs is 12,4 in the low income suburbs, 4,1 in the middle income suburbs and 0,9 in the high income suburbs. The high proportion of Henties Bay houses that have trees and shrubs, many unoccupied for most of the year, keeps up the water consumption during the periods of absence of the occupants.

Plot size is one factor bearing on the density of large vegetation in the suburbs. Map-derived estimates have been made of the average plot size in each suburb of Walvis Bay and Swakopmund on the basis of the distribution of developed erven. Although only approximate, these estimates permit broadscale comparisons between the suburbs (see table H28). Again excluding the single quarters, the average plot size in the high income suburbs is generally lower in Walvis Bay than in Swakopmund (1270 against 1540 m^2), in the middle income suburbs higher (1063 against 952 m^2) and in the low income suburbs substantially lower (395 against 699 m^2).

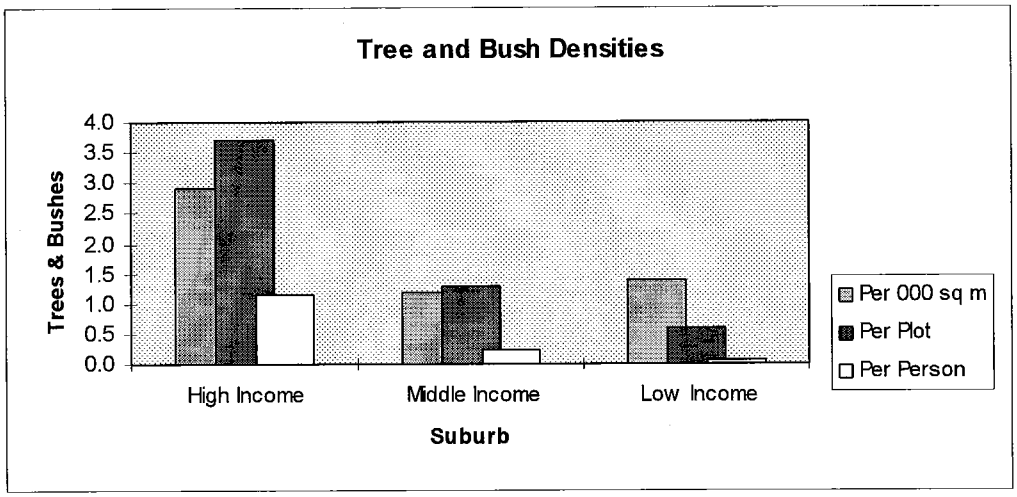

Figure 24

The internal variations are quite marked. Meersig and in most of the Town suburbs of Swakopmund have large plot sizes, but plots in the coastal strip north of the Swakopmund CBD and in the Esplanade area of Walvis Bay are rather smaller. The older parts of Tamariskia and Narraville also have smaller plots than the rest. The old housing of Kuisebmond and Mondesa is on small plots between 300-500 m^2, although larger plots have been laid out in the new building areas.

Overall, the mean plot size in the middle income suburbs is about three quarters of the high income mean and in the low income suburbs about one-third (1466, 1028 and 494 m^2 respectively). Differing population densities again intensify the disparities. In old Mondesa the density is as high as 20 persons per 1000 m^2, an area which is close to the mean plot size for both towns of 918 m^2. In the old core of central and western Kuisebmond the ratio reaches 16 and 26 persons/1000m^2 respectively. At the other end of the scale, densities in the affluent suburbs of Kramersdorf and Meersig are only 1,6 and 1,9 persons/1000 m^2. The middle income suburbs of Tamariskia and Narraville are closer to the latter than the former (5,8 and 5,3 persons/1000 m^2).

This distinctive pattern of concentrated space and concentrated overcrowding has generated much of the lopsided distribution of garden vegetation between the suburbs. It cannot be overemphasised that in a pure desert environment all vegetation is exotic - hardly anywhere does natural vegetation of any kind grow on residential land. In other words, all plants depend on water supplied and paid for by householders. In the low income suburbs few households can afford water for gardens; in any case overcrowding ensures that most of the small plots are covered with main and backyard structures and that the small open spaces are intensively used. In the middle income suburbs plots are larger but so too are houses. Open space on the plot is modest and trees and shrubs are frequently the commonest form of garden vegetation. On the larger plots in the high income suburbs vegetation is generally denser and trees and shrubs are part of a more diversified garden environment which includes lawns, cultivated beds and hedges.

The key line of difference in gardening intensity thus lies between the high income suburbs and the rest. In the former, gardening is common, integrated and intensive. In the latter, it is scattered, small-scale and limited largely to small trees and shrubs. The 79 per cent of trees and shrubs calculated to be located in the high income suburbs is likely to underestimate substantially the proportion of garden water consumed in the high income suburbs.

4.2.3 Household Distribution of Large Vegetation

Respondents were asked whether they had any trees, large bushes hedges or large climbing plants on their plots. The fact that only slightly more answered positively than the number having gardens, a difference of 2 per cent, tends to confirm a reasonable consistency in the information since in a desert environment virtually all garden vegetation survives only with watering from the household supply.

The responses indicate that 54 per cent had some kind of large vegetation on their plots and 46 per cent did not (see table H30). However, Henties Bay and Arandis recorded substantially more plots with large vegetation than gardens watered. This may reflect a higher proportion of plots whose only vegetation is one or several trees or bushes which are watered only occasionally.

With the assistance of interviewers, respondents were ask to count the number of trees and large bushes on their plots, the guideline being any freestanding vegetation above about 2 m in height. The great majority of plots with large vegetation had trees but, reflecting their small areas and high population densities, about 10 per cent of such plots in the low income suburbs were reported to have only bushes. Generally, about two-fifths of plots with large vegetation had bushes and the proportion was up to around half in the high income suburbs, 44 per cent in Walvis Bay and 56 per cent in Swakopmund, pointing to a more diverse and extensive array of large garden vegetation.

The count of large vegetation also allows rough calculations to be made of vegetation densities (see table H32). The calculations were made for households having such vegetation, bearing in mind that 8 per cent of respondents with gardens did not give details. The mean number of trees per plot comes out the same for Swakopmund, Walvis Bay and Henties Bay at 3,6 and with Arandis lower at 2,0. The bush count has Swakopmund well ahead at 2,5 with Walvis Bay at 1,4 and Henties Bay and Arandis much lower at 0,5 and 0,6 respectively. This reinforces the picture of somewhat denser and more diverse vegetation in gardens in Swakopmund than in Walvis Bay. The low bush count in Henties Bay Town complements the very high incidence of part-time residence, placing a premium on less frequent garden watering, and a preponderance of trees adapted to arid conditions, especially palms.

4.2.4 Lawns, Cultivated Beds and Desert-adapted Plants

The survey also attempted to gather basic information on the areas under lawn, cultivated beds and desert plants. Again respondents were asked to estimate the total areas of each and interviewers assisted where appropriate by stepping out the borders. The data cannot substitute for accurate aerial or ground mapping and are necessarily very approximate, but they do permit some broad conclusions to be drawn.

The first is that lawns, which probably consume the most water per unit area, occupy a far larger surface area than cultivated beds, which in turn are several times greater than desert-adapted plants (see table H33 and table 25). The ratios are between 4:1 and 5:1 in each case. The relatively small area under desert plants is surprising for a rainless climate. In fact only 8 per cent of all households and 15 per cent of those with gardens reported having desert sections at all. By contrast, 57 per cent of gardens had cultivated beds and 67 per cent had lawns.

Comparing the towns[6], Swakopmund and Walvis Bay are fairly close in the incidence of lawns (about 70 per cent of gardens) but farther apart on cultivated beds (65 to 47 per cent); more households with gardens cultivate in Swakopmund than in Walvis Bay. Arandis is very different: here only a third of gardens have lawns but nearly three-fifths cultivate beds, not much less than Swakopmund.

6. Excluding Henties Bay, for which the sample numbers are too small for reliable analysis.

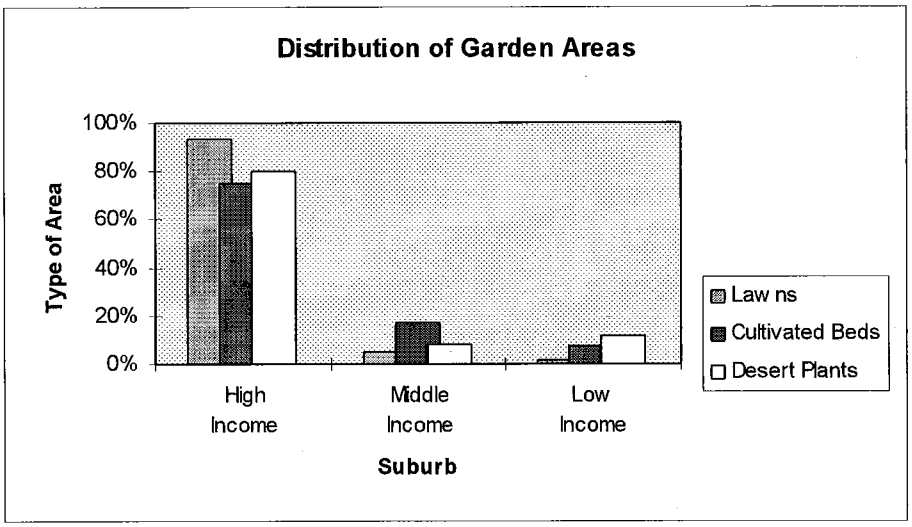

Figure 25

A clear picture emerges at the socio-economic level. The number of gardens having desert plants and cultivated beds is remarkably similar across the income range (13-16 and 53-59 per cent respectively). But lawns are far less common in the low income suburbs than in the middle and especially the high income suburbs (34, 60 and 85 per cent respectively). Here, most of the quarter of households that have gardens at all tend to keep a small tree or two and about half of them cultivate small plant beds.

The mean areas for each type of vegetation also vary strongly with the income level, being influenced in particular by plot and garden size. Averaging the total areas over all gardens (see table H33), the mean area under desert plants per garden was less than a third as much in the low and middle income areas as in the high income areas (2, 2 and 6 m^2 respectively). Middle income households lead in the mean area under cultivation; while around the same proportion of gardens in the middle and high income suburbs had cultivated beds, the former had slightly larger cultivated areas.

It is in the areas under lawn that the sharpest variation with income level is evident (see table H34). Far fewer poor households grow lawns and those that do have much smaller areas than in the gardens of affluent households. The mean reported area under lawn in gardens in the high income suburbs is extensive at 138 m^2 per garden and 163 m^2 per garden with lawn. This compares with 27 m^2 and 11 m^2 for the middle and low income suburbs respectively. The area in the low income suburbs is less than 10 per cent of the high income suburb mean and in the middle income suburbs less than 20 per cent.

It is hardly surprising that nearly all the total area under lawn is concentrated in the high income suburbs (see table H34 and figure 26); lawns are small in the middle income suburbs and both small and very scarce in the low income suburbs (94, 5 and 2 per cent of total area respectively). The use of water on lawns will have more or less a pro rata imbalance. A similar and only slightly less skewed distribution applies to the total number of trees and bushes in both the survey returns (69, 21 and 10 per cent respectively) and the separate tree count (79, 13 and 8 per cent respectively). The descriptive concept of the 'leafy suburb' has considerable resonance in the Town suburbs of Walvis Bay, Swakopmund and Henties Bay. Their correlates are the largely treeless and gardenless expanses of high density housing in Mondesa and Kuisebmond.

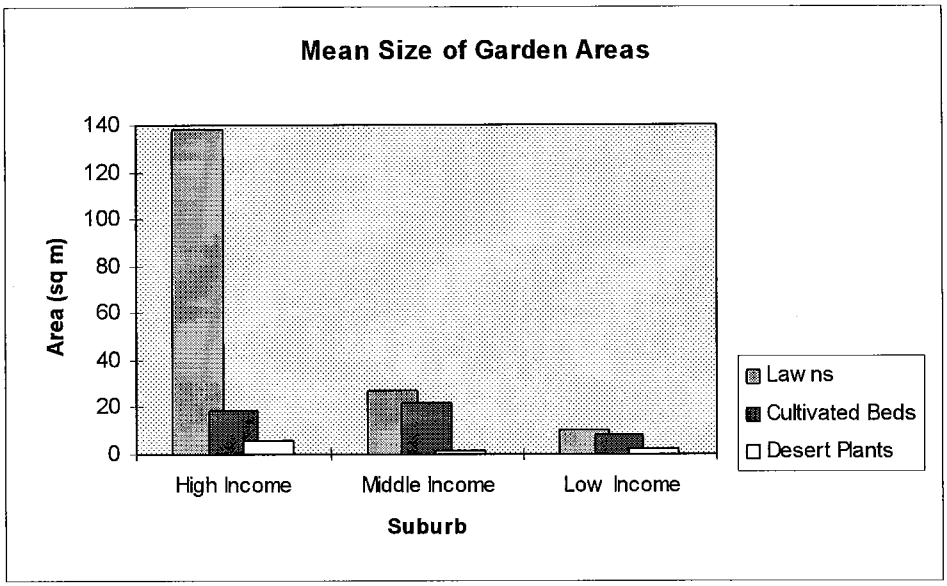

Figure 26

The implications for water consumption of these patterns of vegetation distribution on residential land need little further emphasis. If garden watering in desert towns is considered to be of lower priority than consumption inside the house, then a substantial proportion - perhaps more than half - of the domestic water consumed in the high income suburbs falls under that category. Hitherto, many households on higher incomes have been willing and able to pay for the large quantities of water required to maintain green gardens.

Irrigation systems appear to be common amongst houses with gardens. In the high income suburbs where the great majority of gardens and garden area is concentrated, 78 per cent of households with gardens said that they had an irrigation system in place. The implications for water consumption are, however, not self-evident. Such systems allow a more targeted application of garden watering which reduces waste, but they may also make it easier than with hand watering to grow a denser vegetation cover that consumes more water. Many gardens would in any case receive a mix of automatic and hand watering.

4.2.5 Other Outdoor Uses of Water

The prevalence of outdoor water-consuming equipment and fixtures gives information on the type and extent of outdoor water usage on residential plots. Several survey questions were directed to investigating the outdoor use of water.

One feature of affluent housing in the towns of the interior, the fixed garden swimming pool, is virtually absent at the coast, mainly because the cool moist climate renders it unattractive. Asked whether they had their own swimming pools, only two respondents in the entire sample, located in the East Town suburb of Walvis Bay gave a positive answer. Council officials at Walvis Bay confirmed that they know of only six private pools in the municipal area, some of which are covered and de facto indoor. In any case the loss of water from evaporation would amount to a fraction of the rate found in the interior given the high relative humidity prevailing through most of the year.

A different potential source of water consumption is productive activity on residential plots, both inside the house and buildings and in the open. The survey attempted to gather basic information on such activities and any associated water demand. Home-based business activity in the Town suburbs is

sparse and only isolated instances were encountered during the interviewing. Such activity is limited to a few professional occupations such as doctors, dentists and business agents.

Home-based activity was more widespread in the middle income suburbs (9 per cent of households) and more particularly the low income suburbs (17 per cent), where it was located mostly in the informal sector. Households identified a wide range of activities in which they were engaged but by far the commonest were selling beer or liquor (29 per cent of active households) and making and selling tombo (21 per cent). In fact making and selling drinks accounted for 58 per cent of first activities named. Cooking and selling food also featured as did car repairs and knitting/tailoring, but overall the range and extent of small-scale manufacturing work was very narrow. This was by no means a comprehensive coverage of home-based enterprise but it does reflect the limited diversity and scale of the informal sector in the low income suburbs.

The use of water in residential productive activities was not widespread and was indicated for just over a third of active households. The highest incidence by far was in brewing tombo (48 per cent of water-using activities), followed at some distance by making ice (20 per cent), baking (9 per cent) and selling beer and liquor (8 per cent). In the overall consumption pattern small-scale residential production is insignificant in the low income suburbs.

4.3 Use of Water from outside the Plot

Respondents were asked whether their household often fetched water from outside the main house. Virtually all answered this question and only 8 out of 772 replies were in the affirmative. These were scattered throughout the four towns with no one pocket of concentration. 5 of the 8 fetched from neighbours and most gave as reasons that there was no piped supply to the house (3) or that they were disconnected (2). The very small number of households (8) reporting no taps on their plots at all tends to corroborate the general pattern that very few suburban households rely on external water sources.

The very small number reporting the regular use of outside water reflects the infrastructural situation that nearly all residential houses have water connections. There are few public taps and nowhere in Swakopmund, Walvis Bay and Arandis are standpipes used on a regular basis to supply water for household use. The low number nevertheless understates the true incidence of temporary disconnections, which many poor households are unable to avoid periodically. Interviews with officials in Arandis, for instance, indicated that late payment and at times non-payment of water bills was widespread and a matter of concern. The threat and sometimes the execution of short-term disconnections were used as a tactic to encourage payment.

The principal exception to the general pattern is in Omdel at Henties Bay. Up to the early 1990s this was a self-built squatter settlement with no private connections which was supplied only by a handful of public standpipes. The recently built housing in Omdel all has piped water. The local authority's list of residential water accounts implies roughly 700 private connections in Omdel as of mid-1995. The lack of usage data makes it difficult to assess how many of these are currently active. However, the so-called reception area remains on unsurveyed land and retains the social and infrastructural character of the earlier settlement. The water account list has some 180 names listed for 'squatters'. According to council officials, roughly a quarter of the shanties in the squatter settlement are connected. The majority there get most of their household water from neighbours with connections either by private arrangement or through local water clubs. This section of Omdel was not covered by the survey largely for technical reasons, in particular the lack of plot maps for sampling, and is thus not reflected in the survey results.

5 HOUSEHOLD INCOME, WATER PAYMENTS AND AFFORDABILITY

5.1 Household Income

5.1.1 Income Data

Reliable independent data on personal and household income in the central west coast towns is virtually non-existent. The results of the National Household Income and Expenditure Survey (HIES) will shed a great deal of light on household economic patterns at the national level and for urban areas generally, but it is not disaggregated by region. The HIES was in progress at the time of the project survey and its output was not available in time for use into this analysis. No other recent research publications contain significant primary data on the socio-economic characteristics of the coastal communities.

The survey requested respondents to give the total monthly cash income for their entire household. The interviewers were briefed to count all sources of income, including rent and business, and all earners in the household. The primary aim was to capture the approximate gross cash income available to the household. Since all four towns are remote from food-producing areas it was assumed that non-cash income from within and outside the urban areas would be minimal and that most inward cash transfers would be on a roughly reciprocal basis. Most significant amongst the exceptions would be payments in kind to house-servants. It was anticipated that household social composition would vary greatly, that more than one respondent would often participate in answering questions and that often the main respondent would not be the head of household. It was also expected that this would be the question to meet with most resistance, especially from affluent households, and interviewers were asked to persist in obtaining at least an approximate estimate.

In practice the achieved response rate to the question on household income was a high 94 per cent with only minor variations between the suburbs and income groups. The coverage can be regarded as satisfactory. The interpretation of the data is somewhat more problematic. In most cases the respondent will have given gross income. This is the case for most low income earners, very few of whom pay tax. Some higher earners may have given net or take-home income. They mat also have omitted non-salary income, especially where not received monthly. Low earners may have excluded incidental income from room renting or informal sector activities. For larger households, concentrated in the low income suburbs, respondents may have omitted other income earners. Households letting on-site flats or rooms will have reported little income from visitors since the survey with taken at the trough of the off-season.

In nearly all cases the replies will have covered the main household. In the high-income suburbs second households on the same plot are uncommon but in the densely populated older quarters of Mondesa and Kuisebmond where multi-occupation is common, most occupants of backyard shanty rooms were excluded. Conversely, second and subsequent families sharing the main house, a common situation in the old locations and single quarters, were covered in the replies. In most cases therefore the income data reflect the position of the occupants of the main house. It must be emphasised that the social definition of 'household' therefore differs markedly from the standard population census concepts.

The net tendency of the qualifying factors is to reduce the reported aggregate income. The tendency will have been accentuated by a general reluctance to give the full amount, especially in the high income suburbs. Mean reported income for areas and categories is therefore lower than actual income and the disparities between low and high earning households is dampened. The results are probably more reliable for internal comparative purposes than as measures of real gross income. Nevertheless they have sufficient internal consistency to generate an adequate basis of assessment for the purposes of this analysis.

5.1.2 Area Distribution of Household Income

The aggregate cash income extrapolated for the four towns was just over N$26 million per month at the time of the survey with a mean household cash income of N$2891 per month (see tables H36 and H37, figures 27 and 28). Swakopmund was substantially ahead of Walvis Bay at N$3918 compared to N$2695. Arandis and Henties Bay had lower means of N$1822 and N$1264 respectively. Mean annual household incomes thus ranged from N$15 000 up to N$47 000 with an overall mean of just under N$35 000.

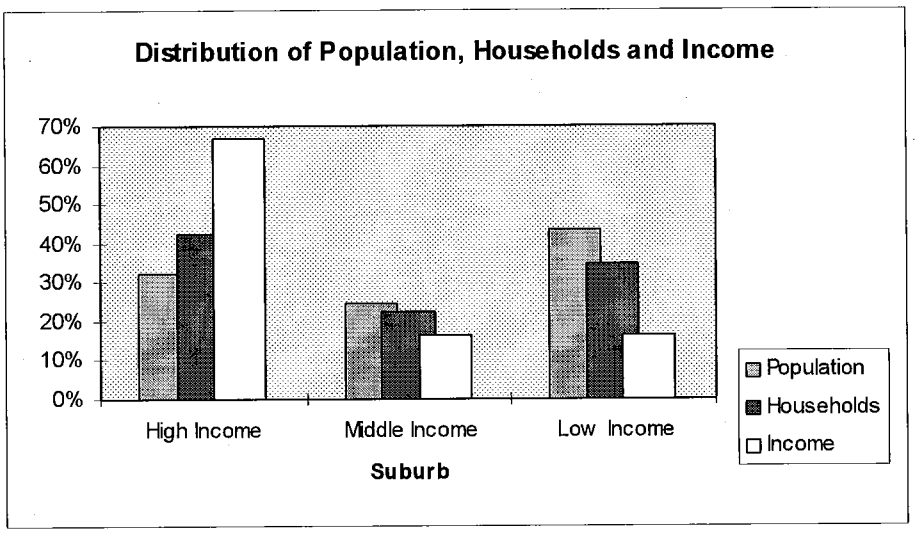

Figure 27

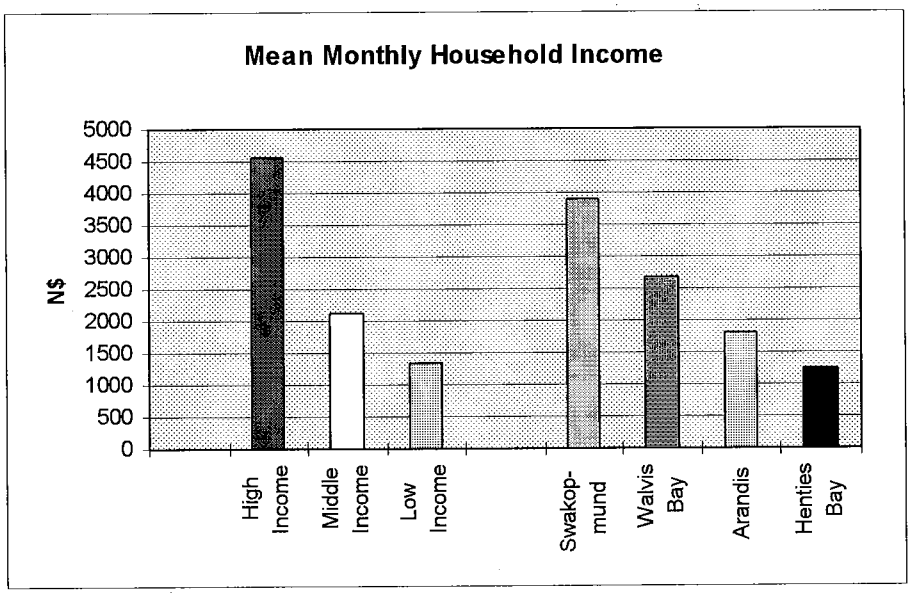

Figure 28

The town aggregates conceal sharp internal variations between areas and social categories. The monthly mean for the Town high income suburbs of Swakopmund was substantially higher than for Walvis Bay (N$5593 against N$4029), but both were well above the middle income areas of Tamariskia, Narraville and Arandis whose means were close together (N$2165, N$2360 and N$1822

respectively). The same was true of Mondesa and Kuisebmond (N$1576 and N$1454). The remarkably uniform pattern of bunching at three sharply separated income steps illustrates once again the structural dominance of the three-tier suburban hierarchy in which area of residence and household income level remain closely correlated despite the easing of obstacles to racial mobility in the housing market.

At the suburban level there were wider variations in Walvis Bay than in Swakopmund. The Central and North suburbs of Walvis Bay, comprising the older housing either side of the CBD, returned much lower means than the South suburb adjacent to the esplanade. The North had a higher proportion of retirement age residents but a smaller working population can account for only part of the disparity, which probably reflects differences in occupational mix and salary levels between the two urban economies, which are based respectively industrial and tourism. Problematic in both towns are the low means in the luxury suburbs of Kramersdorf and Meersig, where affluent and often opulent housing prevails. Responses below N$4000 per month are scarcely credible for total household income in these neighbourhoods and may reflect understatements in several instances. They may also report the single incomes of respondents who were not the main occupants or owners since many of the latter are only part-time residents.

In the middle income areas while Tamariskia was fairly uniform western Narraville had a much higher mean than the central and eastern parts. In the low income suburbs the new Jabulani and Mahetago suburbs had means double those of households in the old quarters and matching the middle income areas, reflecting an emerging pattern of social differentiation between those who can afford to participate in NHE housing schemes or build privately and those who cannot. In Kuisebmond the pattern was more uniform except for a small pocket of middle income housing in the south.

In Arandis the great bulk of housing was in the company housing estate style with a uniformity designed for employees earning within a fairly narrow salary range. However, the social context has been rendered more complex by the large-scale RUL redundancies of the early 1990s and the transfer of the housing stock to council ownership. A substantial minority of houses are now occupied by households lacking members in RUL employment and often without any jobs at all.

Henties Bay Town shares social characteristics with the beachfront area north of the Swakopmund CBD but differs substantially from the other three towns. Most of its houses are owned by non-residents who visit for weekends or holidays of several weeks in the year. The visitor population peaks in mid-summer at up to 10 000 or more but the permanently resident population of the Town suburbs, although growing, is estimated at under 1000. At the time of the survey in mid-winter most houses were empty and representative sampling was impossible. The low reported mean income partly reflects the more modest incomes of retired residents and local workers and gives little indication of the more affluent profile of the bulk of owners and seasonal visitors.

Omdel stands out as by some way the poorest suburb on the west coast. Its mean household income was at N$634 per month less than half the level of Mondesa and Kuisebmond. It was until recently a squatter area with self-built shanty housing, which has only partly been replaced by more permanent structures as the community expands rapidly. Since the survey reached only the older, more established section of Omdel the incidence of poverty is likely to be understated.

Considered by socio-economic characteristics, the disparities are sharply displayed in the contrasting distributions of income and households (see figure 27). Households in the low income suburbs made up 35 per cent of the survey total but received only 16 per cent of the total cash income. In the middle income suburbs 22 per cent of households received 17 per cent of total income. In the high income suburbs 43 per cent of households received 67 per cent of total income. Considering the distribution of the suburban population between the areas, which for 1995 was estimated at 46, 24 and 30 per cent respectively, the skew in the area shares of aggregate cash income was sharper and would be sharper

still if the single quarters, which accounted for 21 per cent of the total regional population and had a low income profile, were included.

Mean household cash incomes show the same pattern (see figure 28). In the high income areas the monthly mean was N$4557, more than double the middle income household mean of N$2139 and more than triple the low income household mean of N$1350.

5.1.3 Levels of Household Income

The distribution of household income by income band sheds further light on the economic characteristics of the coastal communities (see table H37 and figure 29). It is striking that households receiving N$5000 or more per month numbered 35 per cent in the high income suburbs. At the other end of the scale, only 8 per cent of households in the middle income suburbs and 3,5 per cent in the low income suburbs had monthly incomes above N$5000.

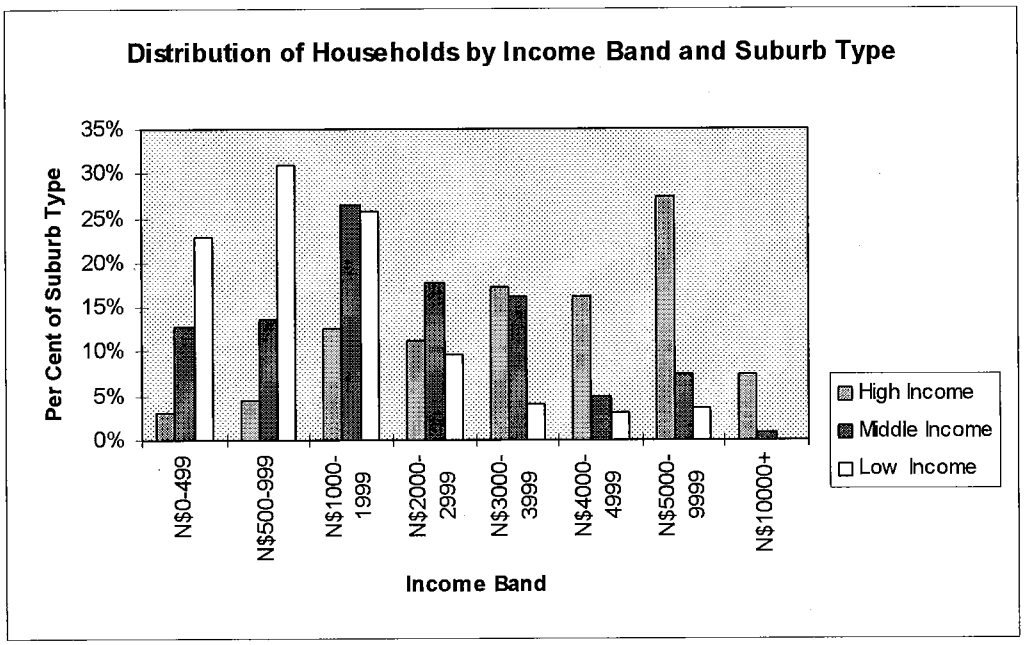

Figure 29

Equally striking is that 23 per cent of all households in the low income suburbs reported incomes below N$500 per month. In Omdel, the poorest of the urban areas, the figure was as high as 38 per cent and in Arandis, reflecting the high unemployment, 14 per cent. These proportions understate the true prevalence of very poor urban households because in practice they exclude many backyard shanty dwellers and reflect primarily the inhabitants of the main house. The fact that 17 per cent of households in Narraville fell into this income bracket (below N$500) indicates sizeable pockets of poverty compared to Tamariskia where only 2,5 per cent of households reported less than N$500 per month and another 4 per cent less than N$1000.

Taking another angle on the results, nearly four-fifths of households in the low income suburbs received under N$2000 per month (Mondesa 73 per cent, Kuisebmond 77 per cent, Omdel 100 per cent), whereas the same proportion, four-fifths, in the high income suburbs received more than N$2000 per month (Swakopmund 89 per cent, Walvis Bay 77 per cent). Very high income households earning N$10 000 or more were 3.4 per cent overall but 10 per cent in Swakopmund Town and 6 per cent in Walvis Bay Town. They accounted for 15 per cent of total cash income.

The strong socio-economic divide between the three groups of suburban areas clearly dampens the diversity of income levels within them. While there were handfuls of more affluent households in Mondesa, Kuisebmond and Omdel, they were few and far between and hardly any households had cash incomes above N$2000. In Tamariskia 70 per cent of households received between N$1000 and N$3000 with few poor or affluent households outside this low to middle band. In Swakopmund Town 73 per cent received more than N$4000 with small numbers in the low and middle bands.

Several areas show greater diversity. The broadest income spread was in Narraville, where 32 per cent received less than N$1000 and 49 per cent between N$1000 and N$4000, while the 19 per cent receiving more than N$4000 was a higher share than in Tamariskia (9 per cent). Marked suburban contrasts accounted for most of the spread. While the east showed a similar diversity, the old central quarter was much poorer: only 27 per cent of households received more than N$2000 and 46 per cent below N$1000. Conversely in the newer housing of the western half 63 per cent of households received more than N$3000.

The Town suburbs of Walvis Bay also showed considerable internal variation underlying a broad spectrum at the area level. Most affluent households are concentrated in Meersig and the South along the esplanade, where middle income households are also numerous. But in the older section north of the CBD poorer households are common: 50 per cent received less than N$2000 and hardly any above N$4000. In the newer eastern suburb and to a more limited extent in the older central section south of the CBD there is a broader spread; street observation indicates a scattering of improved as well as new houses amongst unimproved stock.

5.1.4 Area Distribution of Aggregate Income

It is possible, with due caution, to combine the household income data with the property and water account statistics so as to extrapolate an approximate spatial distribution of income in the four coastal towns. The survey's stratified sampling distribution, which was approximated to the erf count in the seven major areas, does not precisely match the distribution of developed residential plots on the ground, but by using the area and suburban means a modified distribution has been prepared. The output gives the distribution of total household cash income and numbers of households for each area and suburb and for the eight income bands in respect of each spatial unit. It works on the assumption of one main house per developed plot, which as we have seen totals up to a fairly close match in most areas with the number of active residential water accounts. It should be stressed once again that such an extrapolation takes no account of household size and little account of multi-occupation either in second houses or flats or in backyard shanties in the densely populated old quarters of Mondesa and Kuisebmond. Nor are the large single quarter communities counted and the squatter settlement in Omdel's reception area.

The results are as might be expected close to the patterns of the survey discussed above, but there is a small increase in the disparity between high and low income suburbs. This arises partly from thinner coverage of parts of the more affluent Town areas of Swakopmund and Walvis Bay, where plots are large, housing is low density and at the time of the survey a number of houses were empty or only partly occupied. The absentee householder factor made representative surveying impossible in Henties Bay, as explained earlier, and the Town remains under-represented in the modified results.

The extrapolations thus accentuate the three-tier pattern of income distribution between the major suburban areas. Of the estimated 10 116 developed residential plots in the four towns, 30 per cent were in low income areas, 23 per cent in middle income areas and 48 per cent in high income areas (see table H3). 'High' is of course something of a misnomer since these areas, the former white suburbs, include large numbers of middle as well as high income households and in parts of Walvis Bay, pockets of poorer housing as well. Nonetheless, the relative spatial distributions of wealth and poverty are still

stark: the low income suburbs received only 16 per cent of total cash income, the middle income suburbs 17 per cent and the high income suburbs as much as 67 per cent (see table H38).

The vertical distributions within each income band are also of interest (see table H39). Some two-thirds of the poorest households receiving less than N$1000 per month were in the low income suburbs, plus a fifth of households in the middle income suburbs. At the top end, 80 per cent or more of households receiving N$4000 or more were in the high income suburbs. Matching this highly skewed distribution is the weight of affluent households in the distribution of aggregate cash income: in the high income suburbs, a third of the households, numbering just under 1300, received more than N$5000 per month, amounting to 62 per cent of the aggregate income for these suburbs.

5.2 Sources of Income

In addition to monthly household cash income, respondents were asked to rank their households' 'most important' sources of income. Nine choices were offered plus a general 'other' category. Nearly all respondents answered this question, the response rate being over 98 per cent. The question was once again explicitly directed to the household and not the individual respondent.

The great majority of households (98 per cent) gave a single source of income as important (see table H40). The number giving only one source was 74 per cent, only two sources 21 per cent and three sources 3 per cent. None gave more than three income sources. It is clear that most interpreted the question as being to name their single most important source, although an appreciable number also gave a second source of importance to their household. The results should therefore be treated as shedding light on the principal source of household income rather than the relative importance of the multiple sources of income on which many and perhaps most households undoubtedly rely.

Not surprisingly for an enclave urban economy, most of those answering, 80,6 per cent in all, gave 'salary/wages' as their most important source of income. Another 7,6 per cent gave pensions, 5,2 per cent business and 2,4 per cent informal sector activities. No other category exceeded 1 per cent. 24 per cent also gave their households' second most important sources of income. Here the spread of second choices was more diverse with salaries/wages, business, informal sector, pensions, rent and assistance from friends and relatives all featuring. For the small number giving a third important income source, pensions, investments and relatives and friends were the most frequent.

Considering the three highest ranked first income sources, 81 per cent of those giving salary/wages did not state a second important income source (see table H41). For business and pensions as a first source the majority did give second sources but the numbers involved were small. Too much cannot be read into the high proportions not giving a second source, but the pensions category is high as a sole main income source given the much lower mean cash income of households relying mainly on pensions.

Of those giving salary/wages as the most important source plus a second source (17 per cent of all households), 24 per cent named business as the second most important, 15 per cent informal sector activities, 21 per cent pensions and 16 per cent assistance from relatives and friends. Under the other two income categories salaries featured strongly as a second source and investment income was also prominent.

Considering each income source in turn, it is clear that salary/wages was almost always named as a first choice and rarely as a second choice. Business and pensions were mostly first choices but also formed a large minority of second choices. The remaining income sources were predominantly second and occasionally third choices.

Correlating income sources with monthly household cash incomes, some strong differences emerge. When given as the only important income source, the salary/wage category was associated with a mean household income of N$2409 per month (see table H42). Business, although numerically smaller, was much higher at N$4464. Pensions and informal sector were correspondingly lower at N$976 and N$922. When combined with second and third choices, household incomes were generally higher. In the salary/wages and business categories the increase was modest at 10-15 per cent but much higher in the pensions category. The low informal sector mean was not much increased when second income sources were stated, suggesting that such households were in survival mode. The differences suggest that multiple sources of income are much more significant for poor than for middle or upper income households. The lowest means were, as might be expected, in those households relying on friends/relatives and on church/NGO welfare as their most important income source.

5.3 Ability and Willingness to Pay Water Charges

5.3.1 Past Water Payments and Savings Practices

Respondents were asked whether their households could afford to pay their existing monthly water bill. Only 1,2 per cent did not answer; 93,4 per cent replied in the affirmative and 5,4 per cent said they could not. Given the low cash incomes of substantial numbers of low income households, this is a surprisingly large positive response and may mask a reluctance on the part of a few to admit payment difficulties to interviewers.

Those stating they could not afford their current bills were asked to whom they looked for help in paying their water bills or reducing arrears. Most indicated family and relatives or employers as the source of assistance.

It is also clear that the great majority of households are directly responsible for paying their water and electricity bills. 87 per cent stated that their own household usually paid their account. However, employers are a significant factor; they were paying the bills of 8 per cent of respondents. Another 1,1 per cent indicated relatives or friends outside the household. No other category exceeded 1 per cent.

Despite affirming their ability to pay their bills at the current rate scale, many households considered themselves sensitive to increases in the rates. Respondents were asked by how much they reduced their water usage after the last increase, which for most would have been nearly a year prior to the survey. Nearly a third of households said that they had reduced a lot and another third moderately. Only 14 per cent had increased or not reduced their consumption (see table H44 and figure 30).

Breaking down the results by town, modest but significant differences emerge. A larger proportion of households in Swakopmund considered that they had made major reductions in their consumption than in Walvis Bay (38 per cent against 26 per cent). Arandis was closer to Swakopmund and Henties Bay to Walvis Bay. The numbers making moderate reductions were much the same except in Arandis. But Walvis Bay was correspondingly higher than Swakopmund in households reducing by only a little. Except in Arandis (21 per cent) the proportions making no reductions at all were around 10-13 per cent.

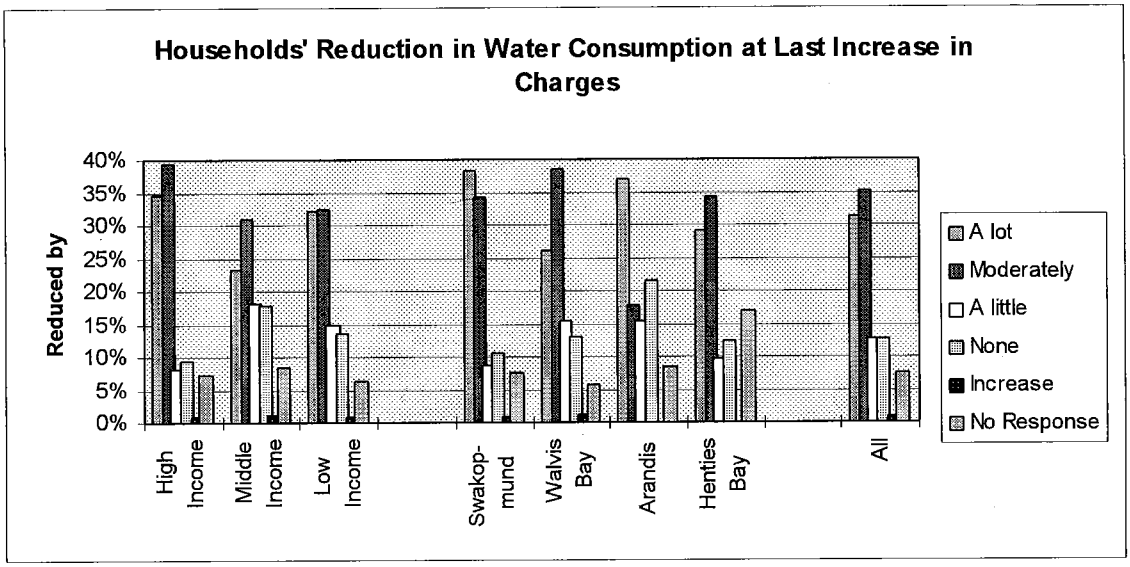

Figure 30

Arandis stands out as different from the other three towns. The distribution is both bottom and top heavy with many fewer households making moderate reductions and the highest proportion in the region making no reductions. Since Arandis is less affluent as a whole than the other towns, this anomaly may be partly attributable to the sizeable number of households whose basic water bills up to a stated threshold are paid by their employer RUL; the amounts they pay for additional consumption will in most cases be smaller than for non-subsidised households.

Differences between the major socio-economic groups of suburbs are perhaps less than might be expected, although they do appear. Nearly two-thirds of households in low income areas stated that they reduced their consumption either a lot or moderately (see table H44). This is surprising in view of the poor domestic infrastructure in many houses and the relatively low per capita rates of consumption, which imply that any major reduction would affect water use for basic needs purposes. Substantially fewer households in middle income areas reduced their consumption either a lot or moderately than in high income areas (54 against 74 per cent). In fact only 18 per cent of households in high income areas said they reduced their consumption a little or not at all. To what extent the stated reductions accurately reflect the real patterns cannot be judged from these responses alone, but they do suggest an expected pattern of higher sensitivity to increases in rates amongst more affluent households, as well as difficulty amongst poorer households in affording such increases.

Economic factors figured prominently in the reasons given for taking action during the previous year to save water (see table H45 and figure 31). Seven options were given and the overall ratio of selections to respondents was 1,7. At 35 per cent of households, inability to afford the cost of water was the second highest motive given and was remarkably uniform across the socioeconomic divides though more prominent in Swakopmund and Henties Bay than in Walvis Bay and Arandis. A more specific option, inability to afford the increase in the bill, attracted 13 per cent of selections with little variation between the suburbs or the towns. Reducing the cost of water was thus a reason for about half of households, ranging from 40 per cent in Walvis Bay up to 59 per cent in both Swakopmund and Henties Bay.

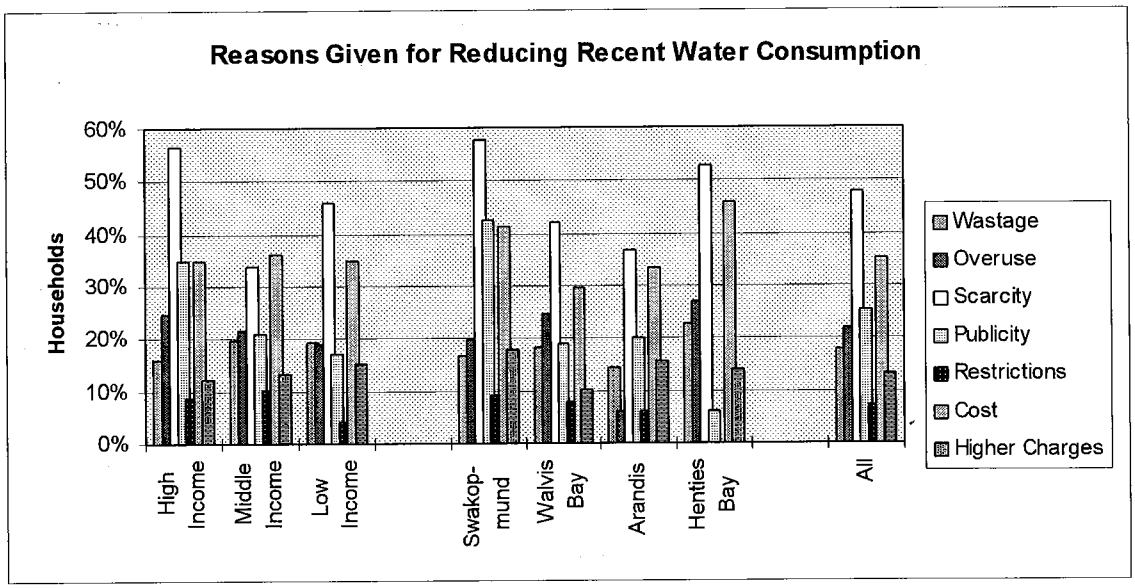

Figure 31

Nonetheless resource management and environmental options also attracted major support. The general scarcity of water received the highest single ranking at 48 per cent. Wasting of water was 18 per cent and excessive use of water was 22 per cent. Official encouragement to save water was also a major factor at 25 per cent with double the prominence for the high than the low income suburbs (35 to 17 per cent). This suggests that water-saving publicity is influencing more strongly the more affluent households which can indeed save most water. But there were surprisingly large differences between the towns with 43 per cent citing official encouragement to save water in Swakopmund but only 19-20 per cent in Walvis Bay and Arandis and a mere 6 per cent in Henties Bay.

5.3.2 Affordability of Step Increases in Water Charges

Respondents were asked whether their households could afford to pay even a small increase in water charges. A quarter of households replied in the negative but the 76 per cent answering positively is a large proportion (see table H46). Both Walvis Bay and Swakopmund recorded a 79 per cent positive response. Arandis was rather lower at 66 per cent as might be expected. Henties Bay was lowest at 61 per cent, influenced by the lower incomes of Town residents and the deep poverty in Omdel. The sample numbers from Henties Bay are anyway too few for reliable interpretation.

At the socio-economic level the results turn out not quite as might be expected. At 79 per cent, households in high income suburbs have the highest proportion indicating an ability to pay higher charges. But at 73 per cent, households in middle income suburbs are lower than those in low income suburbs at 75 per cent. This apparent anomaly may reflect a more acute middle income consumer resistance to raising charges and a corresponding sense of powerlessness in the low income suburbs to oppose such increases.

Those respondents answering positively were then asked how much more their households could afford to pay without undergoing hardship. They were requested to select an amount from a scale ranging from N$5 up to more than N$200 per month. The replies shed some light on the scale of increases that consumers can envisage affording in the immediate future. In Swakopmund, Walvis Bay and Arandis the distribution is fairly similar (see table H47 and figure 32). Cumulating the replies, the proportion of households answering negatively was between 20-30 per cent for all suburbs, increasing at succeeding increase steps more rapidly for the low income suburbs than the middle and high income suburbs, whose repose rate was fairly similar.

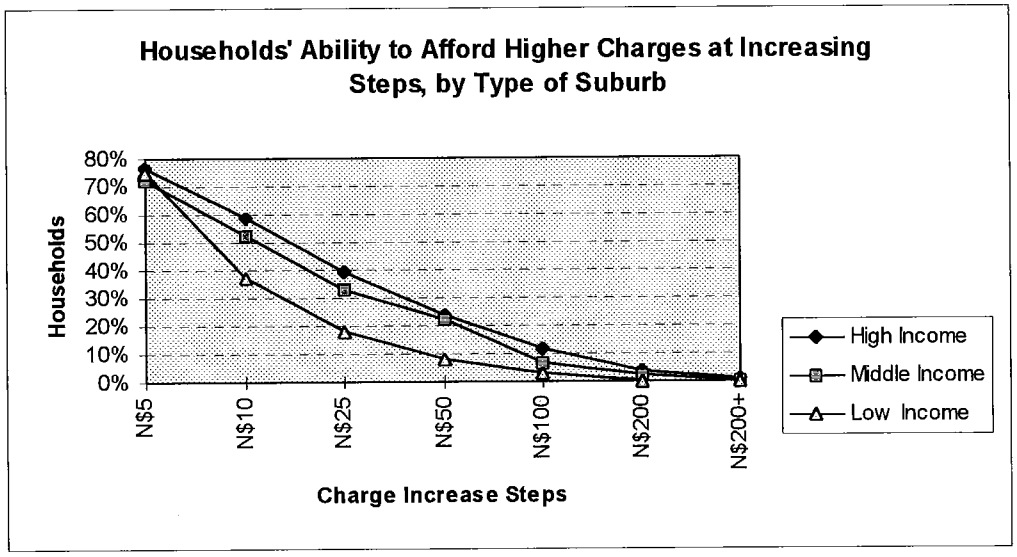

Figure 32

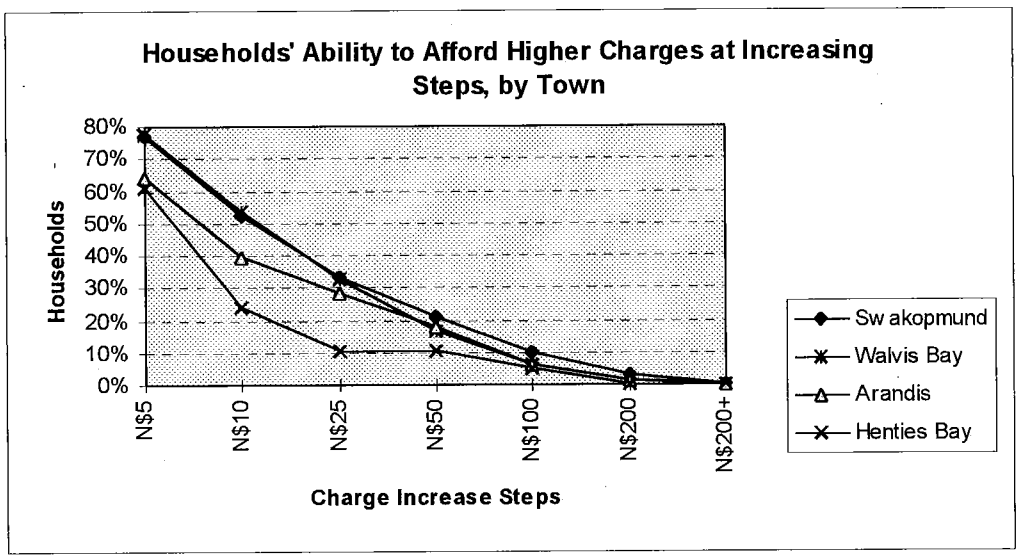

Figure 33

Considering only households that answered positively, nearly all said that they could afford another N$5 per month, two-thirds another N$10 per month, two-fifths another N$25 per month, a quarter another N$50 per month and a tenth another N$100 per month. Three of the towns showed a similar trend but in Henties Bay the fall-off was much steeper.

The socio-economic groupings show stronger differences (see figure 33). While 74 per cent of households answering positively in the high income suburbs and 72 per cent in the middle income suburbs stated that they could afford another N$10 per month, only 50 per cent in the low income suburbs could afford this modest extra amount. Few in the low income suburbs (10 per cent) could envisage N$50 per month or more extra. In the middle income suburbs (8,5 per cent) few could envisage N$100 per month or more extra. The high income suburbs followed much the same trend but at the upper end more (15 per cent) could envisage N$100 or more extra. These self-assessments are very probably underestimates given that water charges have nearly doubled in the past four years for

many households and the gaps between households at succeeding income steps are likely to be larger in practice than stated.

5.3.3 Reductions in Water Consumption at Multiples of Present Water Bills

Respondents were also asked to assess their likely reduction in water usage at each step in an escalating scale of increases in their monthly bills. Unlike the fixed scale of dollar increases discussed above, the baseline here was multiples of the household's existing bill, whether frugal or extravagant, and therefore on a relative scale. The steps presented in the question were deliberately large, ranging from half as much again up to ten times the present bill. Since such large increases were beyond the experience of all respondents, the aim was to encourage them to think in a longer term perspective and to view the survey exercise in a more strategic light.

The quality of data from replies to this question indicate a less than perfect understanding of its meaning on the part of a few respondents and the results should be interpreted with due caution. However, the number not answering was below 1 per cent and the trends are sufficiently clear to allow conclusions to be drawn.

The results indicate that most households' responses are elastic up to a doubling of their present bills but reach a high threshold at a tripling (200 per cent increase) beyond which there is little scope for price sensitivity (see table H50 and figures 34-36). The proportion saying they would reduce their water consumption a lot was 31 per cent for a 50 per cent increase and 57 per cent for a 100 per cent increase (doubling). At 200 per cent the proportion was 80 per cent, rising to 86 per cent for a tenfold increase.

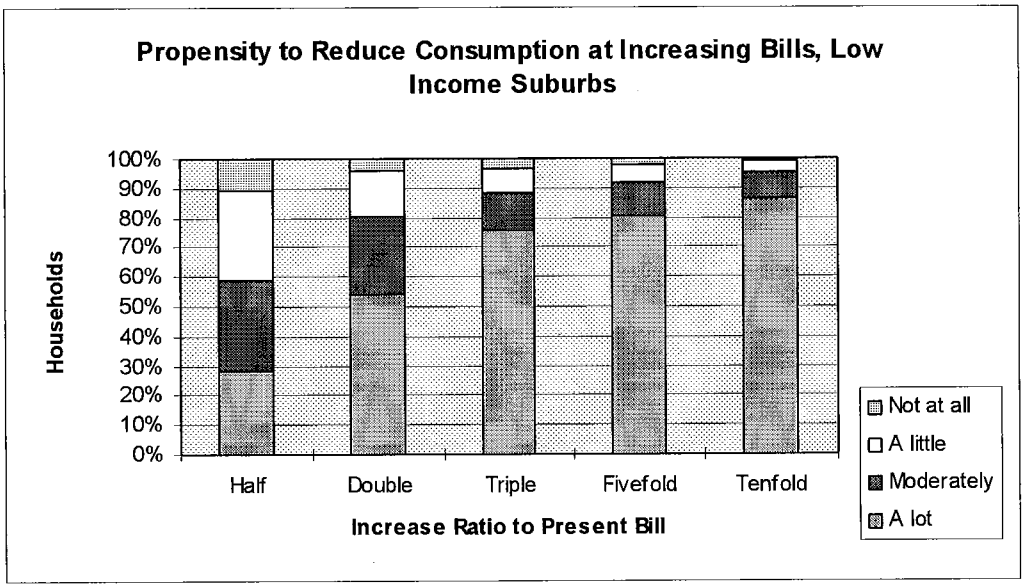

Figure 34

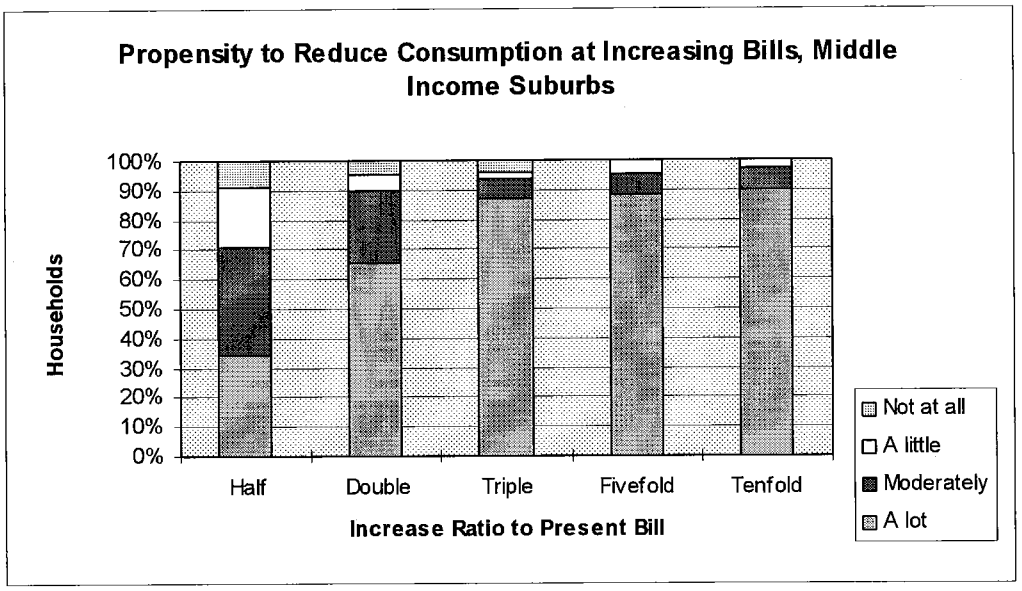

Figure 35

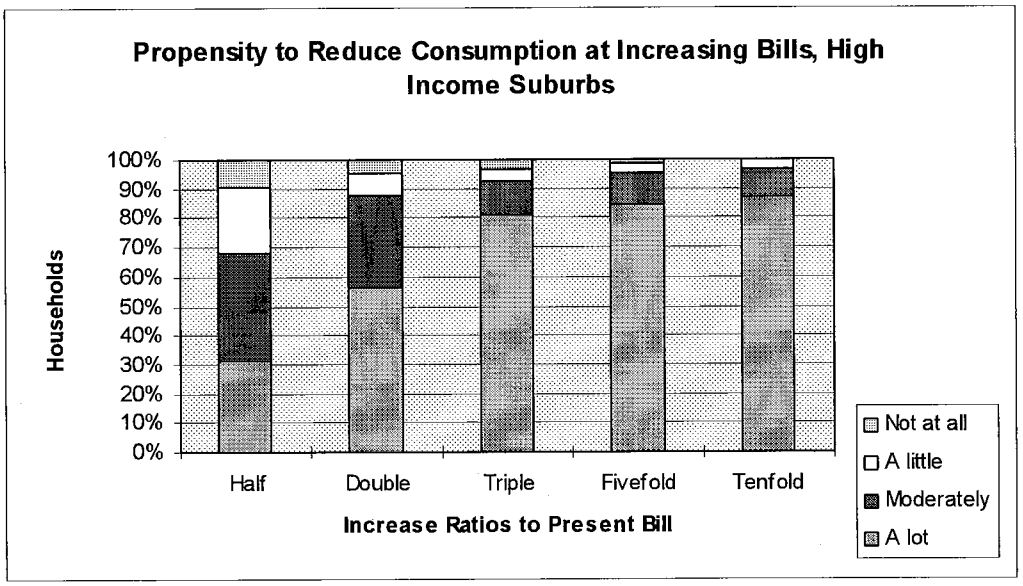

Figure 36

A moderate reduction of consumption accounted for most of the remaining response to a doubling of the bill or more. Only at a 50 per cent increase was there a sizeable minority of households likely to reduce a little (25 per cent) or not at all (10 per cent). Larger increases shrank these two responses combined to 14 per cent at a doubling of the bill and down to 4 per cent at a tenfold increase, the latter households being, one should assume, either represented by perverse replies or impervious to price rises on any scale.

Thus two-thirds of households would reduce their water consumption either a lot or moderately in the face of a 50 per cent increase in their bills and 85 per cent would do so faced with a doubling of their bills. These overall results, which indicate a fairly high level of price sensitivity, were analysed further for sensitivity to geographic and socio-economic factors. Looking at the towns as a whole, Walvis Bay and Swakopmund have very similar response rates. Households likely to reduce their consumption a lot were a third of the total at a 50 per cent increase in their bills, three-fifths at a doubling and four-fifths at a tripling. Together with a moderate reduction in consumption, the proportions rose to two-thirds,

over 80 per cent and over 90 per cent respectively. The proportions of households likely to reduce only a little or not at all were a third of the total at a 50 per cent increase but rapidly reducing to 15 per cent and below at a doubling or more. In Arandis the scale of response is steeper: at a doubling of the bill more than 90 per cent would reduce a lot or moderately. The pattern in Henties Bay is somewhat different but the numbers of respondents are too small to allow confident interpretation.

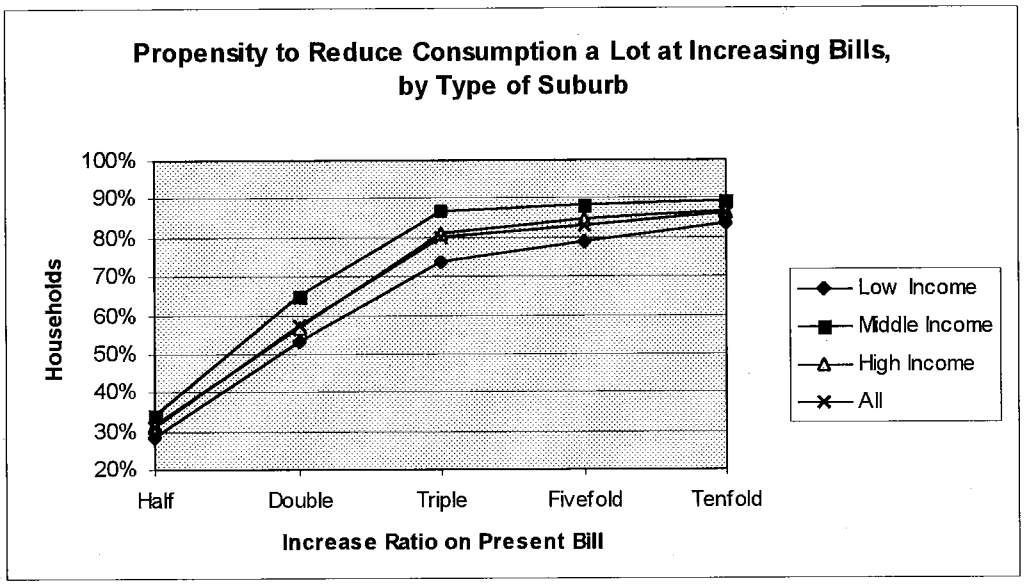

Figure 37

The town aggregates show few significant differences between the two big centres of Walvis Bay and Swakopmund but a sharper price sensitivity in Arandis, which is to be expected of a predominantly middle income area. The general pattern is of a graduated response only at the first level of increase (50 per cent), above which most households expect to make large reductions in their consumption. At the socio-economic level it might be expected that sharper contrasts would show up but in fact contradictory influences come into play. Poor households are on the whole low unit consumers and may see little scope to cut their basic needs consumption further; on the other hand a large increase in their bills would cripple their tight expenditure budgets and would force a reduction regardless. By contrast, affluent households can afford to absorb sizeable increases but have considerable scope to cut discretionary water usage, especially on garden watering.

The results indicate a varying interplay of these countervailing factors. At the first step, a 50 per cent increase, households in the high income suburbs showed less price sensitivity than those in the middle income suburbs, but slightly greater than those in middle income suburbs. Those likely to reduce their consumption a lot constituted 31, 34 and 28 per cent respectively. Combined with those reducing moderately the proportions rose to 68, 70 and 58 per cent respectively.

At the next step, a doubling of the water bill, these differentials were maintained for households likely to reduce a lot (56, 65 and 53 pr cent) but high and middle income areas were close when combined with those likely to reduce moderately (88 and 89 per cent) and well ahead of low income areas (79 per cent). These differentials narrowed at higher steps but are still evident.

Considered from the opposite angle, some 40 per cent of households in the low income suburbs would reduce their consumption little or not at all at a 50 per cent increase, 19 per cent at a doubling and 11 per cent at a tripling. The corresponding proportions for households in the high income suburbs were

somewhat lower at 32, 12 and 8 per cent respectively and lower still for households in the middle income suburbs at 29, 10 and 6 per cent respectively.

These results point to a lower price sensitivity in the low income suburbs throughout the range and especially at the first two steps, but not by as much as might be anticipated on the basis of affordability given the very large income inequalities between the suburbs and between poor and affluent households. The low income suburbs emerge as significantly price sensitive given their low income and water consumption levels. Whether steeply higher water charges would translate into big reductions in actual consumption is, however, debatable given the low per capita water consumption rates prevailing: major reductions would directly affect basic needs uses. Other responses, such as increasing arrears and community payment strikes, are equally plausible. Such higher charges would nevertheless lessen the potential release of suppressed demand, imposed mainly by crowded access to household water facilities, when poor households move from old or backyard housing to new houses with better water provision.

The highest price sensitivity was in fact shown by households in middle income suburbs, 70 per cent of which would reduce consumption a lot or moderately at the first step and 89 per cent at the second step. The response at the first step was significantly stronger than in the high income suburbs. At succeeding steps the response remained higher for households likely to reduce a lot while much the same when combined with those likely to reduce moderately. In other words, households in middle income areas tended to respond more strongly at the first step. At later steps (doubling and above) they showed similar broad sensitivity to those in high income areas but with proportionately more indicating large rather than moderate reductions.

The higher readings from the middle income suburbs are likely in fact to understate their price sensitivity since both household income and per capita rates of water consumption were much lower than for high income households, implying less scope for reductions. It is likely that middle income households are more acutely cost conscious and that their stronger responses to this question indicated a stronger intention to reduce consumption than their actual ability to do so without cutting into basic needs uses. Conversely, the lower readings from the low income suburbs are nevertheless likely to overstate their real price sensitivity.

The data were also differentiated by income band (see table H51 and figure 38). The lowest two bands, below N$1000 per month, turned out to be a little below or close to the overall mean across all the step increases. The proportion of households likely to reduce their consumption a lot increased from 29-30 per cent at the 50 per cent step and 53-58 per cent at the doubling step up to around 80-85 per cent at five and ten times. The next band (N$1000-1999) showed the strongest overall sensitivity and for households likely to reduce their consumption a lot was 4-8 per cent above the mean at most of the increase steps. The next two bands (N$2000-3999) were 4 per cent below the mean at the first step but close to it thereafter. At N$4000-4999 the middle/upper income band was well below the mean (by 12-15 per cent) at the first two steps but close to it at higher steps. Both the top bands had the highest response at the first step (8-9 per cent above the mean), but diverged thereafter with the topmost band (above N$10 000) staying 15-21 per cent below the mean at the higher steps.

These results suggest a degree of complexity and the presence of cross-cutting influences. In particular it is not clear why the low/middle N$1000-1999 band should be significantly ahead of the next two middle bands (N$200-3999), nor why the middle/upper band (N$4000-4999) should be much lower at the first two steps. However, these proportions are for the strongest of the reduction options and the distribution tends to become more regular when combined with the next option, to reduce water consumption moderately. It seems that an unexpectedly low rate of strong response is sometimes compensated by a higher rate of moderate response. This is clearly evident, for instance, in the topmost income band where households are markedly less likely to reduce by a lot but more likely to reduce moderately, showing a price sensitivity reduced in intensity but not in breadth.

OVERVIEW

1. The total population of the four towns in the study area has grown by approximately 38 per cent in the last four years to reach just under 65 000 today. All but 2.4 per cent of the regional population is urban. The residential suburbs number 49 400 and 21 per cent live in single quarters.

2. Most of the growth has been concentrated in Walvis Bay and is partly attributable to a one-time influx following its reintegration into Namibia. The majority have concentrated in the low income suburbs and single quarters, which accommodate 55 per cent of the urban population compared to 19 and 25 per cent respectively in the middle and high income areas.

3. The two principal seasonal variations in the coastal population are the influx of tourists, visitors and relatives over the summer holiday period in December/January and the import of short-term contract workers by the fish canneries for the pilchard season from approximately March to June. The two peaks are thus complementary in their impact on regional water demand but concentrated in different towns, respectively Swakopmund/Henties Bay and Walvis Bay. The seasonal peak at Henties Bay may expand the resident population fivefold for one month a year. Secondary peaks coincide with school holidays and angling seasons.

4. Extreme disparities arise in population and housing densities. A three-tier housing hierarchy continues to predominate in the two large towns. There is severe overcrowding in the low income suburbs, where backyard shanties accommodate as many as 30 per cent of the residents of Mondesa and 22 per cent of the residents of Kuisebmond. In Arandis the loss of employment has led to high unemployment and vacant houses. At Henties Bay Omdel's upgrading from self-built shanty structures into a suburb with serviced housing has only recently begun; its 'reception area' is the only significant informal settlement in the region.

5. The dependency ratios are highest in the middle income suburbs and lowest in the single quarters where short-term contract workers and jobseekers are concentrated. The population in the low income suburbs has a younger age profile and very few elderly people. Higher ratios of elderly are concentrated in coastal Vineta, Henties Bay and central Walvis Bay.

6. The single quarters in Walvis Bay and Swakopmund have a much higher proportion of adults of working age but also house many families as well as single persons. Overcrowding is severe. The Walvis Bay compound provides barrack-like dormitory accommodation for single men and is controlled to exclude access to non-residents.

7. Nearly all households have water connections. Public standpipes are virtually non-existent. In the shanty sections of Omdel people generally get water from neighbours with connections. The Swakopmund and old section of the Walvis Bay single quarters mostly rely on limited communal ablution blocks. In the Walvis Bay compound many rooms have rudimentary water facilities but problems with hot water distribution contribute to wasteful water use.

8. In 1994/95 residential water consumption was about 48 per cent of total consumption excluding Henties Bay. Distribution is highly skewed, the high income suburbs taking 58 per cent of consumption with 45 per cent of connections and the low income suburbs 19 per cent of consumption with 31 per cent of connections[1]. The respective mean per capita rates were 358 l/day and 86 l/day.

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1. Excluding Henties Bay.

9. Overall, 71 per cent of residential water is taken by 40 per cent of consumers averaging more than 30 m^3 per month and 35 per cent by 13 per cent of consumers averaging over 60 m^3 per month. Large proportions of domestic consumption are discretionary. By contrast, in Mondesa less than 10 per cent of consumers averaged above 30 m^3 per month and 45 per cent averaged less than 15 m^3 per month. Consumption in the low income suburbs is heavily geared to basic needs and severe overcrowding with scarce amenities indicates suppressed demand.

10. Gardens account for most outdoor water consumption. Gardens are the norm in the high income suburbs, more scattered in the middle income suburbs and uncommon in the low income suburbs. Some 79 per cent of trees and large bushes and 94 per cent of the area under lawn are located in the high income suburbs, which average 7.4 trees/bushes per garden and 138 m^2 under lawn. Outdoor swimming pools are virtually absent.

11. Generally, houses are well provided with standard water fixtures in the high income suburbs and adequately provided in the middle income and newer sections of the low income suburbs. But the old sections and single quarters, housing most of the low income population, are severely deprived, a sizeable number of houses apparently lacking working toilets or showers. High intensity ratios of persons per facility, ranging up to more than 20 persons per shower and 3.5 persons per tap, point to suppressed water demand through sheer difficulty of access and use.

12. Mean household cash income was highest in Swakopmund. The distribution is again highly skewed. Household income in the low and middle income suburbs is respectively 30 and 47 per cent of the mean in the high income suburbs. In the high income suburbs 51 per cent of households receive more than N$4000 per month; in the low income suburbs 79 per cent of households receive less than N$2000 per month. In the single quarters, severe overcrowding and a concentration of wage-earners tend to push the average household cash income above the low income norm although per capita income remains low.

13. Overall, the 35 per cent of households located in the low income suburbs account for 16 per cent of total residential cash income while the 43 per cent of households located in the high income suburbs account for 67 per cent. Most households rely on cash income from salaries and wages. Few have major second sources of income.

14. Only 5 per cent of residential households said they could not afford their present water bills and 24 per cent that even a small increase would cause them hardship. More than half could afford another N$10 per month extra; only 8 per cent in low income suburbs could afford another N$50 but 16 per cent in high income suburbs could afford another N$100.

15. The highest sensitivity to large increases in their current water bills is in the low to middle income bands (N$1000-4000). At a 50 per cent increase in charges 66 per cent of households would reduce their water consumption either a lot or moderately, rising to 85 per cent at a doubling of the bill. Low income households are slightly less responsive because their consumption is mostly for basic needs and high income households can absorb more of the cost.

16. Water bills made up 2.5 per cent of household cash income overall but more than 6 per cent where incomes were below N$1000 per month and more than 3 per cent where below N$3000 per month. At the top end, the 18 per cent of households with income above N$5000 paid 2 per cent or less on water. They accounted for a high 31 per cent of total water bills but an even higher 47 per cent of total cash income, whereas households below N$2000 paid 28 per cent of total water bills from 15 per cent of the total income.

17. Income elasticities of water demand are relatively high. At incomes up to N$4000 the elasticity is 0.6 to 0.8 and rises further to peak at 1.03 for the N$5000-9999 income band before falling back at the top of the income scale. Garden watering combined with larger plot size is the major factor inducing a high propensity to spend more on water with rising income.

18. The great majority of households considered saving water to be very important. But more than a third thought that people in general waste water. In awareness of water saving publicity, a higher proportion in high income suburbs were aware of government as a source and a higher proportion in low income suburbs of the local authority. Employers hardly featured.

19. Nearly all households had working water meters and were generally satisfied that they gave accurate readings of their consumption, but pockets of high dissatisfaction emerged in Narraville, parts of Kuisebmond and Arandis.

20. Improving water-saving practices was well supported at all income levels but high income households were much readier to combine them with water-saving devices.

21. On policy approaches to water scarcity, nearly a quarter favoured voluntary methods only for reducing water consumption and the same number supported restrictions on household supply. Just over half preferred increased water charges as the main instrument, targeting heavy users. On who should pay the costs of extra bulk supply to one town, 70 per cent assigned the burden to the town, most favouring higher consumer charges. A quarter wanted to spread the cost to consumers or taxpayers nationally. Business preferences were fairly similar.

22. Only 13 per cent of small and medium sized businesses use significant amounts of process water. Exceptions include laundries, bakeries and food preparation. Informal sector activity is limited in scale and scope and excluded altogether from the CBDs. Concentrated in the old sections, the single quarters and commercial centres of the low income suburbs, it uses very little water.

23. Most businesses said they could sustain a small increase in their water bills but only 20 per cent could afford an extra N$50 or more. About the same number are price insensitive and would not reduce their water consumption even at ten times their present bills. The number likely to reduce their consumption a lot hits a ceiling of between 50-60 per cent.

24. Most businesses consider the present level of water charges to be acceptable and three-quarters said that even a 50 per cent increase would seriously affect their profitability. But most businesses consume little water and only 28 per cent have monthly bills of N$200 and above.

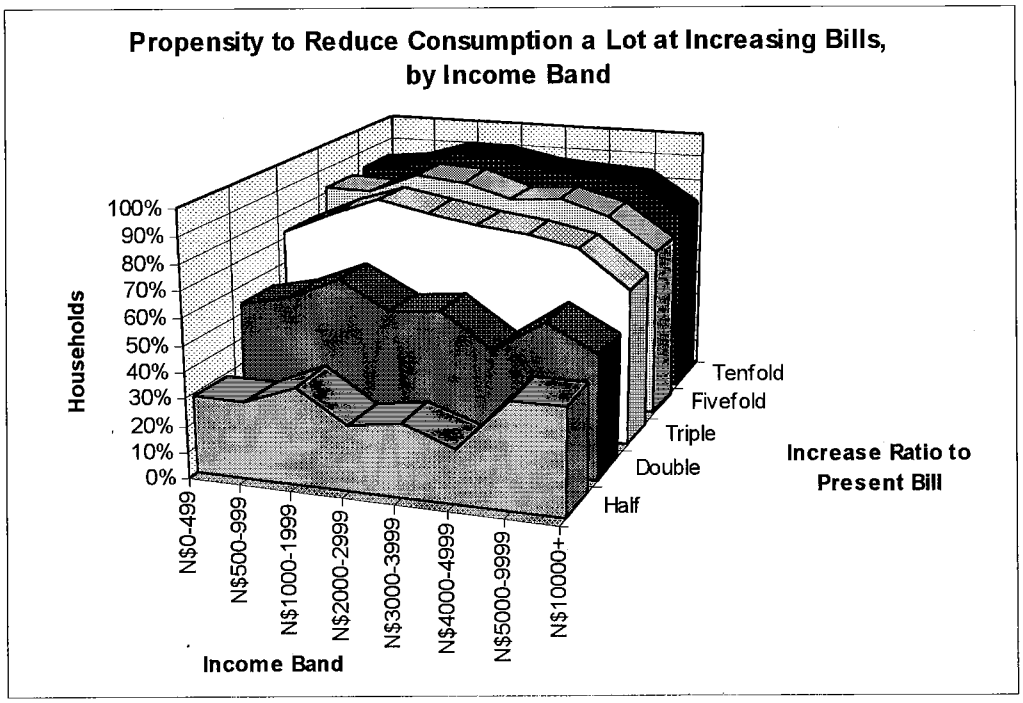

Figure 38

Combining the responses (a lot and moderately), the two low income bands were 5-10 per cent below the mean at the first two steps and 2-5 per cent below at the higher steps with the lowest income band showing - a true reflection of helplessness - a consistently lower response rate. The lower/middle band was still ahead of the mean across the steps but no longer far ahead of the two middle bands. The middle/upper bands (N$4000-9999) were close to the mean and the upper band a little below it. The topmost band was 5 per cent below at the first step but fairly close to the mean thereafter.

These results suggest that while the strength of particular responses by households in different income bands at succeeding increase steps may vary, the general pattern is surprisingly uniform. At the first step, the proportion of households likely to reduce their water consumption a lot or moderately lay in the range 55-69 per cent; at the next step 78-91 per cent; and at the upper three steps above 85 per cent. Differences in response were most significant at the first step (50 per cent) and to a limited extent at the second step (100 per cent). At higher steps the overwhelming majority of households expected to make large reductions in consumption.

It should be borne in mind that because they are ratios to existing bills, the step increases have a general expectation of an equilibrium response. In other words, a doubling of a large bill for an affluent household would amount to many times more the monetary amount of the doubling of a small bill for a poor household. It is nevertheless a little surprising that a stronger gradient across the income bands was not more evident at successive increase steps. It is likely that the countervailing factors discussed earlier in the section came more or less equally into play. It is also the case that just as the monetary implications were much larger for the more affluent households, so the leverage of equal intentions to reduce consumption on the volume of water actually used was much greater for affluent than for poor households.

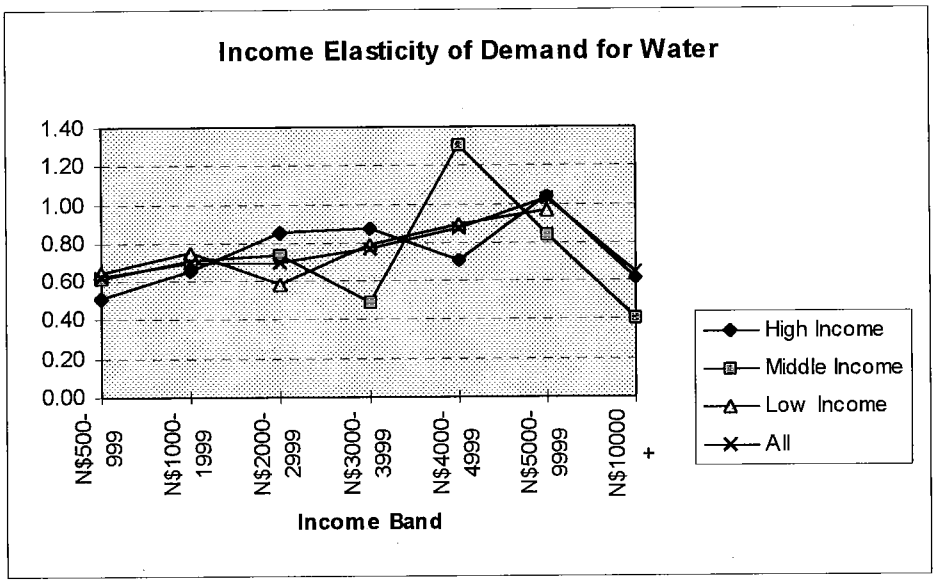

Figure 39

The responses on saving and spending more on water give a broad value picture of community attitudes but do not themselves generate precise elasticities of response to higher future water rates. Because time-series data on residential water consumption is available only on a broad township basis it is not possible to assess with any precision consumer responses to past increases in charges and thereby to generate price elasticities of demand.

However, the survey results permit the calculation of approximate income elasticities of demand for domestic water (see table H71 and figure 39). For the four towns taken together, the increment is in the range 0.60 to 0.75 at each household income step up to N$3000-3999 per month. In other words, for every doubling of income a household pays between 60 and 80 per cent more for water[7]. The elasticity rises to a peak of 1.03 at NS5000-9999 but declines sharply to 0.64 for the top income group of N$10,000 and above. This pattern points to the strong influence of garden watering in the average volume of household water consumption. At higher incomes, households are prepared to invest proportionately more of the income in maintaining gardens and lawns, while for the most affluent households the increase in outdoor space is less than the increase in income, leading to a lower incremental rise in water spending.

The same broad pattern is evident in each of the low, middle and high income areas. Particular variations may be related to housing type and plot size: for example, in the middle income suburbs the increment peaks at N$4000-4999 and then tails off sharply, which may reflect the lack of opportunity to build sizeable gardens on plots that are mostly smaller than in the Town suburbs. When household size is taken into account, generating elasticities of per capita income, the differences between the three suburb types are somewhat accentuated but without disturbing the basic trend.

These elasticities appear rather high when compared with instances in other countries. A cross-sectional study of 40 developing country cities in the 1960s indicated an average income elasticity of 0.4 and a 1970s study of Penang arrived at a ratio of 0.2 to 0.4 for higher income households. At low volumes for basic needs (below about 15-25 m^3/household/month), demand is both income and price inelastic. Estimates of price elasticities have varied quite widely, one survey supporting a ratio of about -0.4 but up to -0.6 in urban slums in Brazil. A second study concluded that a range of -0.3 to -0.7 was common

7. The ratio is to the water bill, which will be more than the amount of water actually consumed for heavier consumers in towns where higher block tariffs are charged.

in developed countries and a range of -0.3 to -0.8 in developing countries. Evidence from Australia, Canada and the USA suggests a rough range of -0.3 to -0.6 but with quite wide variations[8].

Price elasticities can be expected to vary markedly between different domestic uses. One comparative survey concluded that for inside household uses such as cooking, washing and sanitation a normal ratio was less than -0.1 but for garden and recreational uses it rose to -0.2 to -0.4. Consensus estimates for the USA were stated as being 0.0 to -0.1 for indoor use but -0.7 to -0.9 for outdoor use in the western USA and as high as -1.3 to -1.6 in the eastern USA. In an urban household with a moderately high per capita consumption of 150-200 l/p/d, typically only 3-6 l would go to cooking and drinking, 15-20 l to washing and personal hygiene, 3-10 l to house cleaning and larger amounts to toilet flushes, showers and baths, and the garden[9]. In the desert coastal towns, the upkeep of conventional gardens requires a larger quantity of tapwater than in most comparable instances elsewhere since it must provide the entire garden supply. The high income elasticities of demand, particularly at the upper income bands, are therefore likely to reflect both an unusually high proportion of water usage for the garden and a general willingness to pay for it, which the declining share of water costs in increasing income tends to suggest is also affordable.

5.4 Household Income, Water Bills and Affordability

The proportion of household payments for water in total household expenditure and the influence of income and geographic factors are of particular interest in any assessment of the affordability of present and future charges for water. The survey did not seek to cover household expenditure, a field of considerable empirical complexity, but did request approximate estimates of total household cash income and of the last month's household water bill. Cash income is taken here as a rough indicator of household expenditure and is likely to be rather less on average for low income households with additional non-cash income and rather more for high income households with a greater savings propensity.

The definition and quality of data from the income question are discussed in another section. As regards payments for water, respondents were asked to give the water component of their monthly water and electricity bill. Interviewers were briefed to suggest that they refer to the actual document and in some cases were able to verify the amount. If the precise amount could not be given, they were asked to give an estimate. A further question sought to identify those households without electricity; 5 per cent of households stated that they did not have electricity. Nearly all the remainder receive combined bills for municipal services, mainly water and electricity. Interviewers made a particular effort to distinguish the water charge from the rest.

The quality of the data is nevertheless more mixed than might have been expected (see table H53). Some 18 per cent of respondents either did not answer the question or said they did not know the amount. On closer disaggregation it turns out that the response rate was particularly poor in the middle income suburbs. Arandis recorded only 49 per cent, Tamariskia only 59 per cent and western Narraville (its most affluent section) 50 per cent, although from a small number of households. Elsewhere, the rate was generally above 90 per cent except in several of the Town suburbs of Walvis Bay (70-80 per cent). The factors behind this striking anomaly, one of the few strong area contrasts to affect the response rate to survey questions, are unknown. It is possible that middle income households were generally more reluctant to disclose their water bills because they were suspicious of the motives for the question, but this is speculation. The fact that they tended to show a stronger propensity to cut their water consumption at step increases on their present water bills points towards a sense of pressure on their household budgets.

8. Evidence summarised and analysed by Katko 1989, p.70-71; Winpenny 1994, p.44-45 & table 4.1.
9. Katko 1989, table 4; Winpenny 1994, p.45 & table 4.2.

Also affecting the quality of the data is the wide variation in the proportion of water bills in household cash income. Few answers to this question are likely to be understated; thus anomalies show up as high percentages. They arise either from understated monthly cash incomes, commonly where the respondent has given a figure for only themselves rather than the whole household, or from overstated water payments, either because the total amount due has been given rather than the water charge or, less often, the annual rather than the monthly amount. Occasionally there may be good reason for the last month's water bill to take a high share of monthly cash income, but in order to weed out a high proportion of probable errors an upper ceiling of 15 per cent was imposed. This procedure excluded a further 15 per cent of those answering the question, the remainder forming 69 per cent of the total sample. The answers from this subset are further analysed below.

The geographical distributions reveals Swakopmund to stand out as far above the other towns in both mean monthly cash income and the last monthly water bill. Its household income was half as much above that of Walvis Bay (N$4209 to N$2831) and its mean water bill nearly double (N$111 to N$58). Arandis and Henties Bay were close to Walvis Bay except that in Henties Bay water was higher (N$80). The regional means for the sub-sample were N$3087 for income and N$76 for water.

As might be expected the ratio of water bill to household income differed less markedly between the towns (see figure 40). Swakopmund, Walvis Bay and Arandis were all within 0,5 per cent of the regional mean of 2,5 per cent. In other words, on the whole households with higher cash incomes paid higher water bills, though Swakopmund was noticeably higher than Walvis Bay (2,6 to 2,0 per cent). The striking exception is Henties Bay which has a much higher ratio of 5,4 per cent. This result is probably attributable to two factors, first that Omdel residents have by some way the lowest mean incomes in the region; and second that the Town area combines high water bills with the fairly low incomes of some of the year-round residents captured by the survey.

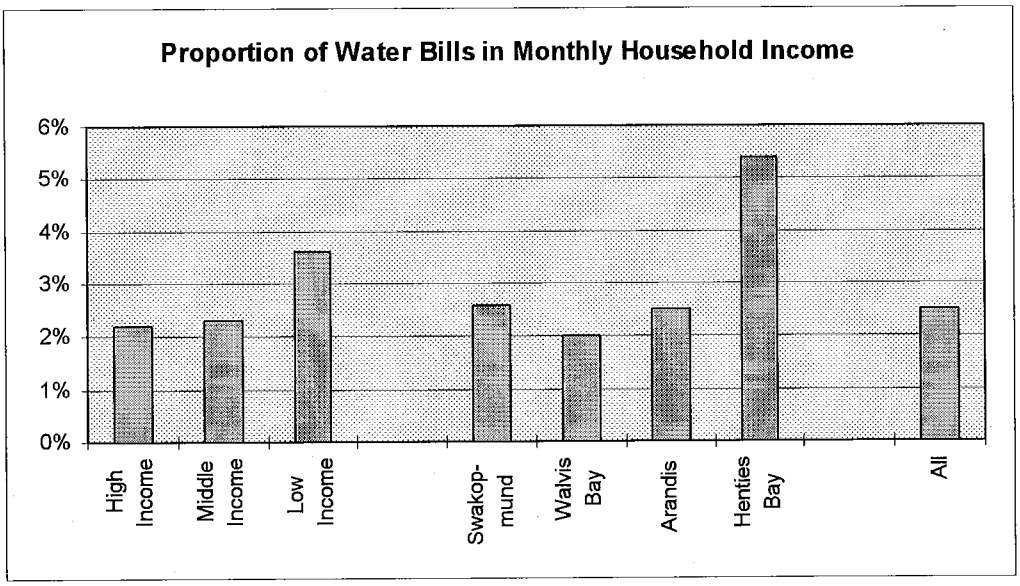

Figure 40

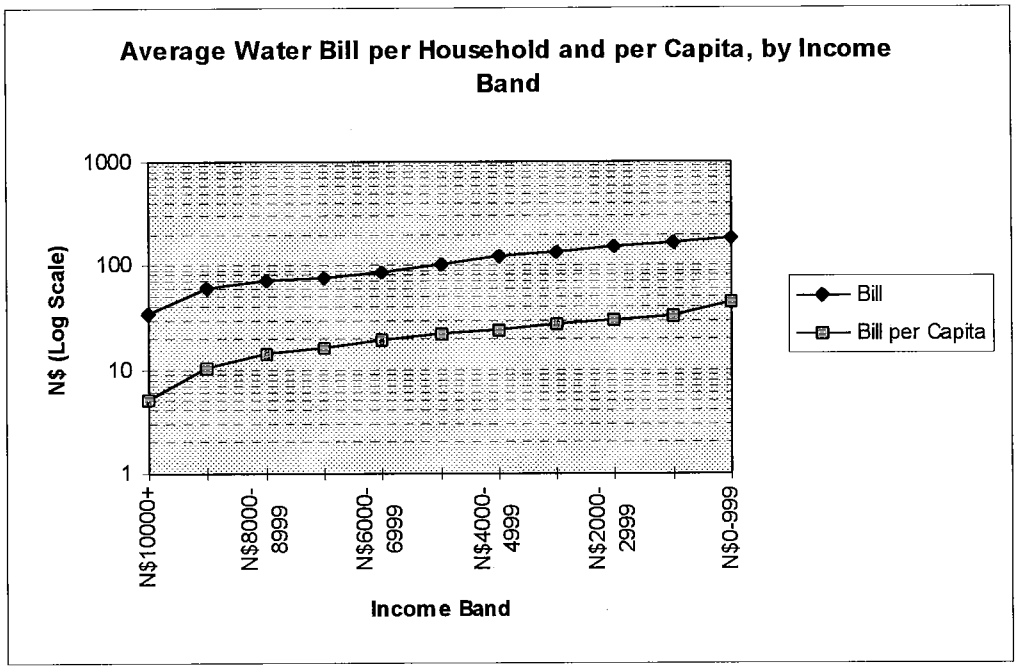

Figure 41

There are quite marked socio-economic differences. The monthly water bills for the low and middle income suburbs were similar but only half the level of the high income suburbs (N$54, N$57 and N$105 respectively). Differentiated by household income band, affluent households receiving more than N$10 000 per month spent more than ten times as much per capita on water as the poorest households receiving less than N$500 per month (see table H56). Per capita spending on water rose from N$10.14 in the lower-middle income band N$1000-1999 to N$18.84 per month in the upper-middle income band N$4000-4999 and N$43.16 at the top of the income scale above N$10 000 per month.

However the proportions of water spending in household income showed the reverse pattern between the low, middle and high income suburbs (3,6, 2,3 and 2,2 per cent). In other words, those who consume less water can ill afford it while those who consume much larger quantities can more easily afford to pay for more water. This strong imbalance is also reflected in the implied distribution of aggregate income from water charges: 25 per cent derived from the low income suburbs, 17 per cent from the middle income suburbs and as much as 58 per cent from the high income suburbs (see table H55).

Viewed at the household level, slightly over half of the sub-sample had water bill to household income ratios below 3 per cent, a quarter above 5 per cent and 5 per cent in the 10-15 per cent range. There is clearly a strong correlation with income (see table H56 and figures 41 and 42). Households in the lowest income brackets (below N$1000) had average bills well below N$50, less than half those in the middle brackets (N$2000-4000) and less than a fifth of those at the top of the scale (N$10 000 plus)[10]. They nonetheless paid a substantially higher proportion of their monthly incomes, as high as 9.9 per cent for the poorest households below N$500 per month and still 4.3 per cent for lower-middle income households (N$1000-2000). Only above N$3000 did the ratio fall below 3 per cent and above N$5000 it reduced to 2 per cent and below. Even allowing for data anomalies, the strongly skewed distribution indicates that on the whole low income households using small amounts of water largely for basic needs paid a much higher proportion of their income for it than did affluent households consuming much larger amounts of water, a substantial part of it for discretionary purposes such as garden watering.

10. The mean monthly cash incomes used here are for the whole sample rather than the sub-set, which may distort the ratios slightly.

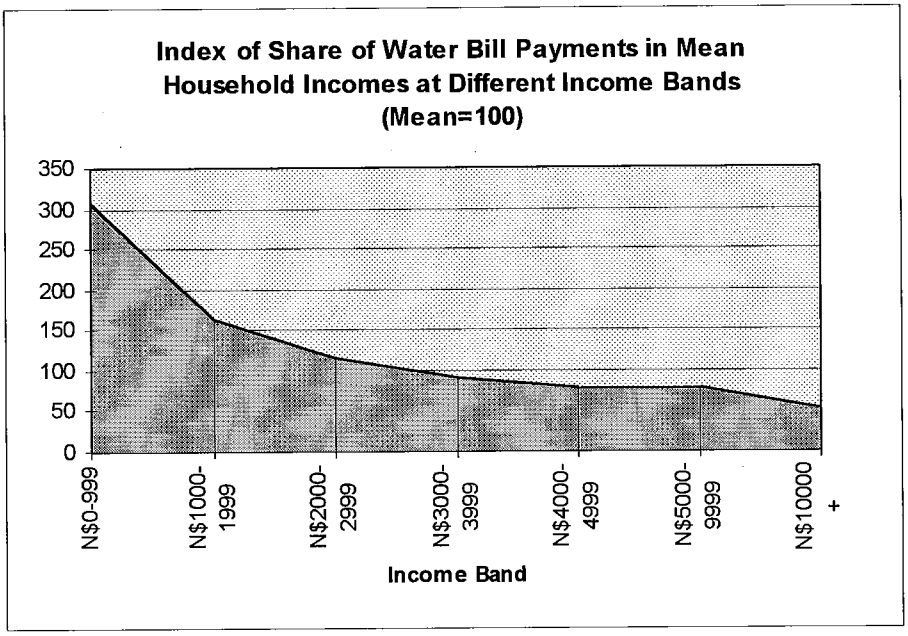

Figure 42

The distribution also suggests that while low income households can ill afford any increases at all in water charges, upper-middle and especially high income households could afford to pay substantially more. Taking the ratio of the water bill to mean household income, while the poorest households paid three or four times as much of their incomes as the regional average, households earning above N$3000 paid less, above N$5000 78 per cent of the regional average and above N$10 000 only 50 per cent (see table H57 and figure 42).

International comparisons need to be drawn with due caution since the isolated, small-scale and fully commercialised desert context of the Namib coastal towns is unusual. Selective comparisons nonetheless provide some useful yardsticks. By way of contrast, the proportion of the cost of drinking water in the annual household income of working class households in 1987 in 15 European countries lay in the much lower range of 0.3 to 1 per cent[11]. On the other hand, survey and consumption figures from 11 developing country cities in the early 1970s revealed a variable but generally regressive pattern in which on average the poorest 20 per cent of consumers paid the largest proportion of their monthly income for water (3.6 per cent) and the highest 20 per cent paid least (1.0 per cent), while the middle bands were fairly evenly spread (between 2 and 3 per cent). In five cases the poorest consumers paid more than 4 per cent but in no cases did the richest 20 per cent pay more than 2.5 per cent[12].

These proportions are broadly similar to the results of this survey and in nearly all cases reflected social contexts of large-scale urban poverty combined with severe income inequality. The Namibian distribution is nevertheless much wider and in particular the poorest households pay substantially more than did the lowest 20 per cent in any of the 11 cities except Manila and Addis Ababa. Elsewhere, in many instances water takes a higher proportion of household income but typically in the absence of a common piped water supply where water is supplied from other sources and often distributed by vendors. In such contexts it is not unusual for poor households in slum conditions to pay up to 30 per

11. Katko 1989, p.48-9 & figure 4.1. Ahmedabad, excluded here because its pattern differed radically from the rest, had proportions rising from 4.25 per cent for the lowest to 27.19 per cent for the highest.
12. Based on Katko 1989, table 4.1, citing Saunders and Warford 1976.

cent of their income for their domestic water; one study concluded that 'the price paid for vended water is typically ten times as high as the price paid for piped water'[13].

A threshold of 5 per cent has sometimes been taken as an appropriate affordable limit on the proportion of household income spent on water[14]. By that norm many of the poorest households in the coastal towns are now paying substantially more for their water than their incomes can reasonably be expected to sustain. Equally, most middle income households are below the limit and all upper income households are substantially below the threshold. The regional mean of 2,5 per cent, although an approximation, suggests that the west coast as a whole is well below the ceiling and that a substantial increase in water charges could be absorbed by middle and upper income households even in the absence of strong income growth. The fairly high income elasticities of water demand at the upper income levels tend to suggest that price elasticities may be correspondingly low, although they could not be calculated directly.

If such an adjustment were made, the bills of households receiving cash incomes above N$3000 per month and especially above N$5000 per month could be doubled and still remain below a 5 per cent ceiling which is likely in the long run to be itself lower than the threshold of affordability for affluent households wishing to keep large gardens. These middle and upper income households, although under a third of all households in number (29 and 18 per cent respectively), are also responsible for the bulk of revenue, having contributed nearly three-fifths of total water payments (56 and 35 per cent respectively). In other words, higher increases in charges for heavy users, through graduated block tariffs, would yield substantial increases in revenue if their price response remains, as expected, relatively inelastic.

That higher charges on heavy domestic consumers might be feasible is further indicated by the fact that average per capita consumption is high by international standards at the upper end of the income range. The mean of 358 l/p/d in the Town suburbs of Swakopmund and Walvis Bay compares with a 'typical' consumption rate of 150-200 l/p/d or 200-300 l/p/d generally in developed countries[15]. Both the regional and middle income suburb averages (respectively 188 and 186 l/p/d) are towards the lower end of the international urban range while the low income suburbs (86 l/p/d) are a long way below.

In a social context of sharp income inequalities between households and communities, an equitable domestic water pricing regime may be difficult both to establish and to achieve consensual support. However, as pointed out in a recent international survey[16]:

> Water is often wasted because it is underpriced. Direct and indirect subsidies... are still common in both developed and developing countries. Removing such subsidies and letting water prices rise can provide incentives for conservation and for the investments needed to spread more efficient technologies... Charging user fees for urban and industrial users that fully reflect costs not only can provide incentives for efficient use but also can help to finance the needed infrastructure to expand services to new users.

13. Roth 1987, p.245 and table 4.1, citing Zaruff & Okun 1984.
14. Ratko 1989, p.48.
15. Roth 1987, p.231; Winpenny 1994, p.45.
16. *World Resources 1996-97*, p.304-5.

6 WATER SAVING

6.1 Attitudes towards Saving and Wasting Water

6.1.1 General Views on Saving and Wasting Water

Respondents were asked the general question whether in their view it was important for people to save water. They were offered four options on a graduated scale and requested to select one (see table H58).

Perhaps not surprisingly the great majority (87 per cent) considered it very important to save water and most of the remainder (6 per cent) thought it quite important. Only 5 per cent thought it of little or no importance. Although a positive response to such a value question is to be expected, the strength of the response points to a developed community awareness of the importance of water provision in a desert environment and a positive attitude towards water saving strategies.

This result is also the common pattern across the towns and suburb types. 10 per cent in Swakopmund thought it of little importance to save water. But 86 per cent (in Walvis Bay) was the lowest proportion thinking it very important. At the socio-economic level the only minor variation was in the 8 per cent of households in the upper income suburbs considering it of little importance to save water. Equally, 98 per cent of households in the middle income suburbs considered it quite or very important.

Respondents were also asked their opinion whether people in the community were wasting water. The majority (59 per cent) answered no but a large minority (36 per cent) considered that people in general were wasting water. There is thus likely to be a general receptiveness towards community-wide water-savings campaigns.

Attitudes on this point are noticeably harder in Swakopmund than in the other towns. The 46 per cent considering that people did waste water compares with 32 per cent in Walvis Bay, 36 per cent in Arandis and 25 per cent in Henties Bay (see table H59). But attitudes were fairly uniform across the socio-economic spectrum. 34 per cent of households in the low and middle income suburbs thought that people wasted water and 39 per cent in the upper income suburbs. Given that more water per household and vastly more per person is consumed in affluent households, the nearly equal strength of opinion between well-off and poor households provides an interesting commentary on attitudes towards social responsibility for water usage.

Those believing that people wasted water were further asked to name what in their opinion were the most wasteful practices. 36 per cent of households answered and named an average of 1,7 practices each (see table H60). The highest category of choices was garden use (30 per cent) and excessive garden watering was the largest single category overall (21 per cent). Washing vehicles too often came a close second (20 per cent). Wasteful practices inside the house accounted for 41 per cent of choices, the most popular being taps left open and wasting by children (14 and 10 per cent). Both commercial activities and local authority maintenance and use (5 and 3 per cent) came low on the list. Overwhelmingly therefore respondents were concerned with wasteful practices at the household level and viewed their control as being a matter of household responsibility.

6.1.2 Responses to Water-saving Publicity

In reply to a question testing awareness of water-saving publicity, only 15 per cent of households stated that they were not aware of any publicity; another 2 per cent did not answer (see table H61). 50 per cent said they aware of publicity put out by the government, 44 per cent of publicity put out by the municipality but only 5 per cent of publicity put out by employers. 81 per cent of respondents named only one publicity source, 17 per cent named two and 1 per cent named three.

A breakdown of the results reveals that the government features fairly uniformly across the towns with between 47 and 54 per cent of households indicating awareness of publicity from government sources. But differences between the local authorities are much stronger. Whereas 51 per cent of respondents in Walvis Bay were aware of municipal publicity, only 39 per cent were aware in Swakopmund and Henties Bay and 32 per cent in Arandis. Lack of awareness of any publicity was also more prevalent in Henties Bay (31 per cent) and Arandis (24 per cent) than in Swakopmund and Walvis Bay (16 and 14 per cent respectively).

A significantly higher proportion of households in the high income suburbs were aware of government publicity than in the middle and low income suburbs (56 against 48 and 45 per cent). The proportions were reversed for local authority publicity (42 against 46 and 49 per cent). It appears that the government is more effective in getting through to higher income households and local authorities to low income households. The numbers not aware of any publicity were about even (15-19 per cent). The numbers making multiple responses were slightly more for the high income suburbs but not by much (20 per cent against 16 per cent).

As a follow-on question those who indicated awareness of some form of water-saving publicity were asked what effect it had made on their water using disposition (see table H62). Most answered that it had made them more likely to save water (65 per cent) and only small numbers that it had made no difference or made them less inclined to save water (6 and 5 per cent respectively). But a sizeable proportion didn't know or did not answer the question (3 and 22 per cent).

6.1.3 Priorities for Saving Water

In order to focus on priorities for water-saving in the house respondents were asked to rank six listed options for reducing their household's water consumption if less water had to be used. Four of the six attracted a response rate of over 80 per cent overall and the remaining two, washing the car and hosing the driveway, would not have been options for less well off households lacking the equipment but still got a response rate of around 70 per cent (see table H65). This latter percentage indicates that at least some respondents were advancing opinions for households in general rather than for their own practice alone.

Of the six options, switching from bath to shower received 19 per cent of first choices, more in the middle and high income suburbs than in the low income suburbs where very few houses had baths (20-25 to 13 per cent). Having fewer baths or showers was supported by 14-16 per cent in the low and middle income suburbs but by only 2 per cent in the high income suburbs where it could be the most effective. This rather surprising result suggests either a low awareness of the water savings that could be achieved or a reluctance to make personal sacrifices in more affluent households. Both watering the garden and washing the car got 15 per cent first choice support in the high income suburbs and laying dust/hosing the driveway got 36-37 per cent support in the high and low income suburbs but only 22 per cent support in the middle income suburbs.

The final reduction option, washing clothes, received much higher support in the low than the high income suburbs (21 to 8 per cent). For poorer households clothes washing is in relative terms a major water consumer. In more affluent households it stands amongst a greater diversity of water uses. Nevertheless its much lower ranking indicates that it is regarded amongst more affluent households as a basic need even though in many the use of washing machines would consume more water than the hand washing which prevails in poorer households.

6.1.4 Technological Responses to Future Increases in Charges

A similar question was designed to test the propensity to respond to higher water charges by investing in new water-saving technology as an alternative to strengthening water-saving practices (see table

H66). Most accepted the premise of the question and only 7 per cent of households answered that they would do neither, the highest ratio (10 per cent) being in the low income suburbs where reduction of an already low level of personal water consumption is more difficult to accept.

Nearly half of all households said their preference was for water-saving practices alone, but 15 per cent preferred fitting new devices and 28 per cent would use both practices and devices. Strong income-based differences were evident. Water-saving practices were most popular in the middle income suburbs, reinforcing their profile as the most acutely cost-conscious of the three income groups, and least popular in the high income suburbs (67 to 37 per cent). The high income suburbs had much the strongest preference for adopting both practices and technology (44 per cent), which reflects their ability both to afford the cost of devices and to reduce discretionary consumption; water-saving technology as first or joint preference scored 56 per cent compared with under 25 per cent in the middle and low income suburbs. The low income suburbs emerged with a stronger preference than the middle income suburbs for combining devices and practices but otherwise the patterns were similar.

There are also marked differences between the towns. Swakopmund had by far the strongest preference for a combined approach and the lowest preference for relying on practices alone (44 and 37 per cent). Arandis, reflecting its middle income status, had the highest preference for relying on practices alone (71 per cent). A sole or combined preference for water-saving devices to reduce consumption was highest in Swakopmund (54 per cent), around 40 per cent in Walvis Bay and 20-30 per cent in Arandis and Henties Bay.

It is noticeable that a combined preference featured strongly (40-50 per cent) in the older suburbs of Mondesa and Kuisebmond where household water fixtures are very limited and the use intensity at times extreme; what would commonly be regarded as new devices in these areas would be taken as standard basic needs fixtures in the middle and high income suburbs. The high preference rating for new devices in the high income suburbs is a stronger indicator of a willingness to adopt specialised water-saving technology on top of or replacing installed standard fixtures in order to reduce existing discretionary consumption.

6.1.5 Water-saving Methods and Practices

In order to assess people's level of awareness of water-saving methods in house and garden respondents were asked to list any methods they knew. The interviewers were asked to help people to answer in their own words and then to match their answers to the most appropriate options in a list of 25 common water-saving methods, to which 'none' and 'other' were additional choices. They then asked which actions respondents had actually taken in this house, this time reading out the list of methods.

Perhaps not surprisingly selections of actions taken were somewhat more numerous than methods known. People answering the second question were already sensitised by the first, had a list to choose from and were motivated to attest to their good water management behaviour. The average number of selections per household was thus 5,7 for practices taken and a lower 3,7 for methods known (see table H67). The largest gaps between knowledge and practice, in the 10-15 per cent range, were in the garden section for repairing hosepipes and shortening their use; and in the house section for dealing with leaking and dripping taps, using less bathwater, turning taps off at the basin and for dishwashing, and making full loads for the washing machine.

Knowledge of water-saving methods was rather narrow (see table H68). 18 per cent knew only a single method and 15 per dent knew two. The number able to list five or more was only 29 per cent and 10 or more only 3 per cent. Turning to actions taken, the average number of choices increased. Nearly half (48 per cent) took five or more and 16 per cent took 10 or more. In fact 5 per cent of households claimed to have implemented more than 15 water-saving actions. These higher ratios may reflect rather more aspiration than application but nonetheless can be seen as representing at the least positive

intentions. Comparing the gaps for each household, a third of households selected the same number of methods as actions, 44 per cent named more actions than methods and 24 per cent named more methods than actions. The balance was thus on the side of improving future performance. In fact 17 per cent selected more than five more actions than methods and 7 per cent selected more than ten more actions than methods.

Turning to the water-saving practices themselves, only 6 per cent of households said they knew no methods and 5 per cent that they had taken no action. These are very low proportions and the great majority selected the general option 'use less water' for both method and action (66 and 75 per cent). Choices under the specific categories were fewer although in the action column one exceeded 40 per cent of households, a couple exceeded 30 per cent and quite a few were between 20-30 per cent. In the methods column many responses were in the 10-20 per cent range.

One group of actions covered outside water use, mainly on gardens. The highest rating action was to reduce garden watering (methods 21 per cent, actions 29 per cent). Actions reducing the direct application of water to garden use rated well and included not letting the hose run a long time (13 and 26 per cent) and not laying dust/hosing the driveway (8 and 16 per cent). Avoiding evapotranspiration by watering early and late was well supported (11 and 21 per cent), but more efficient application of water to plants by channelling scored low. Using dirty housewater in the garden was quite high, an interesting result given that gardening is mainly an activity of the high income suburbs. Repairing leaky hosepipes rated far higher as an action than as a method, indicating that it is a common experience.

Both reducing the incidence of car washing and switching from hose to bucket achieved fairly high scores (action 24 per cent for each). Since most low income households do not have cars and nearly all households in the high income suburbs do, the proportions will be rather higher in the latter and indicate at the least a widespread awareness of this common water-saving option.

Inside the house options relating to taps scored well, including fixing leaks (24 and 39 per cent), stopping drips (the highest at 32 and 47 per cent), and keeping taps turned off while basin washing (10 and 22 per cent) and dishwashing (14 and 28 per cent). These options would have been accessible at all income levels. Putting full loads into washing machines was more significant than its 21 per cent action rating since washing machines are mostly confined to middle and upper income households. The four actions to reduce bath and shower water usage all scored well and in fact rated higher because three of the four related to baths, which few low income households possess. The results indicated a general awareness of the main methods of reducing water use for body washing, a major component of domestic consumption. Training children in water-saving habits and stopping them from wasting water was also popular (27 and 36 per cent) and suggested a generally well developed sense of adult responsibility for establishing a water-aware household culture.

Less obvious techniques attracted smaller support. Neither putting a brick in the cistern nor fitting short/long flush cisterns, both ways of cutting toilet consumption significantly, got above the 10 per cent level. Nor did fitting a low-flow shower head (2 and 7 per cent). There is considerable scope for improving community awareness of simple water-saving improvements to water fixtures.

6.1.6 Policy Preferences on Reducing Consumption and Paying for New Infrastructure

In order to gauge opinion on how the costs of new bulk supply infrastructure should be met, two general policy questions were put. The first asked respondents to rank four methods of achieving equitably a necessary reduction in overall water consumption (see table H69 and figure 43). Some 23 per cent of households explicitly opposed either price or rationing instruments in favour of a voluntary approach encouraging people to save water. This proportion was uniform across the income divides but varied considerably between the towns, Swakopmund coming out much more strongly in favour of a voluntary approach than Walvis Bay (34 to 17 per cent) and the small towns. Swakopmund also had

the highest level of support, though not by much, for the compulsory imposition of supply restrictions on households (26 to 23 per cent).

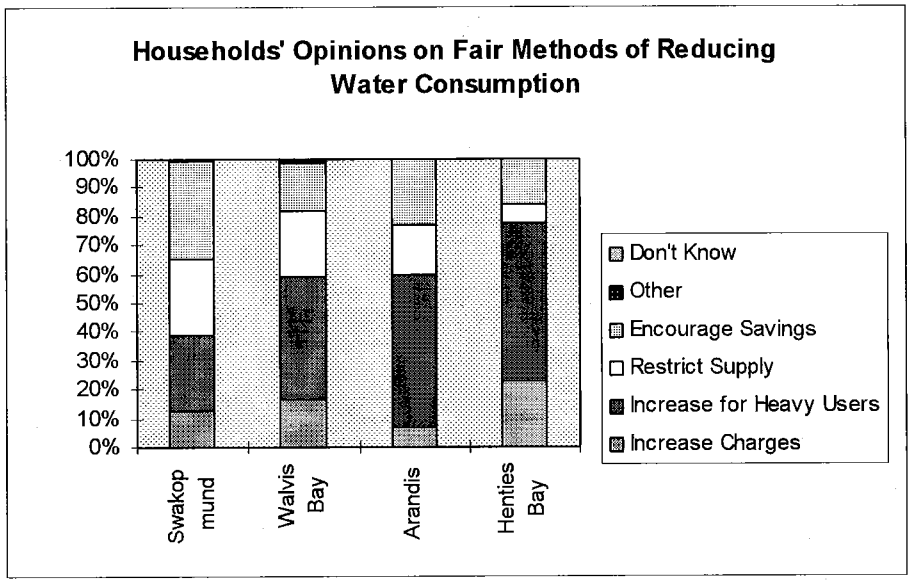

Figure 43

This seeming paradox is resolved by Swakopmund's much lower support for a price-based policy, its 39 per cent favouring increases in water charges lagging well behind the 59-60 per cent for Walvis Bay and Arandis and the 78 per cent for Henties Bay. Overall support for increasing water charges as the best fair method was nevertheless at more than half of all households. 15 per cent favoured a general increase in charges for all consumers but far more wanted to place the burden on heavy consumers (39 per cent).

Interestingly, there was more support for this more equitable approach from the middle and high income suburbs than from the low income suburbs. Although the tendency to believe in the normality of one's own consumption and that others consume more heavily may have been prevalent, few households in the high income suburbs can have been under any illusion that a graduated scale of water charges would not hit their areas hardest. Thus there seems to be general community support, much weaker in Swakopmund, for the type of banded charge scheme that municipalities have recently begun to introduce as a fair method of achieving required water savings. However, it should be noted that variations between the suburbs are frequent and sharp with little consistent income or area pattern evident. If accurate, they point to divided opinions on the policy issue and a need for more extensive community education and public consultation.

The second general question asked who should pay the cost of installing additional bulk supply capacity to one town in the region. The aim was to switch the focus from forced reductions in consumption to approaches to funding increased supply. The 'one town' stipulation was designed to simplify the focus and avoid complications over the distinction between town and region for an integrated bulk supply network, a distinction which is a local issue and surfaced at the public consultation held in Kuisebmond during the survey. Respondents were offered five funding options grouped into local and national categories (see table H70 and figure 44).

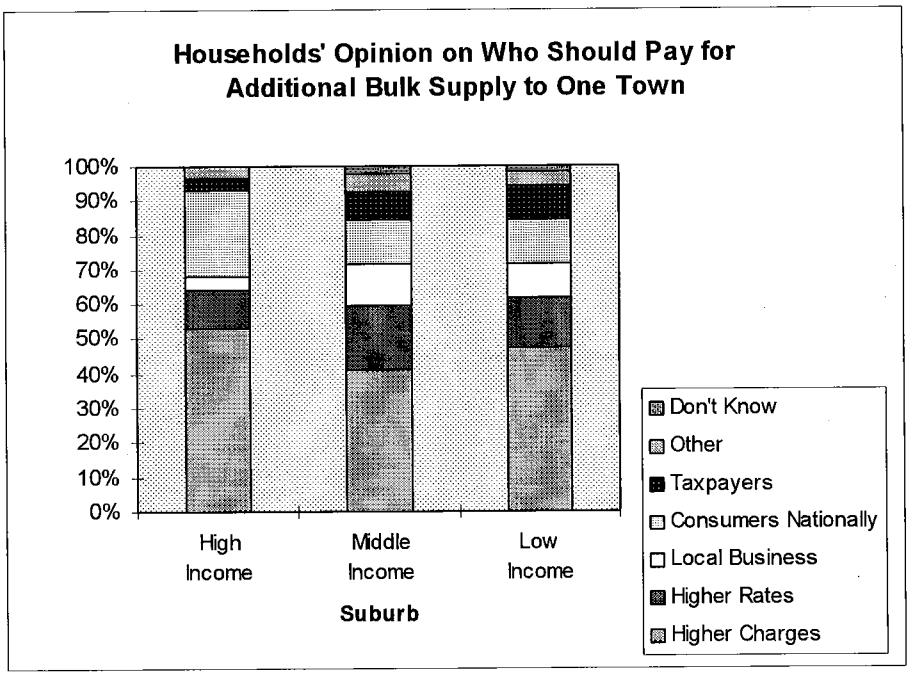

Figure 44

Overall, 70 per cent of households favoured local responsibility with the additional cost to be met either by users (49 per cent), by ratepayers (14 per cent) or by local employers (8 per cent). Another 25 per cent wanted to spread the burden nationally through a general increase in water charges or through taxation. 4 per cent wanted other solutions. Local employers were not seen as major targets and the highest ratio of 10 per cent was in Walvis Bay where company power and affluence is more prominent. Ratepayers were also not heavily targeted and the low and middle income suburbs were not much above the ratio for the high income suburbs which would undoubtedly bear most of the burden of any charge on the rates. Nearly half thus favoured higher charges on water consumers and again there were surprisingly small differences between the towns and the income levels.

The quarter of all households going for a national solution would either have considered this an equitable approach or have viewed the cost as too high to be entirely financed from the given town's own resources. More favoured higher charges than higher taxes (18 to 7 per cent). The number favouring national financing was perhaps smaller than might have been expected given that the bulk supplier is national and the towns' supplies come from an integrated regional supply network. The results point to a widespread community concern for local responsibility and local solutions.

6.2 Perceptions of Water Supply Agencies

Respondents were asked to state who supplies their tapwater. The question was intended not to yield factual information since except in the reception area of Omdel virtually all households were already known to be connected and to receive municipal supply, but to test people's perception of the most important public authority associated with their water supply.

Three-quarters of households named the municipality as being responsible for their water supply, but as many as 17 per cent named the government (3 per cent), DWA (7 per cent) and other agencies (6 per cent), and 4 per cent did not know (see table H63 and figure 45). These results do not mean that some water consumers are unaware that the municipality to which they pay their monthly bills actually supplies their water, but rather that some perceive other agencies as being more important in the overall supply of their domestic water.

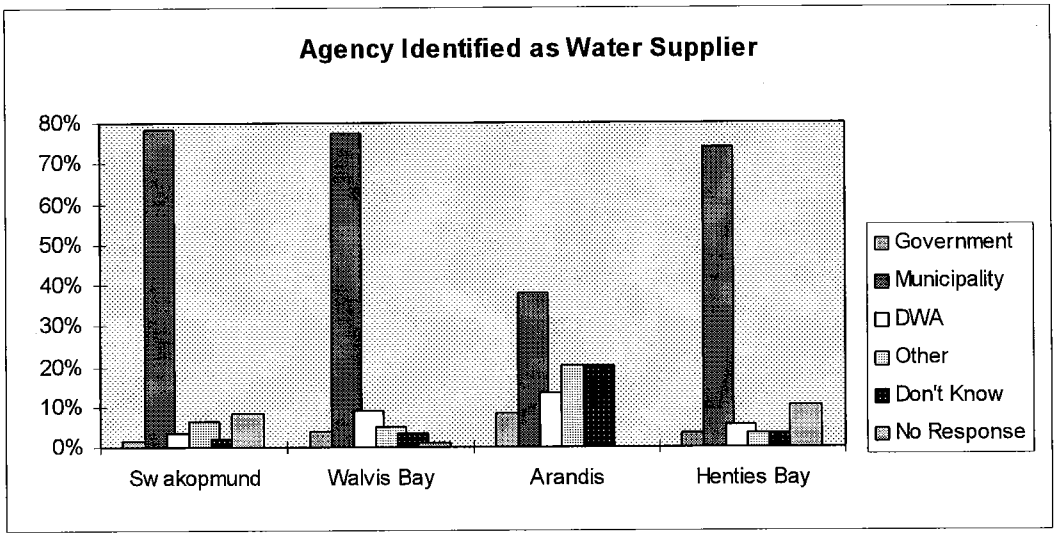

Figure 45

Respondents were also asked about the reading of their water supply. The questions were aimed not at generating technical information but rather at gauging consumer's level of confidence in the state of repair of the fixtures and, indirectly, in the performance of the local authority staff responsible for meter readings and water accounts.

Nearly all residential consumers are supplied through metered connections: 98 per cent said that they had a water meter, only 1,7 per cent did not and 0,2 per cent did not reply (see table H64). Two exceptions show up in a pattern of almost universal household connection: 7 per cent of households in Arandis and 11 per cent in Omdel stated that they had no water meters. In Arandis, where all the housing is to a company-built standard, the likelihood is that they were disconnected rather than without meters. This factor may also account for a small number of reported non-connections (5 per cent) in the west of Kuisebmond. In Omdel, on the other hand, a minority of houses even in the established western part of the suburb, where the survey sample was concentrated, may still be without connections.

Respondents with meters were close to unanimous in confirming that their meters were working, accounting for 97 per cent of all households with only 0,8 per cent saying that they were not. However, an appreciable minority, 9 per cent of all households, considered that their meters were not giving accurate readings of their water consumption. Another 5 per cent did not answer or didn't know and 82 per cent were satisfied with the accuracy of their meters.

Amongst those not satisfied with their meter readings, there are moderate variations with income level. The lowest dissatisfaction rate was in the high income suburbs at 4,8 per cent, the highest in the middle income suburbs at 17 per cent with the low income suburbs in between at 10 per cent.

A geographical breakdown reveals sharper differences (see figure 46). Swakopmund recorded very low dissatisfaction rates in all suburbs, the town's average being 1,1 per cent and only the affluent suburb of Kramersdorf recording a significant exception at 17 per cent. In Walvis Bay the dissatisfaction rate was generally higher than Swakopmund with a town mean of 15 per cent. In the Town suburbs the rate was low except for the east which was high at 22 per cent. In Kuisebmond the rate was low in the central and southern areas but high in the older west and especially the newer north (14 and 38,5 per cent). Dissatisfaction was more widespread in Narraville (24 per cent), indicating a general lack of confidence. The chief problem area was Narraville West where fully half of all consumers were not satisfied and only 36 per cent declared themselves satisfied.

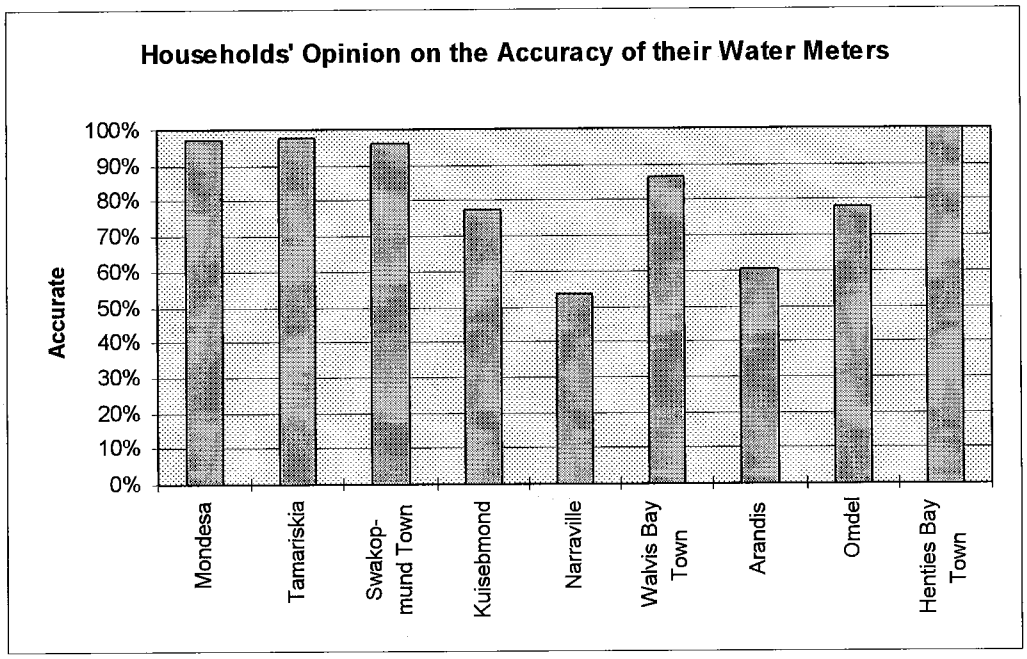

Figure 46

Arandis was another problem area. In addition to the appreciable number saying they did not have water meters, another 17 per cent were not satisfied that their meters gave accurate readings, leaving only 61 per cent who were. Interviews with town council and RUL officers suggested that there might be conflicting opinions between council and community as to the reliability of the capture of meter data, either in the field readings or their keyboard entry into the council's accounts system. Of the three sets of monthly water meter data analysed for this study, the Arandis database contained the largest number of apparent internal inconsistencies.

Despite problems in some areas, the overall pattern is of general confidence in the functioning and accuracy of the water meter system, with most consumers accepting that the quantities appearing on their accounts reflect their actual consumption of piped water.

The great majority of water consumers pay their bills in cash at municipal offices (see table H52). The regional average is 73 per cent of all respondents, while 15 per cent pay by cheque. A number (9,5 per cent) indicated that someone else pays their bill. It is probable that the 'someone else' was usually another member of the same household not present at the interview; otherwise, very few did not know or failed to answer the question.

The overwhelming majority of households (94 per cent) in low income suburbs pay in cash. The proportions for middle and upper income suburbs are lower (70 and 47 per cent) with correspondingly larger numbers paying by cheque. But the custom of cash payments is strongly entrenched, which implies that one or more members of most households visit their council payment offices at least once a month.

7 SINGLE QUARTERS

7.1 Population and Living Conditions

7.1.1 Social and Housing Conditions

For reasons explained earlier it was not possible to carry out the planned survey in the Walvis Bay compound or the Swakopmund single quarters. However, the old and new single quarters were surveyed with a sample of approximately 1 accommodation unit in 8 and a total number of 47 units.

The question arises to what extent the Walvis Bay single quarter results can be generalised to the other two areas. They all share the fact of ownership by the respective municipalities but the types of accommodation, conditions of letting and socioeconomic composition are not uniform. The old single quarters comprise long narrow shed-like buildings partitioned into rooms and facing inwards onto a common yard area. The accommodation has many of the characteristics of a barracks. In that respect it has similarities with the compound, which has, however two key differences: the rooms are larger and access is controlled through a single guarded entrance. The Swakopmund single quarters has a more complex variety of building types and room sizes ranging from long shedlike rows with 10 or more small rooms back to back at the northeastern end to smaller blocks with two or three larger rooms in parts of the central and southwestern areas. The new single quarters (the Otto Kabanab flats) are also smaller semi-detached houses laid out unenclosed on an open sandy area.

A second key difference between the single quarters and the compound in Walvis Bay is that a substantial proportion of the accommodation is rented by large employers, primarily the pelagic fish processing companies to house their seasonal contract workers for the duration of the pilchard canning season, which for the last 20 years has generally lasted no longer than 2-4 months. The municipal compound was originally built mainly to replace the fishing companies' privately run compounds during the pre-1972 contract labour period when all their seasonal labour was channelled through the semi-official recruiting agency, the South West African Native Labour Association (SWANLA), which had a monopoly on the supply of labour from the northern reserves.

In recent years the municipality has moved away from centralised control towards transferring rooms on block leases to the major employers housing workers there. Information obtained from the municipality suggests that in 1995 roughly 56 per cent of the accommodation was assigned to five fishing companies and other employers both in and outside the industry rent space for their employees (see table S1 and figure 47).

Living conditions in the compound differ markedly from those in the single quarters. The complex was designed on the lines of the enclosed barrack-like mining compounds on the Rand in order to concentrate large numbers of short-term male contract within a single controlled space. Its current capacity is rated at 5400 sleeping spaces, which consist of concrete bunks in rooms housing either 16 or 28 persons each with no private and very little social space. The density is very high and approaches 40 persons per 1000 m^2 at full capacity, which it usually approaches during the pilchard canning season from about March to June. At other times of the year it is often largely empty although this is partly a function of policy on access. Immediately after Walvis Bay's reintegration into Namibia in March 1994 it provided a base for a large influx of several thousand jobseekers. However, they were forced out by a police/army operation in late 1994 and gate control was tightened to allow access only to registered tenants.

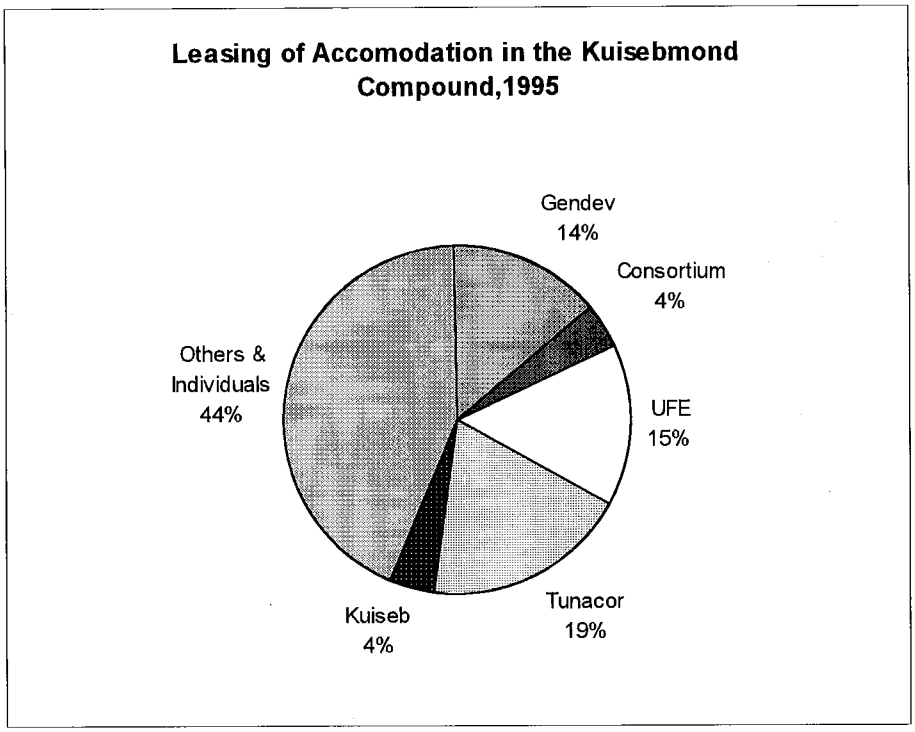

Figure 47

Generally, compound residents are almost exclusively male, employed and from the densely populated mixed farming regions of the far north. A base population lives year-round, expanded during pilchard canning by a large influx of workers on short seasonal contracts. During this period the work process is intensive and shifts can run for 12 hours per day continuously. The compound functions as a dormitory for eating, washing and sleeping with extremely limited facilities for social activity.

7.1.2 Water Consumption and Payment Regimes

In the compound, included in the block company leases is responsibility for the water supply to the rooms, which is separately metered and paid on block accounts by the lessees. This transfer has been enabled by a move away from the former reliance on communal ablution facilities and the installation of basic toilet and shower units in each room, although the conversion is not yet complete. Hot water is nevertheless still centrally heated and piped to the rooms.

Compound residents have very limited choice over the uses they make of water. The cramped facilities make access to fixtures difficult, especially when the compound is full and the factories are working shifts. The fixtures are grouped in communal units either in separate blocks or inside the dormitory rooms. The conditions allow for little more than the satisfaction of the basic needs of washing, cleaning and cooking.

The municipality has observed a steep increase in water consumption in the compound since 1990. It has attempted to improve social access to toilet and washing facilities by transferring them into the rooms and to reduce wastage by fitting such devices as pressure-operated taps. However, the spartan infrastructure severely restricts the scope and impact of such improvements. Because water is still centrally heated, for example, residents experience that it takes long to arrive at the tap or shower. Workers arriving off shift to queue for washing space often prefer to keep the showers and taps continuously open in order to speed up the process. Notwithstanding these problems the average

consumption of water per resident is still fairly close to the levels recorded in the residential sections of the low income suburbs.

Residents of the single quarters in both towns share with compound residents the fact that the cost of their water supply is a fixed component of their rent. Even when they are paying rent directly rather than their employers, there is thus no price incentive to either reduce or increase their consumption. However, the limited number and rudimentary character of water fixtures severely restricts people's access to water. In the old single quarters of Swakopmund and Walvis Bay many must still rely on separate ablution blocks. In the newer Otto Kabanab flats of Walvis Bay kitchen, washing and toilet fixtures are installed in the houses but provide only basic amenities. Here, the water supply to the houses is separately metered but the meters are not read and residents pay fixed charges for water as part of their rent.

7.1.3 Population Structure

There are some broad demographic similarities between the single quarters in Walvis Bay and Swakopmund as revealed by the 1995 sample survey and the 1991 census results respectively (see tables H1c and S2). The very low proportion of 11,3 per cent under 14 years in Walvis Bay compares with 12,5 per cent under 15 years in Swakopmund. The high numbers of working age are also close at 87 and 83 per cent respectively (15-64 and 14-64 years respectively). But there are differences. The Walvis Bay population has probably greater seasonal variation as some fish factory prefer to stay outside the compound. The Swakopmund population is also likely to be more diverse in both regional origin and employment sector.

A reasonable conclusion may therefore be that broad comparability obtains between the Swakopmund and Walvis Bay single quarters but that the Walvis Bay compound stands out as a separate case.

The summary data published at the enumeration area level from the 1991 census allows a rudimentary social profile to be constructed for the Swakopmund single quarters (see table H1c). The age distribution of the population was heavily concentrated in the working age band. Children under 15 made up only 12,5 per cent of the population of 3519 and elderly aged 65 and over were very few at 0,8 per cent. People in the 15-64 age band comprised 86,7 per cent and for men the ratio was 90,3 per cent. The heaviest concentrations were in fact in young children below 5 years (10,0 per cent) and young adults between 15-45 (76,2 per cent).

The sex ratio was strongly male-biased and females constituted only 27,9 per cent of the population and 24,9 per cent in the working age band between 15-64 years. Women made up only 12,5 per cent of the total number employed and only 31 per cent of women aged 15 and over were in jobs, compared to 72 per cent of men. Women also recorded a higher open unemployment rate of 28 per cent compared to 21 per cent for men. The figures indicate that the single quarters population consists primarily of workers and jobseekers with high rates of unemployment and that a substantial proportion of women fall into those categories. But residents are by no means uniformly single and the high incidence of small children and younger adults suggests a substantial number of young families or single women with children. Variations between the four enumeration areas of the single quarters into which the census data was divided are relatively minor compared to the general pattern.

Although the extrapolations are approximate the sample survey results point towards a total population of about 3000 in the Walvis Bay single quarters with 1256 in the old section and 1744 in the new section (see table S2). These numbers are more than three times the total of 914 recorded at the 1991 census, although difference is moderated by the fact that the census was taken just before the start of the pilchard canning season and the survey was taken at the end of the 1995 season when workers and jobseekers filled the compound and single quarters. They are also reduced from the high point of the

post-integration period before shanty housing erected in the new single quarters area was dismantled and removed in a police operation in early 1995.

The age distribution of the population of the Walvis Bay single quarters is fairly similar to that of Swakopmund (see figure 48). Excluding the 4 per cent of individuals whose age was not stated, only 11,3 per cent of the population were under 14 years and 2,5 per cent 65 and over. The adult working age population between 18-64 years made up 76,9 per cent of the population overall, rather lower in the old than in the new section (69,7 to 84,3 per cent). Even allowing for the probability that adults were reported more fully than children, these ratios are very high and confirm that most occupants are young adult workers or jobseekers. The fact that both here and in Swakopmund appreciable numbers of young children nevertheless live in accommodation designed for single persons living communally testifies to the social pressure for family accommodation.

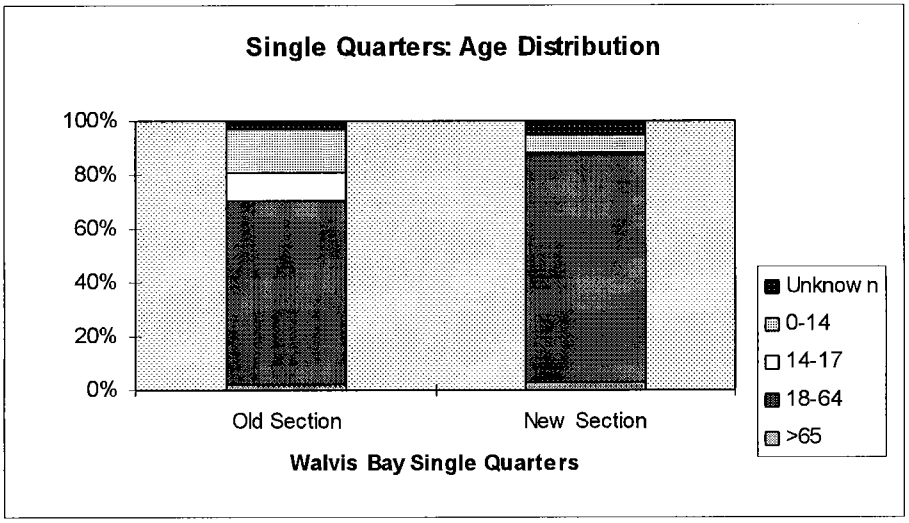

Figure 48

Less detail is available on sex ratios than in the census statistics but the overall female ratio of 35 per cent amongst adults 18 and over is similar to that of the Swakopmund single quarters (see table S3). As might be expected the ratio is lower for the new section than it is for the old section (31 to 39 per cent).

7.1.4 Residential Densities

Residential densities in both towns are very high. In Swakopmund the estimated 1995 population of 5949 occupies approximately 850 separate accommodation units of varying size but mostly small single rooms. The mean of 7 persons per unit, although a very rough estimate for lack of precise figures, is far higher than the nominal number of beds available. In Walvis Bay the densities are higher still. The overall average was 10,2 persons and 8,1 adults per unit but the old section was substantially lower than the new section (8,7 to 12,4 persons per unit). In the new section, where for most of the houses each half is designed to accommodate four persons, the ratio of persons to sleeping places was 3,1 for rated capacity, 2,7 for beds actually counted and 1,4 for all types of sleeping facility (see tables S2 and S5 and figure 50).

In other words, in units designed as bare dormitory accommodation for single occupants living communally, on average more than three times as many people were sleeping in each unit as its rated capacity. The average number of beds was actually higher at 4,5 per unit and even then made up barely half the sleeping places (52 per cent), those unable to get beds using couches (17 per cent), chairs (7

per cent) and floor space (24 per cent) (see table S4 and figure 49). Given the small number of children, this intensity of overcrowding for a predominantly young adult population in small areas would have required the use of most available floor space, including kitchen areas, for sleeping as well as a degree of shift sleeping.

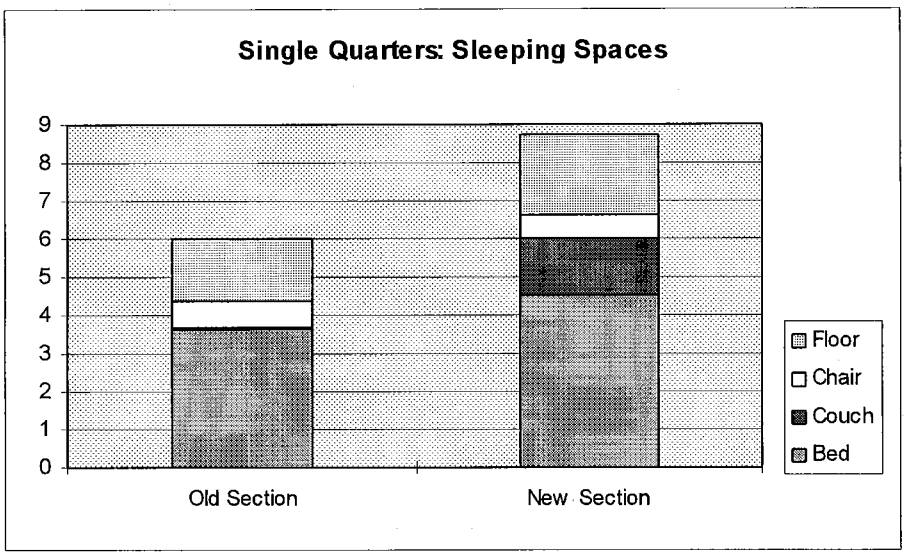

Figure 49

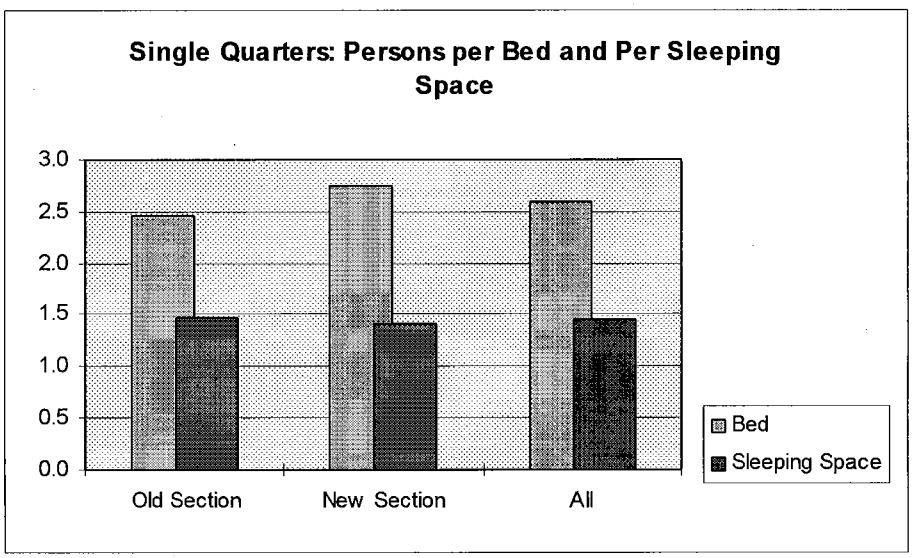

Figure 50

7.1.5 Language

As in the compound the main home language in single quarters households is OshiWambo, 73 per cent in the old section, 94 per cent in the new section and 81 per cent overall (see tables S6 and S7 and figure 51). Nama/Damara is the only other language to figure significantly. On the other hand, as is common throughout Namibia all the households had competence in second languages. As few as 11 per cent had only one second language, 51 per cent had two 32 per cent had three and a small number had four and five second languages. Afrikaans was by far the most common of these (68 per cent of

households), followed by English (36 per cent), OtjiHerero (13 per cent), OshiWambo (11 per cent) and Nama/Damara (4 per cent). In view of the predominance of OshiWambo it is interesting that Portuguese hardly registers at all, suggesting that few people originating from the Angolan side of the border reside in the single quarters.

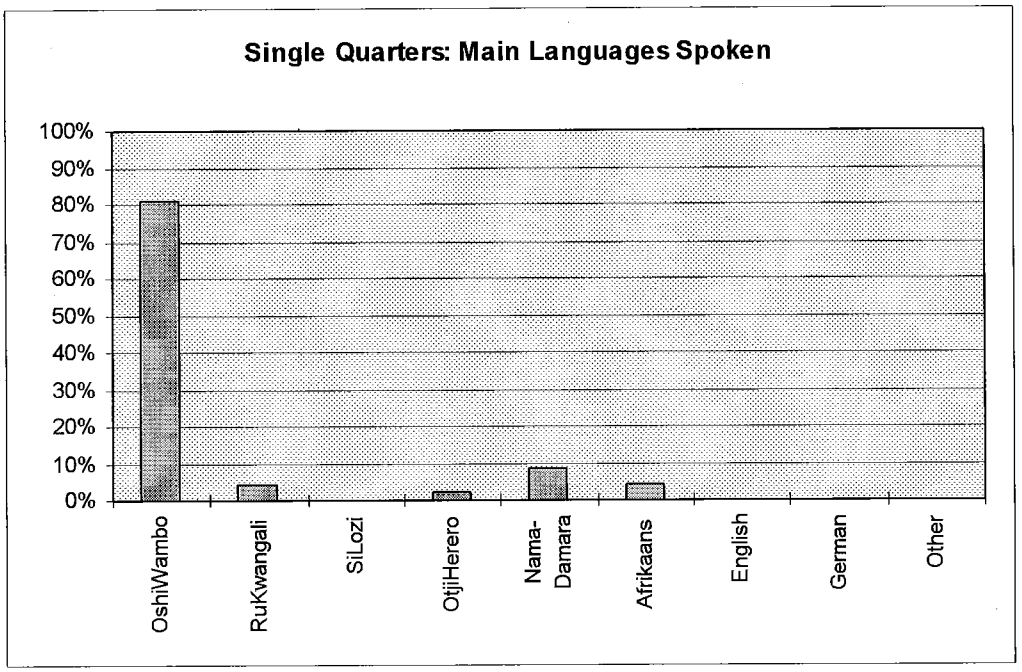

Figure 51

7.2 Patterns of Water Usage

7.2.1 Informal Sector Activity

Informal sector activity is much more common in the single quarters than in the residential low income suburbs. As many as 53 per cent of households were engaged in some kind of income-generating activity (see table S8). Of the identified activities making and selling tombo was by far the most popular, accounting for half the total instances. Selling beer and liquor was also common (24 per cent of instances). However, the range of activities appears narrow and to comprise mainly reselling rather than manufacture. Making tombo is the only major identified activity requiring water.

7.2.2 Usage of Outside Water and by Outsiders of Communal Facilities

Few households in the new section fetch water from outside the area, all having internal water fixtures. But in the old section a large proportion of households (61 per cent) said that they often fetched water from outside the single quarters (see tables S9-S11). Many of the 43 per cent who specified public taps may have meant the communal ablution blocks on which old section residents must still rely, but 21 per cent specified nearby houses and 11 per cent other sources. Respondents identified as motives for going to outside sources overcrowding at the communal taps (18 per cent) but also other particular purposes (25 per cent), implying that some had specific regular uses of water outside the single quarters. A quarter said they went outside to shower, 14 per cent did clothes washing and 11 per cent had other purposes.

Respondents were asked whether they thought that outsiders often used the communal facilities (see table S12). While most in the new section thought not, the majority in the old section (59 per cent) where the communal blocks are located said that outsiders did use them often. Similar proportions stated that the outsiders used all the facilities - toilets, showers, taps and washbasins - indicating that the problem was in their view a general one.

7.2.3 Usage of House and Communal Facilities

Asked what water fixtures and equipment they themselves used, most used showers but virtually none had hot water (see table S13). In the new section nearly all had inside cold showers (95 per cent) but a minority said they also used outside showers (21 per cent). In the old section respondents were evenly divided in the use of inside and outside showers. Most in the new section but rather fewer in the old section used fixed hand basins (79 to 32 per cent). The proportions were reversed in the use of moveable basins for body and clothes washing and of fixed laundry basins, which were more common in the old section. Asked if they went to the toilet on waste ground, nearly all in the old section said they did not but in the new section, where overcrowding is most intense, about a quarter each said they did so often or occasionally (see table S14). As discussed earlier, the type and number of water fixtures is so limited that in the overcrowded conditions it is difficult for residents of the single quarters to satisfy even basic water-use requirements.

7.3 Water Saving and Wastage

Faults in water fixtures appear to occur more commonly in the old section of the single quarters (see table S17). Asked if water leaks had occurred over the last three months in fixtures that they commonly used, half identified instances compared with a still rather high 26 per cent in the new section. Furthermore, more than half of those reporting leaks said that they had not yet been fixed. The rate of disrepair in predominantly communal water fixtures which these responses imply is far higher than in any of the residential low income suburbs.

The field interviewers observed very few instances of either water leaks or water wastage in the new section but in the old single quarters the incidence of both was very high at close to half of households visited (see table S18). This was the only area in the entire survey to record a significantly high ratio of observed leaks and wastage and reflects general conditions around the communal ablution blocks and taps.

Respondents were asked to rate one of the more conspicuous practices of personal water wastage, leaving taps or showers running after use. In the new section nearly two-thirds (63 per cent) said never, but in the old section 21 per cent said often and 36 per cent said sometimes. The sharp difference reflects mainly the difficulties of personal responsibility for managing overcrowded communal facilities open to residents and outsiders alike. Opinion in the old section is strongly of the view that household control of water fixtures would lessen water wastage. Asked what difference having access to piped water in their rooms would make, 61 per cent said that it would be reduced, none that it would be increased and 23 per cent that it would make no difference.

Respondents were asked to name water-saving methods without prompting (see table S15). A quarter said they knew none and 43 per cent replied generally that less water should be used. Of the more specific remedies, most popular was closing taps tightly and stopping drips (28 per cent), followed by turning the tap off while washing at the basin (21 per cent) and never leaving the tap running (19 per cent). When then asked which methods they had applied in their houses the incidence of positive responses was commonly 12-20 per cent higher than for the same category unprompted, pointing in general towards a positive attitude to personal water-saving discipline where practicable.

Residents gave differing reasons for action they took to save water during the past year (see table S16 and figure 52). More than half (55 per cent), the highest response, took the general view that water was scarce. Three of the other four options attracted responses in the range 17-24 per cent. These fairly low response rates may reflect a lack of applicability to their own situation, in which the lack of opportunity either to waste or to make excessive use of water is pervasive.

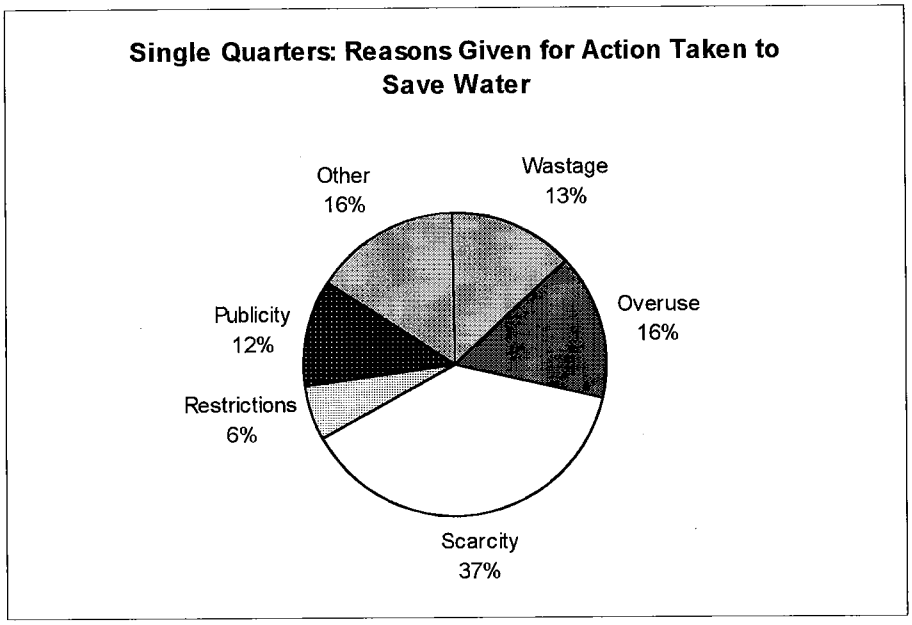

Figure 52

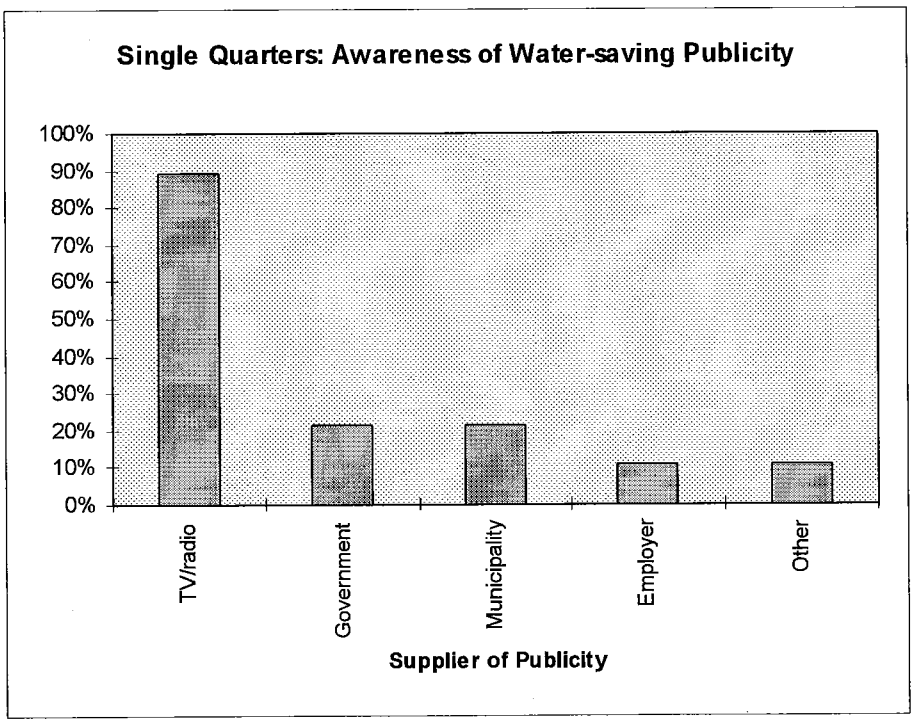

Figure 53

Asked to rate the general importance of saving water, nearly all (96 per cent) regarded it as very important (see table S19). This is one of highest response rates of any section of the community and indicates a strong awareness of the costs of supply in a desert urban environment. Opinion was evenly divided as to whether people in general wasted water (yes = 51 per cent). That wasting is regarded as prevalent is perhaps surprising for a community with such difficult access to water and may reflect a sense of lacking control over their water-using practices.

Nearly all residents (85 per cent) identified the municipality as the supplier of their water, a higher proportion than in many other suburbs (see figure 53). A fifth each said they were aware of water-saving publicity put out by the government and the municipality but by far the highest rating went to TV/radio (89 per cent). Employers figured poorly (11 per cent). The response to the publicity was generally positive, two-thirds saying it made them more inclined to save water (see tables S22 and S23).

7.4 Preferences for Improvements to Water Infrastructure

Most residents - 63 per cent in the new section and 75 per cent in the old section - consider that the water facilities at their disposal are inadequate to their needs (see table S27). In the old section those of this view were virtually unanimous that improvements were needed in all the main categories: toilets, showers, taps and washbasins. A general dissatisfaction with the communal ablution blocks prevails. Asked how they should be improved, most wanted to increase the number of each facility. A few favoured more efficient repairs and for showers some wanted better quality fixtures. The focus on quantity reflects the lack of in-house water and the overcrowding of the communal facilities.

As for new communal facilities, more than a quarter of residents in the old section preferred improvements to the existing blocks (see table S28). But nearly half (46-50 per cent) in each case favoured three options for new communal facilities: baths, fixed basins for washing clothes and fixed basins for dishwashing.

Inside the houses all residents in the old and new sections wanted additional indoor water fixtures and few accepted that it would not be practicable to provide them (see table S29). The lack of indoor taps is reflected in the higher proportion in the old than in the new section placing them on the wish list (68 to 32 per cent). A similar difference applies in the case of flush toilets (61 to 47 per cent). Proportions in the three other categories, hand basins, shower units and kitchen sinks, are similar between the old and new sections and generally in the 40-60 per cent range. Demand in the new section may in practice focus on improved or additional units rather than new installations as in the old section, but the responses generally point to a strong desire for improved water fixtures and widespread suppressed demand for household water.

In order to gauge preferences respondents were asked to rank the same new facilities in order of priority for action with a maximum of three choices (see table S30). In the new section showers, toilets and kitchen sinks for the houses were each selected by about 25-30 per cent of households but new communal facilities also had priority: 32 per cent for baths, 37 per cent for clothes washing and 21 per cent for dishwashing. In the old section the emphasis was more strongly on in-house facilities: 47 per cent for toilets, 36 per cent for kitchen sinks, 34 per cent for shower units and 25 per cent for taps.

7.5 Ability and Willingness to Pay Consumption Charges

Nearly all respondents indicated that they would be prepared to pay consumption charges for a water supply direct to their houses (see table S31 and figure 54). Such unanimity is striking in view of the fact that none of the single quarters residents were paying water charges varying with consumption. Most, however, indicated that they could afford only small charges without hardship: 55 per cent could

pay no more than N$5 per month, 19 per cent N$10 per month and 11 per cent N$25 or more per month.

These hardship limits are likely to be understated since few households in the single quarters have experience of paying separate consumption charges. In practice many could probably afford the average water bills of residential households in the low income suburbs. Contrary to commonly held perceptions it is unlikely that the single quarters have the lowest mean household income. Data from the income question are too inconsistent to generate reliable results from what is a fairly small sample size. The raw data indicates nevertheless some large variations in gross monthly cash income per household and per adult member. Most households comprise mainly young adults and although open unemployment may be high the proportion of wage-earners is also higher than in the residential suburbs. Some households are large and several in the sample had more than 20 adults in a unit rated at only four beds. The combined income to these grossly overcrowded households would have been sizeable.

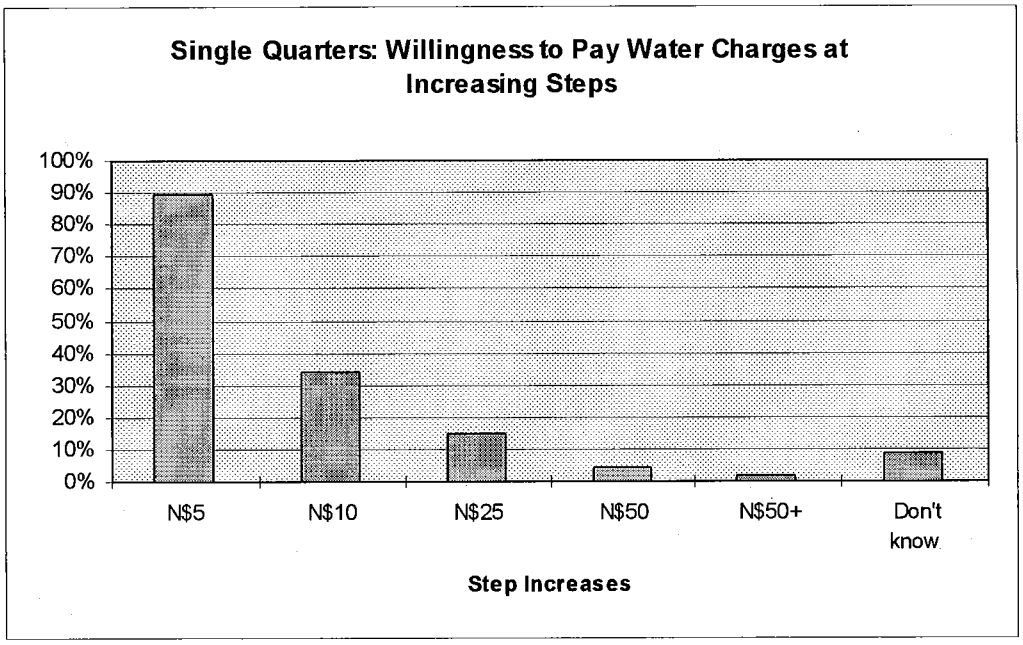

Figure 54

The predominance of men in the adult population and of industrial and commercial employment also lifts average wage-rates since relatively few are in the lowest-earning occupations such as house-servants. Job insecurity is, however, a key factor: many work on short-term contracts with the constant risk of either permanent or long seasonal layoffs. Those in employment, especially in the fishing industry, tend to work all hours on offer to maximise earnings before the work runs out. Ability to pay, including higher future as well as present charges at the current rate of water consumption, may therefore appear more problematic in the slack fishing season than at the peak when the survey was taken. The same applies to the likely acceleration of permanent settlement in family housing in the coastal towns with larger spending liabilities and a rising dependency ratio.

It is probable that many, probably most residents of the single quarters are today long-term rather than temporary tenants. Some would stay on through seasonal layoffs and others would return the next season if forced out for periods to other towns or the rural communal areas. Many also intend to move to more permanent local housing. Respondents were asked whether they intended to try to find other local housing within the next two years (see table S32). Just over half (51 per cent) said they did, giving

a spread of choices over a range of nine housing types. Most popular were NHE houses (15 per cent), a privately built house (8,5 per cent) and a 'government' house (11 per cent). Very few intended to move to backyard shacks, rented rooms or an employer's room/flat. These figures point to large and sustained demand for new low income housing which, to the extent that it is supplied, would provide greatly improved water fixtures and user access than are now available to single quarter residents. There is thus a sizeable potential for the release of suppressed domestic water demand as housing shortages are alleviated.

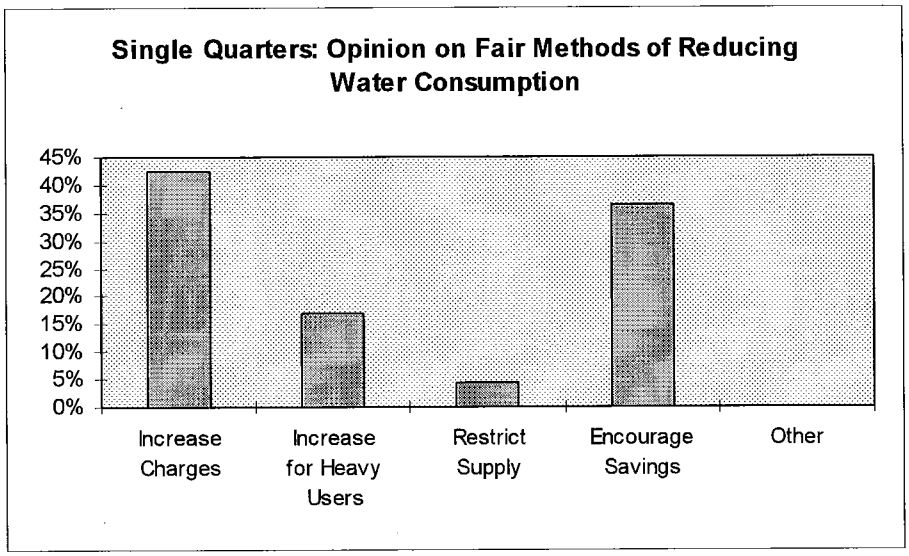

Figure 55

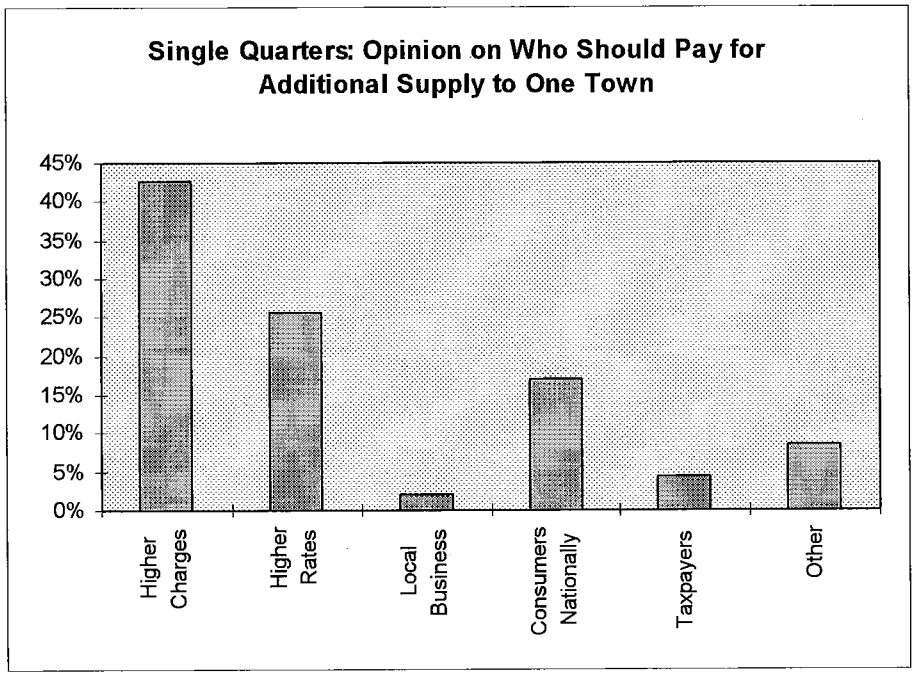

Figure 56

7.6 Policy Preferences on Reducing Consumption and Paying for New Infrastructure

On the issue of equitable methods of reducing consumption, nearly two-thirds favoured a price mechanism, 43 per cent opting for increased water charges for all consumers and 17 per cent favouring increased charges for heavy consumers (see table S25 and figure 55). A third (36 per cent) preferred voluntary persuasion. Hardly any wanted compulsory restrictions on supply. The degree of support for price incentives is striking in one of the most water-deprived sections of the community.

On who should bear the extra cost of additional bulk water supply infrastructure to a particular town, two-thirds favoured local responsibility, 43 per cent supporting higher general water charges, 26 per cent supporting higher rates on property owners and 2 per cent wanting local employers to carry the burden (see table S26 and figure 56). Another 17 per cent favoured spreading the cost to all Namibian water consumers and only 4 per cent supported payment through higher taxes.

8 SMALL AND MEDIUM SIZED BUSINESSES

8.1 The Survey

A separate survey was taken of small and medium sized businesses. The chief criterion for identifying large enterprises, which were to be interviewed individually and in greater detail, was average water consumption and the threshold was set at 3000 m^3 per month. Large commercial consumers as well as institutions were identified from the municipal accounts. However, the criterion was applied pragmatically. For example, all fish processors situated along the fishing harbour waterfront were classed as large, as were all hotels and pensions, while a handful of large consumers within the CBDs were included in the survey. At the other end of the scale, small businesses located outside the CBD and shopping centres, in private houses or on the open ground were excluded.

In terms of aggregate water consumption the net effect of the exclusions is considered to be relatively small. There are few large water consumers within the CBDs and industrial areas and double counting in the survey and large consumer interviewing is thus restricted to a handful of cases at best. Most small businesses excluded from the survey consume little if any water. That this is the case with informal sector activity was indicated in the household survey which asked for basic data on income-generating activities. On residential plots very few used water in any quantity. In the Walvis Bay compound and particularly the Swakopmund single quarters, in and around which most such activity is concentrated, it is generally very small in scale and geared to reselling basic consumer goods or to making food, the one exception being home-brewed tombo and liquor. A striking feature of the urban business environment is how comprehensively the dominance of formal sector commerce has kept street-level vending out of the CBDs, with the exception of a few handicrafts aimed at the tourist market.

Within the CBDs and industrial zones the survey set out to achieve as comprehensive a coverage as possible of enterprises having street-level public access, including multi-occupied blocks and shopping malls. This objective was determined partly to overcome the lack of reliable sampling instruments, since the Swakopmund municipality did not maintain a separate record of commercial water consumers and in Walvis Bay the records of commercial consumers were regarded as seriously inaccurate and were undergoing a complete review. However, in adopting this approach it was anticipated that most businesses thereby excluded would be office-based and using water solely for staff consumption, mainly in toilets, washrooms and kitchens, during working hours.

8.2 Numbers, Distribution and Water Consumption

The 263 enterprises questioned in the survey were almost equally divided between Swakopmund and Walvis Bay (51 and 49 per cent). Some 70 per cent were located in the CBDs and suburban shopping centres and 30 per cent in the industrial zones, with similar balances in each of the towns (see table B1).

The 263 businesses employed a total of 2562 regular employees at the time of the survey, averaging 9,7 per establishment. There were, however, quite marked spreads in size ratios. Only 17 per cent employed either one or two persons, while 31 per cent employed 3-5 persons and 24 per cent employed 6-10. Larger enterprises employing more than 20 were under 10 per cent and only 4 reported employing more than 50.

The distribution of staff per is rather more skewed towards the larger enterprises (see table B6). Those employing 5 or fewer numbered nearly half the total (48 per cent) but had less than 16 per cent of the total employees. The 9 per cent of enterprises employing more than 20, on the other hand, accounted for 36 per cent of total employees. Typical such establishments would be supermarkets and builders.

The average number of staff per establishment was much the same between the Swakopmund and Walvis Bay CBDs (7,0 and 8,7) and between the CBD and industrial zone in Walvis Bay. But the industrial zone average was much higher in Swakopmund (17,9), which pushed the town's overall mean.

Nearly all the establishments (95 per cent) had piped water on their premises. Most of these indicated that they had their own toilet and washroom facilities, only 4 per cent having to rely on nearby outside facilities (see tables B2 and B3).

Whereas all respondents gave estimates of their current staffing level, the response rate on their most recent water bill was fairly low at 60 per cent; in other words, 35 per cent of establishments having piped water did not give details of their water bill. In many cases this could be attributed to that fact that the bill was paid elsewhere, since some 24 per cent reported that another agency (such their landlord or head office) was responsible. Others did not have their details to hand at the time of interview or , more often, the interviewee was not responsible for payments and did not have access to the information. Nevertheless the rate of response was sufficiently evenly spread to give a fairly clear indication of the general pattern.

The last monthly water bill, covering consumption in May/June in most cases, averaged N$179 per establishment, but much less in the CBDs (N$132) than in the industrial areas (N$274) (see table B1). Here the differences between the towns was more pronounced than in the case of employment. Swakopmund's industrial zone average was more than double that of Walvis Bay (N$391 to N$162), attributable mainly to a handful of large accounts above N$1000. In the CBDs the position was reversed with Walvis Bay substantially higher (N$169 to N$104).

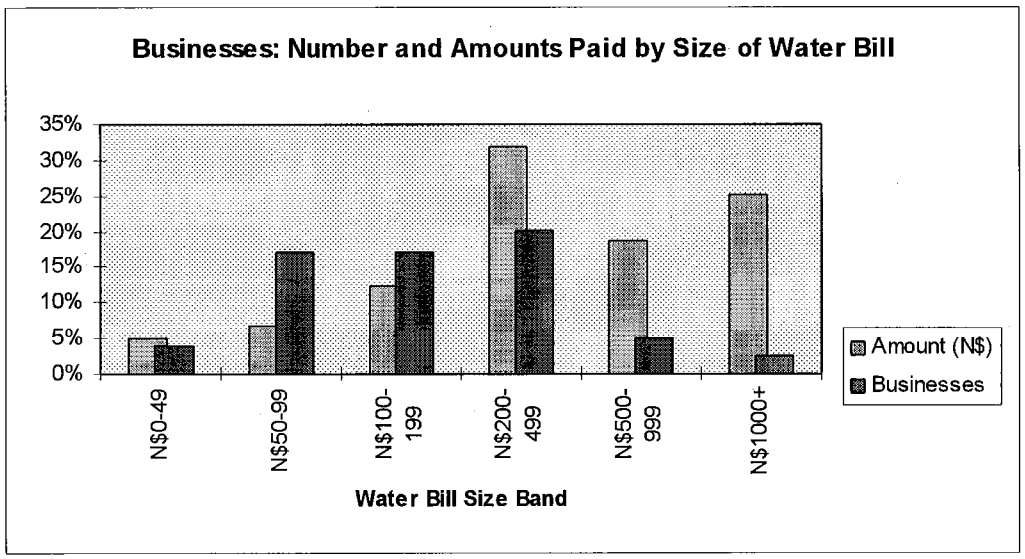

Figure 57

The general picture is that most businesses consumed relatively little water (see table B7 and figure 57). As many as 38 per cent of respondents giving details had bills below N$50, 17 per cent were under N$100 and another 17 per cent were under N$100. Less than 8 per cent paid N$500 or above. These heavy consumers nevertheless accounted for 44 per cent of the total monthly bill while the 72 per cent paying under N$200 were responsible for only 24 per cent of the total bill. Comparing the towns, Swakopmund comes out substantially ahead with 58 per cent, while the CBDs and industrial zones had roughly equal shares in total consumption.

One useful indicator of the intensity of water usage is the average water bill per staff member (see table B8 and figure 58). Taking the 158 businesses which reported their last month's water bill, it is clear that those with small numbers of staff had much the highest ratios. Establishments with one employee spent N$85 per person on water and those with two spent N$43 per person. In the middle bands between 3 and 20 employees the ratio was in a narrow range between N$19-N$22 per person, while for larger employers it was lower at N$8-9.

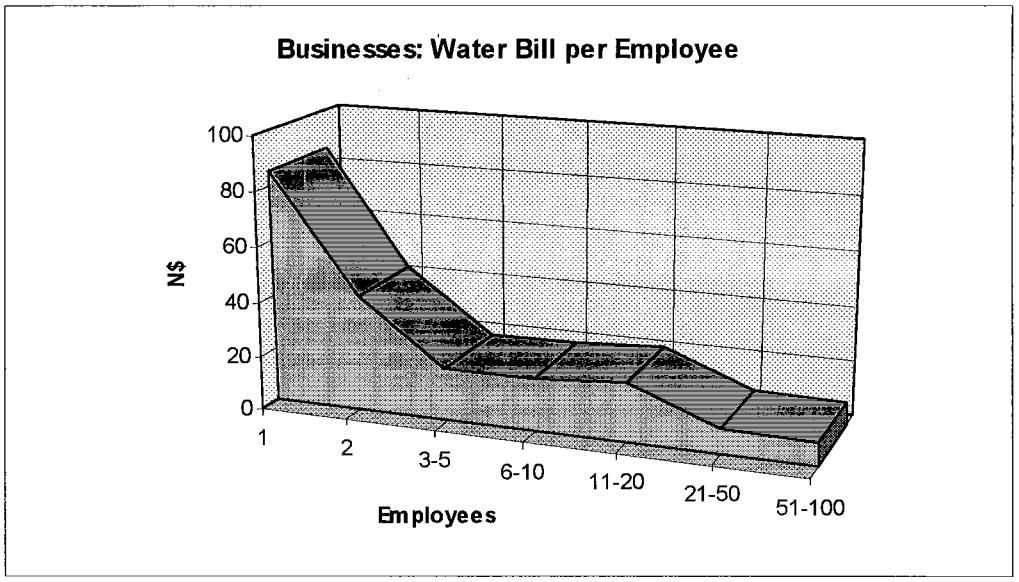

Figure 58

The one- and two-employee businesses were, however, a fairly small proportion. They accounted for only 14 per cent of all businesses reporting their bills and 7 per cent of the aggregate water bill for those businesses. Establishments in the middle consumption band were predominant with 71 per cent of businesses and 74 per cent of the total monthly bill. In the lower band, the larger establishments numbered 12 per cent and paid 23 per cent of the total bill. The overall mean of N$18 per person is thus reasonably representative. Generally, while a few heavy water users account for a substantial component of water consumption in the small/medium business sector, the intensity of water use per employee tends to fall rather than rise with increasing size of staff establishment.

A number of differences emerge between the CBDs and the industrial zones. The CBDs and suburban shopping centres have 70 per cent of total businesses but 56 per cent of total employment. Similarly they comprise 66 per cent of those reporting their last month's water bill but only 49 per cent of the total payments. Their average staff establishment at 8 is well below that of the industrial zones at 14. Many more are in the one and two employee bands (21 to 6 per cent) and many fewer are above 20 (5 to 18 per cent). Correspondingly, 28 per cent of the CBD workforce is in establishments employing more than 20 compared to 46 per cent in the industrial zones.

Differentiating the monthly water bills by size, a similar basic pattern emerges: a large number of businesses paid very small amounts, a large number also paid moderate amounts, while heavy consumers paying N$500 and above are a fairly small minority (see table B7). The skew is rather steeper in the industrial zones where 50 per cent paid below N$100 compared to 63 per cent in the CBDs, while 13 per cent paid N$500 or more compared to 5 per cent in the CBDs. This sharper skew shows up in the spread of aggregate water payments where only 5 per cent of the total amount was attributable to businesses paying under N$100 in the industrial zones compared to 18 per cent in the

CBDs. At the top end the proportions at N$500 and above were reversed at 56 and 31 per cent respectively. Thus heavy consumers weigh in somewhat more strongly in the industrial zones.

The intensity ratios show a more complex pattern (see table B8). In the CBDs the average bill per employee varies fairly evenly in inverse proportion to size of staff, from a high N$95 for one person establishments through N$18-23 in the middle size bands (3-10 employees) down to below N$10 above 20 employees. In the industrial zones the lowest size bands hardly figure, the 6-10 employee band is lower and the 11-20 employee band correspondingly higher than in the CBDs. These relatively modest differences may be partly associated with concentrations of process water use in the middle size bands (see below). At the top end the ratio similarly drops to around N$10 per employee.

Respondents were asked whether they had experienced water leaks within the last three months (see table B5). Of all businesses, 85 per cent had not experienced leaks and 10 per cent did. The most usual problems were leaking toilets (3,0 per cent), slow tap leaks (3,4 per cent) and broken pipes (1,9 per cent). 80 per cent of those experiencing leaks said that the problem was now fixed. Of these two-thirds had taken just one day to do so but 19 per cent had taken more than five days. Generally, these results, if accurate, indicate few major problems in the state of repair and maintenance of the on-site water infrastructure of small and medium businesses, but do suggest that minor leaks are quite frequent and require ongoing vigilance to effect timely repairs.

8.3 Process Water

In general, the use of process water is limited. Asked whether they used water for any commercial purposes, only 33 of the 263 businesses (13 per cent) answered positively. Most (25 out of 33) were in Swakopmund, which may point to a more widespread use of water in the service sector there. They were on average larger in size at 19 staff per establishment and 23 per cent of total staff numbers. Most were in the middle size range with 59 per cent between 6 and 20 staff per establishment and 21 per cent above 20 staff. Generally, very few small businesses used process water. Only 14 per cent of total staff in this category were in establishments employing 5 or less and 56 per cent were in workforces of more than 20.

Not surprisingly businesses using process water accounted for substantially more of the total water bill (34 per cent) than their proportion of the total number of establishments (15 per cent). The water bills of the 24 giving details covered a wide spread with 21 per cent paying less than N$200 but 25 per cent paying N$500 or more. The distribution of aggregate payments was more heavily weighted towards large consumers than for businesses as a whole, only 9 per cent deriving from those paying less than N$200 and 66 per cent deriving from those paying N$500 or more. The same applies to size of staff where the 33 per cent of establishments employing 11-20 accounted for 50 per cent of the total water bill and the 25 per cent employing 21 or more accounted for another 34 per cent.

But the intensity ratio comes out highest in the middle size bands, N$31 per staff member for 3-5 employees and N$41 for 11-20 employees. The low ratios recorded for the largest employers, only N$10-12 per employee for establishments of 21 and above, indicate that water use was more marginal to their activities. The overall intensity ratio of N$22 per staff member was not much higher than the N$ 18 for all businesses and suggests that the proportion of water used for commercial processes was small overall. Process water use appears to be concentrated in two size bands, small establishments of 3-5 and medium establishments of 11-20 staff, where the intensity ratio for process water users is nearly double the general mean for the band. Differences in the other bands were either small or difficult to measure.

In order to assess the seasonality of business water use respondents using process water were asked to give the maximum and minimum numbers of employees at their premises over the past year and to differentiate regular, casual and part-time status. The response rate was too low to yield significant

results but the returns tentatively suggest that permanent employment status was much more common than casual and part-time working, which however was more commonly used at peak periods.

The majority of businesses using process water (58 per cent) stated that visitors or customers had access to toilets/washrooms on their premises. About a quarter of CBD and two-thirds of industrial zone businesses indicated that there was no public access. These proportions are unexceptional and provide a rough indication of extra demand on water supply on the premises emanating from outside users.

Businesses using process water were asked for further details on water-related aspects of their selection and use of technology. The response rate to these questions was variable and generally rather low and any conclusions based on them should be treated with caution.

Only one of the respondents stated that it reused process water. This is a very low proportion but reflects that fact that most process use is in low technology commercial establishments making little use of power machinery. Similarly, out of 15 businesses that said they had bought powered equipment during the last five years, 12 had not taken water saving into account, one indicated that appropriate technology was not available and one considered that it was not important for their line of business.

Respondents were asked to select from a list of seven reasons for any action(s) they took over the past year to save water (see table B22). Only 2 out of 33 failed to give any reasons, 12 gave one reason, 11 gave two reasons and 8 gave more than two. There was on the whole a general awareness of and involvement in water saving measures. Of all the reasons selected the most popular was water-saving publicity from the government and/or municipality (46 per cent), closely followed by the scarcity of water (42 per cent), over-use of water (39 per cent) and the general cost of water (30 per cent). A specific increase in the water bill featured less prominently as a reason (15 per cent), as did water wastage (18 per cent). This pattern suggests high receptivity to official water-saving campaigns and a basic ecological awareness of the difficulties of bulk supply in a desert environment. Cost factors register but less significantly.

It appears that few users of process water have production difficulties with the quality or chemical composition of the water, only 4 out of 33 indicating that they did have problems (see table B21).

Respondents were asked what non-process equipment they had which used water (see table B23). Very few had bath or shower facilities on the premises. None had a garden irrigation system but nearly half had a yard hose. Indoors, a few had canteen facilities onsite (18 per cent). Mechanical cleaning using water was uncommon (15 per cent) but the use of water in cleaning by hand was prevalent (67 per cent). Nearly half had fixed basins for cleaning tools and general purposes. In general, the non-process use of water was limited to simple, common tasks such as floor cleaning.

8.4 Attitudes towards Water Saving and Higher Charges

To the general question whether it was important for people to save water, the great majority of respondents with piped water rated it very important (88 per cent) (see table B9). This proportion is close to the household survey and indicates a general community consensus on the high priority for effecting water savings in general.

Respondents were more divided in their opinions as to whether people in the community wasted water, 55 per cent answering yes and 44 per cent answering no. The proportion believing there is wastage is substantially higher than in the household survey (36 per cent) and indicates a less favourable view of community standards amongst small and medium businesses.

Asked about their awareness of any water-saving publicity, by far the highest number (68 per cent) had heard such publicity on the radio or TV (see table B11). Smaller proportions had noted publicity put out by the government (22 per cent) and the local authority (26 per cent). The impact of the publicity was reported as fairly positive: 62 per cent said that it made them more inclined to save water while for 17 per cent it made no difference and only 3 per cent were motivated to save less water.

Respondents' views on how an unavoidable reduction in general water consumption should be achieved fairly, the most popular method was to increase water charges for heavy users (39 per cent) (see table B13 and figure 59). Alternative responses were fairly evenly divided between increasing charges for all consumers (18 per cent), imposing water restrictions on all households (16 per cent) and voluntary persuasion (24 per cent). This pattern is once again very close to that of the household survey and indicates a surprising degree of consensus in the community at large. Of particular note is that small and medium businesses tend to favour concentrating the burden of reducing consumption on heavy consumers, a category from which most of their businesses were excluded but which would have included the homes of a substantial number of managers and proprietors.

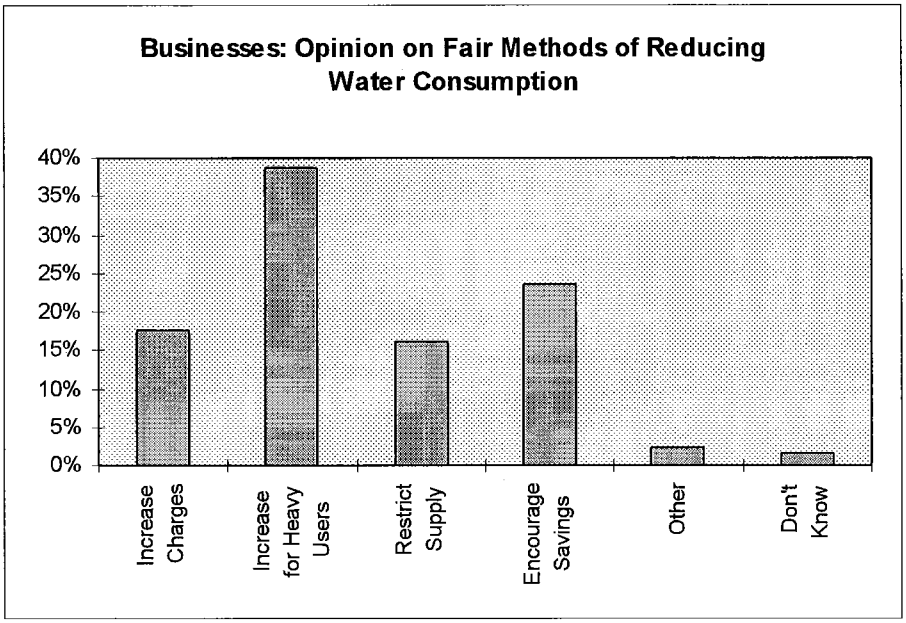

Figure 59

A similar but more strongly accentuated response was given to the question who should pay the extra cost of any necessary increase in the bulk water supply to a particular town (see table B14 and figure 60). Just over half considered that the town's consumers should pay through higher water charges (52 per cent) while a much smaller number favoured burdening owners through the rates (12 per cent) and hardly any nominated local employers. Thus close to two-thirds favoured meeting the cost locally (64 per cent). Excluding don't knows (1 per cent), a quarter wanted to spread the burden by sharing it amongst all water consumers nationwide through higher charges (20 per cent) or amongst taxpayers through higher taxes (4 per cent). 10 per cent had other proposals.

Asked whether their businesses could afford an increase in water charges without hardship, 78 per cent replied that they could (see tables B15 and B16 and figure 61). 30 per cent indicated that they could afford an increase of less than N$25, 22 per cent could afford N$25, 9 per cent could afford N$50 and 2 per cent could afford N$100 or more.

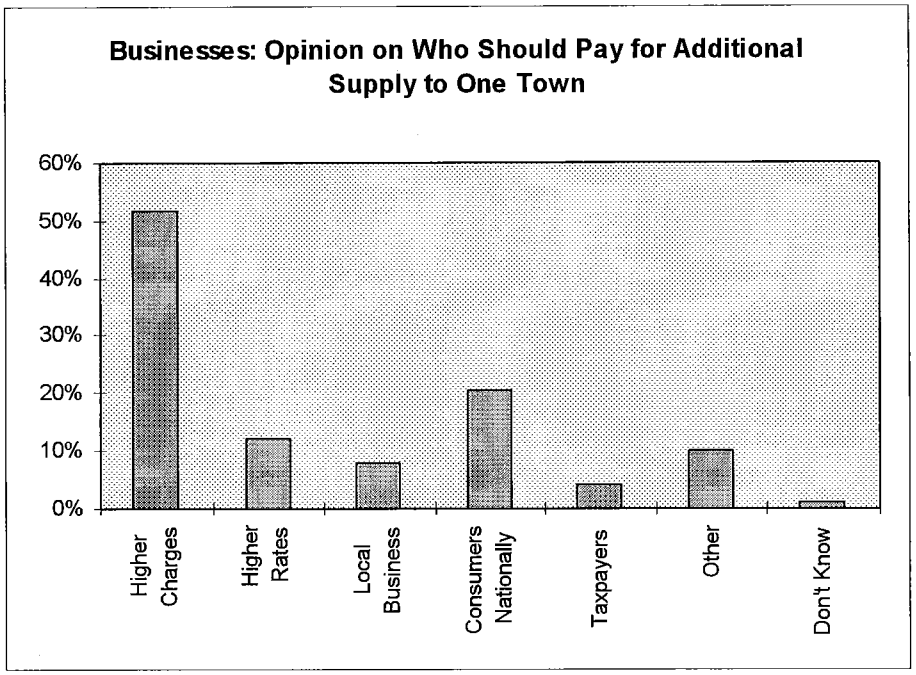

Figure 60

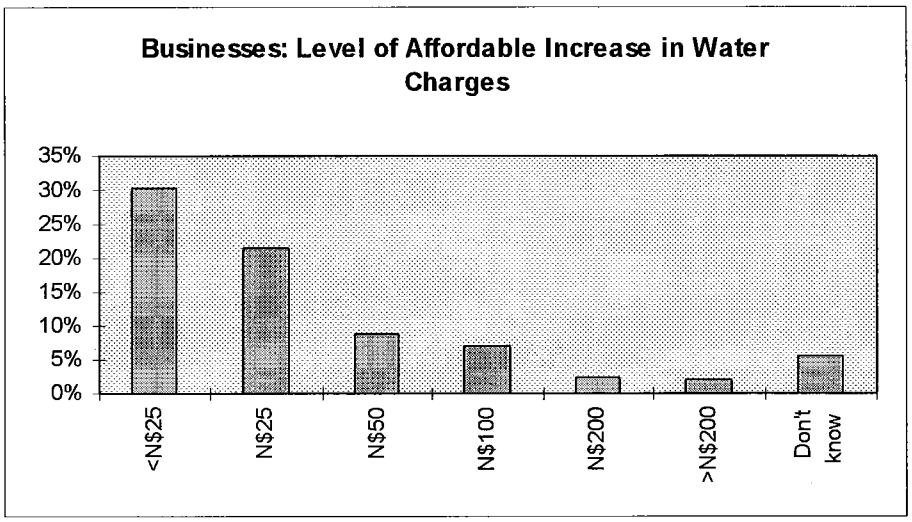

Figure 61

Comparing actual responses at the last increase in water charges, 27 per cent stated that they had reduced their water consumption a lot and 24 per cent had reduced moderately (see table B17). However, 26 per cent said their consumption had remained unchanged. A similar base level of price inelasticity appears in the responses to hypothetical step increases in the present water bill. At a 50 per cent increase 23 per cent of businesses would keep their water consumption the same, falling only a little to 18 per cent at a tenfold increase (see table B18 and figure 62). The number likely to decrease their consumption a lot rises from 29 per cent at the 50 per cent step to 54 per cent at 200 per cent (triple) but flattens out above that to 58 per cent at 900 per cent (tenfold). These results suggest that small and medium business consumers are less sensitive than households to increases in water charges and that price elasticity flattens off above a tripling of present bills.

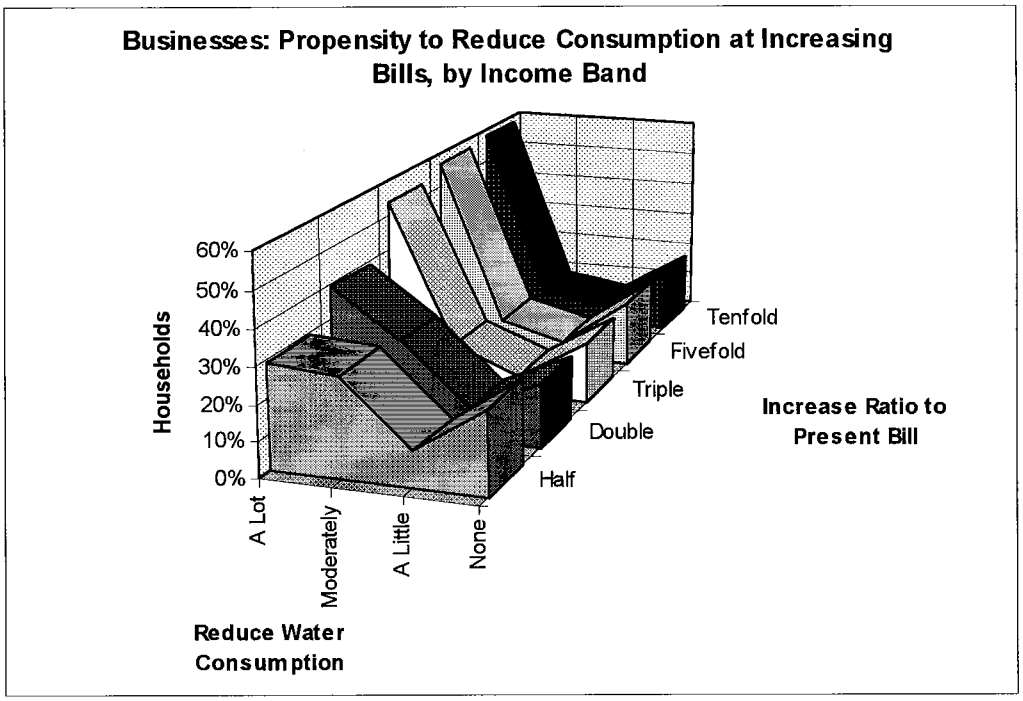

Figure 62

Businesses using process water were additionally asked what measures they had taken or planned to implement to save water sued by their staff (see table B24). Only 2 out of the 33 respondents said they had taken no measures, 1 that it planned no measures and 6 that they would implement but hadn't yet planned water-saving measures. Of measures already taken, unspecified encouragement of staff to use less water (70 per cent) and staff training (30 per cent) featured strongly, as did ensuring that staff close taps after use (70 per cent) and fixing any leaking taps and pipes quickly (46 per cent). But only 2 of the 33 had actually issued written instructions to staff or put up water-saving publicity. A few had improved their toilet/washroom facilities by installing short flush toilets (24 per cent), urinals (15 per cent) or bricks in toilet cisterns (18 per cent). Others had reduced outdoor consumption by reducing car washing (24 per cent), hosing the yard (15 per cent) and the size and watering of gardens (9 per cent). Generally, little information was advanced on the planning of future water-saving measures which did not appear to have high priority for active implementation.

Most businesses using process water thought that the present level of water charges was satisfactory for them (67 per cent) and only 18 per cent considered them too high (see tables B26 and B27). But they indicated a somewhat greater sensitivity than businesses in general to step increases in their present bills. 42 per cent said that their profitability would be seriously affected if charges rose 20 per cent, 76 per cent would suffer from a 50 per cent increase and 88 per cent from a 100 per cent increase (doubling).

9. CONCLUSIONS

The previous sections of this study have presented and analysed the empirical results of the three survey components of the field research covering households, the Walvis Bay single quarters and small and medium sized businesses. They have also drawn on several other data sets, notably the 1991 population censuses and the municipal water accounts records. This final section attempts briefly to draw together some of the emerging themes, summarise some principal conclusions and, although not the main purpose of the study, make relevant recommendations. It covers in turn factors affecting population projections; suppressed demand in low income suburbs; retail water pricing policy in a desert environment; income elasticities of water demand; gardens as a discretionary demand factor; equity principles, willingness to pay and tariff policy in the context of severe income inequality; the position of small and medium businesses; and the significance of spatial and income-related factors in interpreting the survey results.

Population growth will inevitably have a major bearing on the future trend of domestic water consumption. Developments in the six years since independence have been volatile and the facts of the present situation are more controversial than in most other parts of Namibia. Both seasonal influences and one-off singular episodes have had considerable impact on the recent demographic history of the coastal communities and in such a context the underlying trends of natural population growth have assumed less importance than usual.

An attempt was made to establish as reliable as possible a base estimate of the mid-1995 regional population, giving a detailed breakdown by town, major area or township, and suburb. Aggregating the various local estimates of peak annual populations, mostly from municipal sources, would put the total regional population in 1995 at roughly 100 000 with a low-season equivalent of perhaps 75 000. Such numbers would amount to a doubling of the population within the space of four years, explosive growth by any standards. From a careful and integrated analysis of the survey results, the distribution of urban housing stock and consumer water accounts, it is argued that the prevailing estimates are substantially over-stated. The 1991 regional population of 47 600 as taken by the Namibian and South African censuses is estimated to have grown by 36 per cent to just under 65 000 in mid-1995, an annual rate of increase of 8 per cent. The net seasonal maxima and minima, in other words the balances of movements into and out of the region, were calculated to reach a low of 61 000 and a high of 71 000, a peak variation of approximately 10 000 over the year or 15 per cent of the mean population.

A growth in a predominantly urban population - less than 2,5 per cent is rural - of more than a third within the space of four years is rapid by any standards. A key question is therefore how useful this short term trend is as a predictor of longer term outcomes. Following a lengthy period of slow economic and demographic growth, big influxes from other parts of Namibia occurred in the immediate aftermath of independence in 1990 and again after the reintegration of Walvis Bay in 1994. They were compounded by annual influxes of large numbers of jobseekers attracted mainly by economic growth and improving indigenous participation in the fishing industry. However, the mid-1995 population was probably down from its 1994 peak as popular expectations of employment prospects became more pessimistic and in particular following the mass removals in Walvis Bay of illegal residents from the compound and of unauthorised makeshift housing from the single quarters. The large scale redundancies at RUL had also kept the population of Arandis at best static.

The demographic and social characteristics of the recent changes have also been very uneven. There is little evidence of any major influx into the high and middle income suburbs, although the level of recent house-building activity in the former points to a continuing augmentation of the resident population by new arrivals. The respective rates of growth over 1991-95 are estimated at a modest but steady 2-3 and 4-5 per cent per annum. Almost all the recent influx has thus concentrated in the low income suburbs where the annual rate of growth is estimated at a spectacular 17-18 per cent per annum, and a good

deal higher in the single quarters and old sections of Mondesa and Kuisebmond which have accommodated the bulk of the new arrivals.

Several conclusions may be drawn on the implications of recent events for probable longer term trends in the rate and social composition of population growth:

- The conditions generating the post-1990 influx are non-repeatable and the impact of the political changes is now fully worked out. The net result is that although some of the new arrivals have not remained, many have - or rather, as new arrivals depart they are replaced. This implies that the relative proportion of unemployed jobseekers at the coast will remain higher than formerly.

- The recent influx has comprised predominantly people earning low incomes or no income at all. Their numbers have increased the proportion of low income households in the urban population as well as the concentration of poor households in the low income suburbs.

- The age profile of the new arrivals is heavily weighted towards young adults and this pattern is likely to continue. Those who settle will contribute proportionately more to the natural increase of the local population as they start families and accommodate dependants arriving mainly from the rural areas.

- The high share of single quarter accommodation in the housing stock, providing at present for more than a fifth of the entire population and some 35-40 per cent of the population of the low income suburbs, depending on seasonal factors, will decrease steadily as new low-cost family housing becomes available. The conversion of the single quarters themselves to individual accommodation units may proceed more erratically, particularly where employment patterns remain strongly seasonal and short term. The demographic implications of both trends - new housing and single quarter conversions - point strongly towards a major acceleration of long term growth as more family members and relatives join income earners in the new housing and the location of child-raising switches from rural to urban households. It is essential to bear in mind that this gradual expansion, consequent upon changes in social policy and housing provision, is additional to other factors and would occur even in a situation of zero economic growth.

- Volatility will nonetheless persist as a significant factor influencing both short term year on year movements and longer term trends. The chief influence is employment prospects in sectors subject to sharp variations, especially the fishing industry but also, as witnessed in a number of instances in the last five years, the mining sector. News of higher quotas and good prospects in the fishing industry may attract thousands of jobseekers over a period of months, many of whom would not stay beyond the season whether or not they found work. Sustained economic growth over several years is also likely to attract a higher net proportion of jobseekers to the coastal towns than in more depressed times.

- Nonetheless, the relative significance of short term seasonal movements related to employment is expected to decline over time as seasonal industries take on rising proportions of local residents. The main countervailing tendency will be tourism, which includes, despite a gradual expansion of the resident population, a continuation of the highly seasonal occupation pattern of housing at Henties Bay and other smaller holiday settlements at the coast.

- Long term population growth will depend significantly on real economic growth whose long run prospects are difficult to predict in several major sectors. The coastal towns are heavily geared to particular industries: Arandis to RUL's mining operations, Swakopmund and Henties Bay to tourism, and Walvis Bay to the fishing industry. In each case the multiplier linkages to much other local economic activity, especially indirectly through consumer spending, are strong. The spread of long term predictions of levels of production over a 20 year timeframe are so wide that contrasted

multiple path projections are inevitable, at least to the extent of low and high growth scenarios. Employment growth, closely linked to economic activity in the principal sectors, is taken as the main lead factor influencing the general rate of population growth, which is then modified by the secondary factors discussed above.

- While tourism tends to follow fairly a regular pattern of economic expansion, whether slow or rapid, both the fishing industry and mining are subject to highly irregular patterns of production and unpredictable prospects. Actual growth is likely to depart widely from the smooth growth paths of scenario projections even if the long term rates are similar. Typically, mining output mixes flat periods with sudden rises and falls, while fisheries output, in additional to its seasonal volatility, tends to expand for several years and then terminate in sudden quota cuts. In general, the local population is likely to rise in line with the rate of economic growth but reduce much more slowly after a severe economic decline, absorbing the cost in higher unemployment and reduced households incomes, an example being the present high rate of unemployment at Arandis.

- The socioeconomic implications of a pattern of population growth closely associated with levels of economic activity and a stabilisation of seasonal employment are a continuing though slower increase in the proportion of low income households in the total population. In the long run a greater integration of the narrowly based town economies and growth in service sector occupations is likely to promote middle income job growth as well.

- Any attempt to quantify the relationship between future economic and population growth rates must be approached with great caution in view of the major uncertainties concerning trend and volatility. However, it might be expected that over a long timeframe of 20 years the urban population will expand at perhaps an overall average of 1-2 per cent ahead of economic growth, the gap being larger in the early than the later years.

It was concluded above that the proportion of low income households is likely to increase over time. This expectation will remain valid whatever trend emerges in average real incomes unless there is both a major and sustained rise in real incomes and a redistribution in favour of low earners, neither outcome being probable on present trends. Given the steep skew observed across the household income spectrum in terms of water consumption per household and per capita, the general outcome is likely to be a steady increase in both the absolute number of households in the lower consumption brackets (below 15 and 15-30 m^3 per month) and their proportion of all domestic water accounts. If mean household consumption amongst middle and upper income households does not increase, it is likely therefore than mean household and per capita water consumption will show a gradual overall decline over the long run.

Income is, however, by no means the only determinant of the propensity to consume and a simple multiplication of population growth by changes in the income profile may yield misleading results. One independent factor of some weight is the domestic water infrastructure, which is closely related to housing type. The survey results point to the likelihood of significant suppressed demand in the low income suburbs generally and especially in the severely overcrowded old sections of Mondesa and Kuisebmond, where the houses are smallest, the water fixtures fewest and backyard shanties the most concentrated. The single quarters also suffer severe overcrowding and even worse water provision.

The very high usage ratios of people per basic facility (taps, washbasins, toilets) and especially per bath or shower make it probable that better provision at the same income levels would lead to an increase in water consumption despite the high shares of their income that the poorest households are already paying on their water accounts. Although it cannot be tested directly, the marked difference in per capita consumption between the low and middle income suburbs, which more than doubles from 86 to 186 l/c/d, is likely to be partly associated with the much better provision of water fixtures in most

middle income houses. Since gardens of any size are uncommon in the middle income suburbs, the chief variables are likely to be inside uses in personal hygiene, clothes and floor washing.

The chief implication is that improvements in housing quality will lead to higher per capita consumption as some of the suppressed demand is released. At the time of the survey in mid-1995 the housing infrastructure in Swakopmund and Walvis Bay was still dominated by the rigid structures of past township planning, which was based on state-directed system building in the racially designated middle and low income suburban areas. The resulting social pattern was of rental housing which allowed tenants little scope for self-improvement and a uniformity of housing type that blocked higher earners from investing in improved housing within the area, the exact opposite of the trend in the formerly white high income suburbs. Although new housing schemes were started during the 1980s in such areas as Jabulani and Mahetago, the rate of provision was rapidly overtaken by the big urban influx of the early 1990s.

The position is, however, likely to change rapidly over the next few years as new housing schemes are launched by the NHE, the Build Together Programme, the municipalities and also several large employers and property developers. A rough estimate in mid-1995 was that in Walvis Bay alone at least 1500 new low- and middle-income housing units were scheduled for completion over the coming two years. The new occupants would be not new arrivals from outside the region but existing residents, mainly from the densely populated low income suburbs and single quarters. This movement into new, better provided housing would lead to a double increase in per capita water consumption, in the old sections insofar as reduced overcrowding eased access to basic water fixtures, and more so in the new houses where both densities and water provision would be much improved.

Both the factors bearing on future population and income growth and the assessment of suppressed demand have been discussed on the assumption of an unchanged water charging policy. Continuing that assumption for the moment, it might be expected that households moving up or down the income ladder would adopt the water usage norms of their counterparts at the same income level. This expectation is likely to hold insofar as major moves up the income ladder have normally required the household to relocate into a different township in order to gain a higher standard of housing, given the prevailing lack of diversity in the low and middle income suburbs. If mixed housing types begin to develop, especially in the low income suburbs, significant divergence may emerge between households at the same income level located in different township areas. But the three-tier housing pattern, which fosters strong internal social convergence, will continue to dominate the water-using practices of most households for the foreseeable future, including socially mobile new arrivals.

It has been, however, one of the major objectives of this survey to assess the likely consequences of possible changes in retail water pricing policy, or rather to develop criteria for use in making such an assessment. It is important first to establish a basic framework for reviewing water pricing policy. Normative assumptions are commonly influential in such a review, on the one hand for example the 'basic needs' expectation that the poorest households are nevertheless entitled to a minimum standard and volume of provision irrespective of their ability to pay, and on the other that high rates of consumption by affluent households are intrinsically wasteful and in an arid or desert environment, environmentally damaging.

In itself the 'basic needs' or minimum entitlement case is compelling within a social policy framework that has due regard to principles of equity and social security in a context of extreme inequality of incomes and living standards. There are, however, a number of potentially viable policy instruments for assisting poor households, some of which are price-related (cross-subsidisation, state subsidy on water charges etc) and others are not (benefit payable to consumers, subsidy on composite house rentals, etc). The key result coming out of this survey is that at present the poorest households are already paying a far higher proportion of their cash income for water than is either socially acceptable or, probably, financially sustainable. Although this is an outcome of high unemployment and low wages and does not

necessarily imply that water charges for low consumers are too high, it implies that the interests of the poorest 22 per cent of residential households earning less than N$1000 a month and paying more than 5 per cent of that income in water charges need to be adequately safeguarded, whether within the pricing scheme for water or indirectly through other means of support. In the absence of such means of support there would be a strong case on social grounds from shielding this income group, with an already low rate of per capita consumption, from any real increase in the price of their domestic water.

At the other end of the scale the argument for a punitive component in the water price to force a reduction to a pre-set norm is more suspect. Technologies are in place in other arid and desert climates that deliver adequate supplies of water at acceptable environmental cost. That fact that extraction from the Kuiseb aquifer has indeed caused ecological damage is primarily a function of pricing policy, that on the one hand environmental damage has not been costed into the expense account of bulk water provision and on the other that consumer prices have been set too low to restrain excessive demand or, alternatively, to finance more expensive new supply technologies. In strong contrast to the supply context of the towns of the Namibian interior, where the high volatility of drought-prone reservoir supply places a high premium on consumer's willingness to cut their rates of consumption in times of scarcity, at the Namibian coast the key issue is the price of a water supply that will remain stable whichever mix of technologies is implemented, since rainfall runoff is not part of the supply equation. Whereas the simple borehole extraction that has hitherto supplied most of the region's residential consumers was cheap to operate, any new technology is likely to deliver at a much higher cost price.

The survey therefore placed considerable emphasis on testing for a situation in which additional bulk supply might carry very steep hikes in consumer charges. The price elasticity of residential demand becomes more critical when the threshold unit cost of additional supply is much higher than the present sources. Unfortunately in the absence of time-series of disaggregated domestic consumption data there is no reliable way of measuring actual consumer behaviour in response to previous increases in water rates and seasonal movements of workers, visitors and tourists also complicate the analysis. However, the water bill and income data from the survey, although approximate because of data quality, do allow rough calculations of the income elasticity of demand on the actual amounts paid for water. The results point to rather high ratios of 0,6-0,8 rising to more than 1,0 for upper income households before falling back in the topmost income bracket. Although these ratios do not measure the actual responses of people moving up from one income bracket to the next, their value is enhanced by the strong likelihood, argued above, that a move from one township area to another, more or less forced on the socially mobile by the geographical separation of housing zones, would induce conformity with the consumption patterns of the neighbourhood.

The tentative inference to be drawn is that higher incomes are strongly associated also with higher rates of water consumption, per household and capita: people use much more water and are prepared to pay for it. But the strong income gradient also has the result that they pay a steadily reducing proportion of their income, which drops from 3,0 per cent at a mid-level N$2000-2999 per month to 2,0 per cent at N$4000-4999. Interestingly, the ratio then stabilises at the upper income level of N$5000-9999 before dropping back to 1,3 per cent for those earning more than N$10 000 per month. In general, these figures imply both an ability and a willingness to pay for a higher water consumption in the middle and upper income bands.

The survey responses point in the opposite direction. Respondents at all income levels indicated that most believed that they had taken significant action to save water after the last price increase, that they could afford relatively small increases without difficulty, and that they would cut their consumption severely if faced with large increases on their present bills. There was also strong approval of conservationist values and a general awareness of official water-saving publicity. Nonetheless, a degree of caution is appropriate in interpreting these responses. Households seemed able to contemplate low or moderate increases, which had affected most of them in recent years, but had difficulty envisaging much larger increases outside their frame of experience. Taking together the high income

elasticity of demand, the positive attitudes towards water conservation and the strong saving response to large hikes in water charges, a reasonable interpretation is that the majority of consumers could absorb a major real increase in the price level, but staggered over a lengthy period of incremental increases so as to ease the pain of adjustment[17].

It is useful to disaggregate the components of domestic demand. In the poorest households and fairly generally in the old sections and single quarters of Mondesa and Kuisebmond, consumers have difficulty fulfilling any needs beyond the most basic both because of overcrowding and because water payments take a significant amount of cash income. Since many pay composite bills including electricity and house rent, the payments burden can be heavy. There is very little gardening in these neighbourhoods and few have vehicles to wash. In the middle income suburbs vehicles are more numerous but cultivated gardens are not universal and generally small.

Gardens are undoubtedly the biggest single variable in domestic water consumption and all the more important because discretionary, and therefore expendable under either restrictive regulations or a graduated pricing regime. For this reason the survey devoted considerable effort to documenting the type and extent of significant vegetation. The results, confirmed by visual observation, point to the overwhelming share of the high income suburbs: they have 80 per cent of the stock of large trees and bushes on residential land and 94 per cent of the total area under lawn. It is reasonable to infer that the markedly higher income elasticity above the N$5000 income threshold is associated with the much stronger propensity to keep substantial cultivated gardens in the high income suburbs, where 82 per cent have gardens.

It must be stressed that the terms of debate over the relative merits of exotic and indigenous vegetation which dominates the discussion of garden watering policy in the towns of the Namibian interior is irrelevant at the coast. Here, in a pure desert environment, all vegetation is exotic. Whether it is more drought-resistant or less is also irrelevant. The only important criterion affecting the suitability of a particular plant species is its average water consumption over time. The frequency and timing of garden watering and a plant's rate of evapotranspiration are also insignificant factors since the relative humidity is consistently high on all but a few days in the year.

The chief variables affecting the intensity of garden watering are thus the area, density and height of vegetation and the species rate of water consumption. In this regard desert-adapted vegetation has advantages not only in reduced watering needs but also in generally much lower vegetation densities per unit area. A striking feature of the survey results is that areas under desert-adapted vegetation are relatively small and that conversely trees and lawns are numerous and widespread.

Reducing garden watering is by far the most accessible water-saving response that most households in the high income suburbs could make to steep increases in water charges. It is probable that many would make some reductions. Yet green gardens are a prized environmental attribute in a desert environment and are a dominant feature in the suburban culture of most affluent and many middle income households. It is likely that the consumer response will be less elastic than might be expected: in other words, many households with gardens will be prepared to pay substantially more for the water needed to maintain them in much their present state.

The survey results indicate a clear-cut preference both for shifting the payments burden onto heavy consumers and for placing the capital costs of additional bulk supply on the beneficiary community. Two-fifths favoured targeting heavy consumers as the preferred fair method of reducing general water consumption and combined with those favouring a general increase in charges, made up a majority supporting a pricing regulator of water consumption over compulsory restrictions or voluntary persuasion. Similarly, 70 per cent opted for local rather than national responsibility in paying for new

17. For comparison, a similar policy of imposing stepped surcharges above the commercial price was applied over a period of several years during the 1980s on British gas as a means of rebalancing the domestic energy market in favour of electricity.

capital costs and nearly half through higher consumer charges. The uniformity of response between the low, middle and high income suburbs is striking and even more so the fact that substantial ratios in the high income suburbs favoured burdening consumer charges in both cases.

In general, the survey results are far from incompatible with the type of graduated or block tariff charging scheme that is becoming widely accepted amongst local authorities across Namibia, including the coastal towns. They suggest further that the gradient of graduation could be steep without inducing a dramatic fall in water consumption amongst the heavier residential consumers, who are generally also the most affluent and pay proportionally less of their incomes on water than the less well of consumers. A steeply graduated scheme would also serve the goals of equity in a social context of deeply entrenched racial and spatial division and severe income inequality. Its correlate is protection for the poorest consumers, who are usually also the most frugal, by means of cross-subsidisation, for instance by setting the lowest charge band at the operational cost price of supply or by pegging it to no more than the rate of inflation while the graduated increases are progressively implemented over a specified period.

The business survey, covering most street-level establishments in the CBDs and industrial zones, established that their water usage was most light and that less than a quarter used even small amounts of process water. This pattern is consistent with a predominantly retail and small service industry structure. On the policy questions a strong majority favoured higher consumer charges as a means of reducing consumption and of paying for capital works. Their water-saving response to step multiples of their present bills tended to flatten above mid-range and was somewhat less elastic than residential households. However, their threshold of affordability in dollar terms was quite low, which may reflect less an inability than an unwillingness to pay substantially higher charges.

Finally, it was a major objective of the survey to test for any significant area variations in the responses. For that reason many of the results are reported on both a town and a major area or township basis. In most cases there is general similarity of response and significant variations between the towns are surprisingly few. Where Arandis and Henties Bay stand out, the anomalies are commonly attributable to their differences in socioeconomic attributes compared to the two major towns. There are a few significant differences between Swakopmund and Walvis Bay - one is the much higher rate of dissatisfaction with the accuracy of water meters in Walvis Bay as well as Arandis - but the similarities are generally much stronger.

Overwhelmingly the dominant lines of spatial differentiation were found to be socioeconomic: the sharpest fault lines lie between the three suburb types built into the residential infrastructure from the earliest formative years of the towns' existence and systematised by segregationist policy in the late colonial period. The formal racial barriers have long since been removed but increased social mobility has as yet only marginally eased the ethnic contours of urban residential patterns, which are as equally strongly associated with income inequalities. By taking full account of the spatial dimensions of urban household socioeconomics, this survey was able to demonstrate one conclusion that appears remarkable in the context of the very recently divided past, namely that despite the deeply entrenched ethnic and socioeconomic divisions on the urban residential landscape, there is a high degree of consensus across the coastal communities on values and priorities for the use and conservation of domestic water and on the broad policy framework for paying the higher costs of a more expensive additional bulk supply.

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ANNEX

TABLES

Note: Percentages may not add up to exactly 100% because of rounding up.

H. RESIDENTIAL HOUSEHOLDS

Table H1a. Population Census 1991: Enumeration Areas, Henties Bay

EA-Table

EA and: Sex:	Total:	Age Groups <1	1-4	5-14	15-44	45-64	65+	NS:	Literacy (10 years+) Total:	Liter-ate	Not Lit	NS:	School Attendance (6-19 years) Total:	None	In Sch	Left: Sch	NS:	Activity Status (15 years+) Total:	Un-Emply: Emply	Not Ec: Active:	NS:	Employed by Industry (15 yrs+) Total:	Agri Fish	Min-ing	Other:	NS:
Swakopmund District: Henties Bay																										
EA 25 02035																										
Tot	439	7	15	13	118	167	119	-	406	396	5	5	14	6	6	1	1	404	136	3	258	7	136	5	4	126	1
M	211	2	7	7	67	68	60	-	196	191	2	3	6	3	3	-	-	195	89	1	100	5	89	5	3	80	1
F	228	5	8	6	51	99	59	-	210	205	3	2	8	3	3	1	1	209	47	2	158	2	47	-	1	46	-
EA 25 02036																										
Tot	578	14	50	33	407	70	4	-	492	429	63	-	60	5	28	27	-	481	334	48	99	-	334	10	-	324	-
M	397	8	27	20	281	58	3	-	348	300	48	-	36	4	17	15	-	342	299	40	3	-	299	10	-	289	-
F	181	6	23	13	126	12	1	-	144	129	15	-	24	1	11	12	-	139	35	8	96	-	35	-	-	35	-
EA 25 02037																										
Tot	595	22	68	32	428	44	1	-	485	469	16	-	81	9	25	47	-	473	318	61	94	-	318	49	1	268	-
M	353	11	24	18	270	30	-	-	307	294	13	-	50	8	12	30	-	300	252	44	4	-	252	49	1	202	-
F	242	11	44	14	158	14	1	-	178	175	3	-	31	1	13	17	-	173	66	17	90	-	66	-	-	66	-

Table H1b. Population Census 1991: Enumeration Areas, Arandis

EA-Table

EA and: Sex:	Total:	Age Groups <1	1-4	5-14	15-44	45-64	65+	NS:	Literacy(10 years+) Total:	Liter-ate	Not Lit	NS:	School Attendance(6-19years) Total:	None	In Sch	Left: Sch	NS:	Activity Status(15 years+) Total:	Emply:	Un-Emply	Not Ec: Active:	NS:	Employed by Industry(15 yrs+) Total:	Agri Fish	Min-ing	Other:	NS:
Damaraland District: Arandis																											
EA 04 03018																											
Tot	330	12	32	92	179	14	1	-	240	238	2	-	113	-	106	7	-	194	99	31	64	-	99	1	74	24	-
M	179	5	13	43	105	12	1	-	142	140	2	-	55	-	55	-	-	118	80	20	18	-	80	1	71	8	-
F	151	7	19	49	74	2	-	-	98	98	-	-	58	-	51	7	-	76	19	11	46	-	19	-	3	16	-
EA 04 03019																											
Tot	447	14	55	118	246	11	2	1	307	300	7	-	155	7	138	10	-	260	90	106	63	1	90	-	44	46	-
M	209	5	33	53	108	9	-	1	140	139	1	-	65	3	61	1	-	118	59	28	31	-	59	-	43	16	-
F	238	9	22	65	138	2	2	-	167	161	6	-	90	4	77	9	-	142	31	78	32	1	31	-	1	30	-
EA 04 03020																											
Tot	460	13	56	130	240	19	-	2	334	332	2	-	177	5	162	10	-	261	106	93	62	-	106	-	65	40	1
M	235	8	32	63	118	12	-	2	165	163	2	-	83	3	73	7	-	132	82	24	26	-	82	-	65	17	-
F	225	5	24	67	122	7	-	-	169	169	-	-	94	2	89	3	-	129	24	69	36	-	24	-	-	23	1
EA 04 03021																											
Tot	391	11	39	93	218	28	2	-	290	275	13	2	117	3	107	7	-	248	112	85	49	2	112	1	75	36	-
M	209	7	15	42	122	22	1	-	165	157	8	-	53	3	49	1	-	145	98	28	19	-	98	1	75	22	-
F	182	4	24	51	96	6	1	-	125	118	5	2	64	-	58	6	-	103	14	57	30	2	14	-	-	14	-
EA 04 03022																											
Tot	377	14	48	101	192	21	-	1	267	253	13	1	131	1	125	5	-	214	87	80	46	1	87	-	49	38	-
M	197	5	25	62	86	18	-	1	141	136	4	1	70	1	68	1	-	105	67	17	20	1	67	-	48	19	-
F	180	9	23	39	106	3	-	-	126	117	9	-	61	-	57	4	-	109	20	63	26	-	20	-	1	19	-
EA 04 03023																											
Tot	491	33	46	106	277	29	-	-	353	350	3	-	155	1	138	16	-	306	122	60	124	-	122	-	78	44	-
M	250	19	20	45	146	20	-	-	186	184	2	-	67	1	63	3	-	166	102	32	32	-	102	-	75	27	-
F	241	14	26	61	131	9	-	-	167	166	1	-	88	-	75	13	-	140	20	28	92	-	20	-	3	17	-
EA 04 03024																											
Tot	445	23	36	113	250	22	-	1	330	327	3	-	149	4	135	10	-	273	95	119	59	-	95	-	53	42	-
M	236	14	18	55	131	17	-	1	177	175	2	-	76	3	68	5	-	149	74	40	35	-	74	-	52	22	-
F	209	9	18	58	119	5	-	-	153	152	1	-	73	1	67	5	-	124	21	79	24	-	21	-	1	20	-
EA 04 03025																											
Tot	467	18	56	114	253	22	-	4	330	315	11	4	149	1	140	8	-	279	116	62	97	4	116	-	48	68	-
M	236	8	23	61	127	14	-	3	167	158	6	3	75	1	71	3	-	144	81	33	27	3	81	-	48	33	-
F	231	10	33	53	126	8	-	1	163	157	5	1	74	-	69	5	-	135	35	29	70	1	35	-	-	35	-
EA 04 03026																											
Tot	477	19	39	102	263	48	1	5	364	357	3	4	132	2	120	10	-	317	172	44	97	4	172	-	127	45	-
M	291	10	20	53	155	48	1	4	233	228	2	3	69	1	64	4	-	208	146	25	34	3	146	-	126	20	-
F	186	9	19	49	108	-	-	1	131	129	1	1	63	1	56	6	-	109	26	19	63	1	26	-	1	25	-
EA 04 03027																											
Tot	418	17	45	84	239	30	3	-	310	305	5	-	106	5	94	7	-	272	115	61	96	-	115	-	68	47	-
M	218	11	22	39	124	22	-	-	163	162	1	-	47	4	38	5	-	146	93	27	26	-	93	-	68	25	-
F	200	6	23	45	115	8	3	-	147	143	4	-	59	1	56	2	-	126	22	34	70	-	22	-	-	22	-

Table H1c. Population Census 1991: Enumeration Areas, Swakopmund

EA-Table

EA and: Sex:	Total:	Age Groups <1	1-4	5-14	15-44	45-64	65+	NS:	Literacy(10 years+) Total:	Liter-ate	Not Lit	NS:	School Attendance(6-19years) Total:	None	In Sch	Left: Sch	NS:	Activity Status(15 years+) Total:	Emply:	Un-Emply	Not Active:	Ec: NS:	Employed by Industry(15 yrs+) Total:	Agri Fish	Min-ing	Other:	NS:
Swakopmund District																											
EA 25 01001																											
Tot	245	4	6	16	92	40	30	57	226	168	-	58	29	1	24	4	-	219	88	8	65	58	88	3	8	77	-
M	141	3	3	9	49	21	14	42	131	88	-	43	16	-	15	1	-	126	56	2	25	43	56	3	4	49	-
F	104	1	3	7	43	19	16	15	95	80	-	15	13	1	9	3	-	93	32	6	40	15	32	-	4	28	-
EA 25 01002																											
Tot	432	3	15	102	137	74	71	30	382	344	7	31	113	5	105	3	-	312	146	3	130	33	146	5	8	133	-
M	180	1	5	30	69	36	23	16	165	144	4	17	37	1	33	3	-	144	80	3	43	18	80	5	6	69	-
F	252	2	10	72	68	38	48	14	217	200	3	14	76	4	72	-	-	168	66	-	87	15	66	-	2	64	-
EA 25 01003																											
Tot	414	10	21	29	183	105	66	-	362	357	5	-	46	5	36	4	1	354	214	9	131	-	214	3	6	205	-
M	196	3	14	13	93	51	22	-	171	169	2	-	22	2	18	2	-	166	123	6	37	-	123	3	2	118	-
F	218	7	7	16	90	54	44	-	191	188	3	-	24	3	18	2	1	188	91	3	94	-	91	-	4	87	-
EA 25 01004																											
Tot	459	5	14	57	157	71	155	-	418	415	3	-	78	5	70	3	-	383	170	2	211	-	170	8	4	157	1
M	188	2	8	29	75	35	39	-	165	162	3	-	40	2	38	-	-	149	94	-	55	-	94	7	3	83	1
F	271	3	6	28	82	36	116	-	253	253	-	-	38	3	32	3	-	234	76	2	156	-	76	1	1	74	-
EA 25 01005																											
Tot	527	7	40	77	212	133	58	-	438	437	1	-	104	9	91	4	-	403	245	9	149	-	245	4	33	207	1
M	251	3	17	40	102	65	24	-	210	209	1	-	56	6	48	2	-	191	137	6	48	-	137	3	23	111	-
F	276	4	23	37	110	68	34	-	228	228	-	-	48	3	43	2	-	212	108	3	101	-	108	1	10	96	1
EA 25 01006																											
Tot	802	20	52	104	465	113	48	-	684	680	4	-	211	7	192	12	-	626	302	25	299	-	302	2	14	286	-
M	416	13	20	47	252	62	22	-	357	355	2	-	97	5	87	5	-	336	188	11	137	-	188	1	11	176	-
F	386	7	32	57	213	51	26	-	327	325	2	-	114	2	105	7	-	290	114	14	162	-	114	1	3	110	-
EA 25 01007																											
Tot	93	-	3	28	31	20	11	-	84	84	-	-	34	2	31	1	-	62	37	2	23	-	37	-	3	34	-
M	57	-	3	22	18	9	5	-	52	52	-	-	27	1	26	-	-	32	20	2	10	-	20	-	2	18	-
F	36	-	-	6	13	11	6	-	32	32	-	-	7	1	5	1	-	30	17	-	13	-	17	-	1	16	-
EA 25 01008																											
Tot	365	6	15	55	160	59	70	-	327	325	2	-	119	1	113	5	-	289	115	18	156	-	115	2	4	109	-
M	159	4	7	23	80	23	22	-	138	137	1	-	55	1	51	3	-	125	65	2	58	-	65	2	4	59	-
F	206	2	8	32	80	36	48	-	189	188	1	-	64	-	62	2	-	164	50	16	98	-	50	-	-	50	-
EA 25 01009																											
Tot	337	5	14	74	169	61	14	-	283	282	1	-	90	4	83	3	-	244	153	9	82	-	153	1	76	76	-
M	181	1	8	34	94	36	8	-	154	153	1	-	44	3	38	3	-	138	103	6	29	-	103	1	70	32	-
F	156	4	6	40	75	25	6	-	129	129	-	-	46	1	45	-	-	106	50	3	53	-	50	-	6	44	-
EA 25 1010																											
Tot	426	5	22	77	161	107	54	-	361	360	1	-	94	6	83	5	-	322	176	25	121	-	176	5	35	135	1
M	211	1	15	36	78	56	25	-	175	174	1	-	50	3	44	3	-	159	107	7	45	-	107	5	29	73	-
F	215	4	7	41	83	51	29	-	186	186	-	-	44	3	39	2	-	163	69	18	76	-	69	-	6	62	1

EA and: Sex	Age Groups: Total	<1	1-4	5-14	15-44	45-64	65+	NS	Literacy(10 years+): Total	Liter-ate	Not Lit	NS	School Attendance(6-19years): Total	None	In Sch	Left: Sch	NS	Activity Status(15 years+): Total	Emply	Un-Emply	Not Ec: Active	NS	Employed by Industry(15 yrs+): Total	Agri Fish	Min-ing	Other	NS
EA 25 01011																											
Tot	481	8	33	124	228	72	16	-	381	381	-	-	153	9	143	1	-	316	199	7	110	-	199	1	63	134	1
M	232	3	18	56	110	38	7	-	186	186	-	-	71	4	67	-	-	155	119	6	30	-	119	1	55	62	1
F	249	5	15	68	118	34	9	-	195	195	-	-	82	5	76	1	-	161	80	1	80	-	80	-	8	72	-
EA 25 01012																											
Tot	501	12	43	124	254	61	7	-	396	396	-	-	155	1	150	4	-	322	174	12	136	-	174	-	92	82	-
M	243	8	19	64	117	31	4	-	195	195	-	-	81	-	80	1	-	152	103	10	39	-	103	-	75	28	-
F	258	4	24	60	137	30	3	-	201	201	-	-	74	1	70	3	-	170	71	2	97	-	71	-	17	54	-
EA 25 01013																											
Tot	224	3	11	40	104	45	21	-	192	192	-	-	47	2	43	1	1	170	108	8	54	-	108	1	18	87	2
M	108	2	5	20	52	21	8	-	94	94	-	-	28	-	26	1	1	81	56	3	22	-	56	1	16	37	2
F	116	1	6	20	52	24	13	-	98	98	-	-	19	2	17	-	-	89	52	5	32	-	52	-	2	50	-
EA 25 01014																											
Tot	586	14	43	130	315	76	8	-	466	465	1	-	182	12	163	6	1	399	278	14	107	-	278	1	126	150	1
M	271	7	17	51	153	40	3	-	221	221	-	-	77	5	70	1	1	196	157	6	33	-	157	1	110	45	1
F	315	7	26	79	162	36	5	-	245	244	1	-	105	7	93	5	-	203	121	8	74	-	121	-	16	105	-
EA 25 01015 *																											
Tot	110	2	5	30	56	16	1	-	93	92	1	-	38	4	32	2	-	73	49	-	24	-	49	1	10	37	1
M	54	1	2	15	26	10	-	-	45	45	-	-	19	3	15	1	-	36	28	-	8	-	28	1	10	16	1
F	56	1	3	15	30	6	1	-	48	47	1	-	19	1	17	1	-	37	21	-	16	-	21	-	-	21	-
EA 25 01017																											
Tot	440	8	37	121	223	45	6	-	335	334	1	-	147	4	134	9	-	274	155	43	76	-	155	4	24	127	-
M	209	1	19	57	107	23	2	-	159	158	1	-	70	2	65	3	-	132	87	26	19	-	87	4	20	63	-
F	231	7	18	64	116	22	4	-	176	176	-	-	77	2	69	6	-	142	68	17	57	-	68	-	4	64	-
EA 25 01018																											
Tot	604	16	73	176	315	21	3	-	433	432	1	-	214	5	198	10	1	339	161	68	110	-	161	1	85	75	-
M	297	8	33	88	152	16	-	-	215	214	1	-	104	2	98	3	1	168	98	45	25	-	98	1	77	20	-
F	307	8	40	88	163	5	3	-	218	218	-	-	110	3	100	7	-	171	63	23	85	-	63	-	8	55	-
EA 25 01019																											
Tot	461	17	30	125	227	59	3	-	365	363	2	-	164	1	156	4	3	289	157	18	114	-	157	1	78	77	1
M	231	6	11	67	107	38	2	-	185	185	-	-	84	1	83	-	-	147	100	14	33	-	100	1	64	35	-
F	230	11	19	58	120	21	1	-	180	178	2	-	80	-	73	4	3	142	57	4	81	-	57	-	14	42	1
EA 25 01020																											
Tot	794	18	60	269	353	80	14	-	606	606	-	-	347	13	315	19	-	447	232	59	156	-	232	1	14	217	-
M	374	13	35	116	172	35	3	-	281	281	-	-	154	5	140	9	-	210	119	39	52	-	119	1	12	106	-
F	420	5	25	153	181	45	11	-	325	325	-	-	193	8	175	10	-	237	113	20	104	-	113	-	2	111	-
EA 25 01021																											
Tot	260	3	16	45	107	65	24	-	216	215	1	-	55	4	51	-	-	196	108	6	82	-	108	2	10	95	1
M	119	2	9	19	47	34	8	-	97	97	-	-	24	3	21	-	-	89	65	3	21	-	65	2	10	53	-
F	141	1	7	26	60	31	16	-	119	118	1	-	31	1	30	-	-	107	43	3	61	-	43	-	-	42	1
EA 25 01022																											
Tot	612	25	50	114	368	45	10	-	483	464	18	1	168	16	130	22	-	423	219	100	103	1	219	-	10	208	1
M	302	10	26	49	182	29	6	-	242	235	7	-	74	9	57	8	-	217	135	54	28	-	135	-	9	125	1
F	310	15	24	65	186	16	4	-	241	229	11	1	94	7	73	14	-	206	84	46	75	1	84	-	1	83	-

EA and: Sex:	Total:	Age Groups <1	1-4	5-14	15-44	45-64	65+	NS:	Literacy(10 years+) Total:	Liter-ate	Not Lit	NS:	School Attendance(6-19years) Total:	None	In Sch	Left: Sch	NS:	Activity Status(15 years+) Total:	Emply:	Un-Emply	Not Active:	NS:	Employed by Industry(15 yrs+) Total:	Agri Fish	Min-ing	Other:	NS:
EA 25 01023																											
Tot	808	28	65	166	444	81	24	-	641	635	6	-	229	11	189	29	-	549	305	133	111	-	305	4	12	288	1
M	375	14	35	71	202	38	15	-	295	290	5	-	108	5	85	18	-	255	152	57	46	-	152	4	10	137	1
F	433	14	30	95	242	43	9	-	346	345	1	-	121	6	104	11	-	294	153	76	65	-	153	-	2	151	-
EA 25 01024																											
Tot	913	39	79	139	547	95	14	-	722	696	25	1	202	9	160	32	1	656	313	154	187	2	313	10	7	291	5
M	438	15	40	66	259	50	8	-	347	337	9	1	108	8	85	14	1	317	165	71	79	2	165	9	4	147	5
F	475	24	39	73	288	45	6	-	375	359	16	-	94	1	75	18	-	339	148	83	108	-	148	1	3	144	-
EA 25 01025																											
Tot	788	42	70	153	435	71	17	-	584	582	1	1	189	11	152	23	3	523	247	108	167	1	247	9	5	233	-
M	377	26	32	75	212	29	3	-	275	273	1	1	91	6	76	6	3	244	129	77	38	-	129	8	3	118	-
F	411	16	38	78	223	42	14	-	309	309	-	-	98	5	76	17	-	279	118	31	129	1	118	1	2	115	-
EA 25 01026																											
Tot	680	36	50	22	484	81	7	-	577	552	25	-	34	5	12	17	-	572	408	70	94	-	408	1	25	382	-
M	485	17	26	12	349	74	7	-	432	412	20	-	20	2	8	10	-	430	360	52	18	-	360	1	25	334	-
F	195	19	24	10	135	7	-	-	145	140	5	-	14	3	4	7	-	142	48	18	76	-	48	-	-	48	-
EA 25 01027																											
Tot	755	18	17	13	632	69	6	-	713	625	88	-	54	15	8	31	-	707	390	239	78	-	390	12	9	369	-
M	607	7	12	10	512	60	6	-	583	512	71	-	47	14	6	27	-	578	351	201	26	-	351	9	9	333	-
F	148	11	5	3	120	9	-	-	130	113	17	-	7	1	2	4	-	129	39	38	52	-	39	3	-	36	-
EA 25 01028																											
Tot	1,183	40	69	17	950	99	8	-	1,064	937	127	-	66	18	10	38	-	1,057	710	276	70	1	710	4	2	704	-
M	857	17	33	9	698	92	8	-	803	697	106	-	49	13	6	30	-	798	637	147	13	1	637	4	2	631	-
F	326	23	36	8	252	7	-	-	261	240	21	-	17	5	4	8	-	259	73	129	57	-	73	-	-	73	-
EA 25 01029																											
Tot	901	36	87	35	617	119	7	-	750	706	44	-	45	14	19	10	2	743	487	125	130	1	487	2	26	457	2
M	588	18	40	18	402	103	7	-	518	485	33	-	22	10	7	5	-	512	409	94	8	1	409	2	26	379	2
F	313	18	47	17	215	16	-	-	232	221	11	-	23	4	12	5	2	231	78	31	122	-	78	-	-	78	-
EA 25 01030																											
Tot	566	21	40	135	306	53	11	-	444	408	36	-	180	6	163	11	-	370	172	105	93	-	172	-	4	168	-
M	265	10	20	68	133	28	6	-	205	190	15	-	91	6	80	5	-	167	75	55	37	-	75	-	4	71	-
F	301	11	20	67	173	25	5	-	239	218	21	-	89	-	83	6	-	203	97	50	56	-	97	-	-	97	-
EA 25 01031																											
Tot	758	24	70	190	411	53	10	-	578	559	19	-	251	11	212	27	1	474	256	32	186	-	256	3	16	237	-
M	364	15	30	86	198	33	2	-	281	271	10	-	119	5	103	11	-	233	150	19	64	-	150	3	14	133	-
F	394	9	40	104	213	20	8	-	297	288	9	-	132	6	109	16	1	241	106	13	122	-	106	-	2	104	-
EA 25 01032																											
Tot	344	9	36	80	209	10	-	-	255	250	5	-	91	-	83	8	-	219	153	33	33	-	153	1	11	139	2
M	166	5	13	37	104	7	-	-	124	121	3	-	39	-	35	4	-	111	88	18	5	-	88	1	9	76	2
F	178	4	23	43	105	3	-	-	131	129	2	-	52	-	48	4	-	108	65	15	28	-	65	-	2	63	-
EA 25 01033																											
Tot	416	16	42	112	233	13	-	-	306	306	-	-	135	8	115	12	-	246	159	40	47	-	159	-	19	140	-
M	191	8	18	48	109	8	-	-	142	142	-	-	57	5	48	4	-	117	84	21	12	-	84	-	18	66	-
F	225	8	24	64	124	5	-	-	164	164	-	-	78	3	67	8	-	129	75	19	35	-	75	-	1	74	-
EA 25 01034																											
Tot	396	24	33	74	241	24	-	-	298	296	2	-	99	8	78	13	-	265	208	21	36	-	208	2	24	180	2
M	190	10	15	36	115	14	-	-	145	143	2	-	47	6	40	1	-	129	109	7	13	-	109	2	21	86	-
F	206	14	18	38	126	10	-	-	153	153	-	-	52	2	38	12	-	136	99	14	23	-	99	-	3	94	2

Table H2. Distributions of Residential Population, Occupied Plots and Household Sample, 1995

Town/suburb	Occupied plots		Estimated population 1995		Household sample 1995		Raising factor
	No.	%	No.	%	No.	%	
Mondesa:							
Central	437	4,9	3802	7,7	62	8,0	0,607
East	143	1,6	1244	3,4	19	2,5	0,648
Jabulani	190	2,1	1138	2,3	11	1,4	1,484
Mahetago	82	0,9	456	0,9	10	1,3	0,702
Tamariskia:							
North	136	1,5	815	1,7	40	5,2	0,292
South	291	3,2	1831	3,7	42	5,4	0,596
Swakopmund Town:							
Vineta west	374	4,2	1243	2,7	20	2,6	1,608
Vineta east	589	6,5	2472	5,0	38	4,9	1,334
Central	501	5,6	2004	4,1	26	3,4	1,659
Kramersdorf	172	1,9	567	1,1	18	2,3	0,821
Kuisebmond:							
Central	337	3,7	2224	4,5	40	5,2	0,725
South	135	1,5	675	1,4	12	1,5	0,968
West	799	8,9	6792	13,7	93	12,0	0,740
North	505	5,6	3283	6,5	39	5,0	1,115
Narraville:							
Central	264	2,9	1478	3,1	38	4,9	0,598
East	313	3,5	1705	3,1	26	3,4	1,036
West	339	3,8	1964	3,8	14	1,8	2,084
Walvis Bay Town:							
Meersig	349	3,9	1222	2,5	24	3,1	1,252
South	375	4,2	1501	3,1	19	2,5	1,700
Central	307	3,4	1474	2,8	18	2,3	1,468
North	285	3,2	884	2,0	18	2,3	1,363
East	566	6,3	2581	4,8	32	4,1	1,522
Arandis	677	7,5	120	8,3	84	10,8	0,694
Henties Bay:							
Omdel	526	5,8	1754	5,9	18	2,3	2,516
Town							
North	130	1,4	607	0,7	6	0,8	1,868
South	183	2,0	853	1,2	8	1,0	1,966
Swakopmund							
Mondesa	851	9,5	9079	14,2	102	13,2	0,718
Tamariskia	427	4,7	2340	5,4	82	10,6	0,448
Town	1635	18,2	6251	12,9	102	13,2	1,380
Walvis Bay							
Kuisebmond	1776	19,7	10110	26,1	184	23,7	0,831
Narraville	916	10,2	4467	10,0	78	10,1	1,011
Town	1882	20,9	6672	15,2	111	14,3	1,460
Arandis	677	7,5	4313	8,3	84	10,8	0,694
Henties Bay							
Omdel	526	5,8	1163	5,9	18	2,3	2,516
Town	313	3,5	439	2,0	14	1,8	1,924
Swakopmund	2913	32,4	17670	32,5	286	36,9	0,877
Walvis Bay	4574	50,8	21249	51,3	373	48,1	1,056
Arandis	677	7,5	4313	8,3	84	10,8	0,694
Henties Bay	839	9,3	1602	7,9	32	4,1	2,257
Total	9004	100	44834	100	775	100	100
By income group:							
Low income suburbs	3153	35,0	20352	46,2	304	39,2	0,893
Middle income suburbs	2020	22,4	11120	23,6	244	31,5	0,713
High income suburbs	3831	42,5	13362	30,1	227	29,3	1,453

Occupied plots = occupied residential houses, ie excluding vacant houses, single quarters, town houses and blocks of flats.
Population = suburban population excluding single quarters, compound and CBDs.
Household sample = actual sample size.
Raising factor = weighting by which each area sub-total is rebalanced to its proper proportion in the total population.

Table H3. Population and Developed Plots, 1991 and 1995

Town/suburb	Developed plots		Census 1991	Estimate 1995		Persons/plot (weighted means)
	No.	%	No.	No.	%	
Mondesa:						
Central	437	4,4	3266	3802	5,9	8,7
East	143	1,4	872	1244	1,9	11,6
Jabulani	190	1,9	1115	1138	1,8	6,0
Mahetago	82	0,8	307	456	0,7	5,6
Single quarters			3519	5929	9,1	
Tamariskia:						
North	136	1,4	743	815	1,3	6,0
South	291	2,9	1597	1831	2,8	6,3
Swakopmund Town:						
Vineta west	467	4,7	643	1243	1,9	3,6
Vineta east	589	5,9	1675	2472	3,8	4,2
Central	501	5,0	3146	2004	3,1	4,0
Kramersdorf	191	1,9	787	567	0,9	3,3
CBD				128	0,2	3,2
Kuisebmond:						
Central	337	3,4	4561	2224	3,4	6,6
South	135	1,4	|	675	1,0	5,1
West	799	8,0	|	6792	10,5	8,5
North	505	5,1	|	3283	5,1	6,4
Single quarters			914	3000	4,6	
Compound			4635	4968	7,7	
Narraville:						
Central	264	2,6		1478	2,3	5,7
East	313	3,1		1705	2,6	4,9
West	339	3,4		1964	3,0	5,6
Walvis Bay Town:						
Meersig	388	3,9		1222	1,9	3,5
South	395	4,0		1501	2,3	4,1
Central	307	3,1		1474	2,3	4,5
North	285	2,9		884	1,4	3,5
East	566	5,7		2581	4,0	4,2
CBD				120	0,2	4,0
Langstrand				196	0,3	2,5
Arandis	913	9,2	4313	4382	6,8	6,0
Henties Bay:						
Omdel	351	3,5	1163	1754	2,7	5,6
Town						
North	434	4,4		607	0,9	2,8
South	609	6,1		853	1,3	3,4
Swakopmund						
Mondesa	851	8,5	9079	12569	13,5	8,3
Tamariskia	427	4,3	2340	2647	5,4	6,2
Town	1748	17,5	6251	6416	9,9	3,9
Walvis Bay						
Kuisebmond	1776	17,8	10110	20941	32,3	7,3
Narraville	916	9,2	4467	5147	7,9	5,4
Town	1941	19,5	6672	7977	12,3	4,0
Arandis	913	9,2	4313	4382	6,8	6,0
Henties Bay						
Omdel	351	3,5	1163	1754	2,7	5,6
Town	1043	10,5	439	1460	2,3	3,2
Swakopmund	3026	30,4	17670	21631	33,3	5,5
Walvis Bay	4633	46,5	21249	34066	52,5	5,5
Arandis	913	9,2	4313	4382	6,8	6,0
Henties Bay	1394	14,0	1602	3214	5,1	4,7
Wlotzkas Baken	150		300	95	0,1	
Rural			2800	1500	2,3	
Total	10116	100	47634	64887	100	
Urban:						
Low income suburbs	2978	29,9	20352	35264	55,7	7,3
Middle income suburbs	2256	22,6	11120	12176	19,2	5,8
High income suburbs	4732	47,5	13362	15853	25,0	3,9
Total	9966	100	44834	63293	100	5,5

Developed plots = plots containing inhabited structures, ie excluding vacant and non-residential plots.

Table H4. Mean Residential Urban Population excluding Single Quarters, 1995

Town/suburb	No.	Distribution %	Increase on 1991 %
Mondesa:			
Central	3802	7,7	16,4
East	1244	2,5	42,7
Jabulani	1138	2,3	2,0
Mahetago	456	0,9	48,7
Tamariskia:			
North	815	1,7	9,7
South	1831	3,7	14,7
Swakopmund Town:			
Vineta north	252	0,5	129,4
Vineta coast	991	2,0	85,9
Vineta east	2472	5,0	47,7
Central	2004	4,1	*
Kramersdorf	567	1,1	*
CBD	128	0,3	*
Kuisebmond:			
Central	2224	4,5	
South	675	1,4	
West	6792	13,7	
North	3283	6,6	
Narraville:			
Central	1478	3,0	
East	1705	3,5	
West	1964	4,0	
Walvis Bay Town:			
Meersig	1222	2,5	
South	1501	3,0	
Central	1474	3,0	
North	884	1,8	
East	2581	5,2	
Langstrand	196	0,4	
Arandis	4382	8,9	1,6
Henties Bay:			
Omdel	1754	3,6	50,8
Town			
North	607	1,2	*
South	853	1,7	*
Swakopmund			
Mondesa	6640	13,4	19,4
Tamariskia	2647	5,4	13,1
Town	6416	13,0	2,6
Walvis Bay			
Kuisebmond	12973	26,3	184,4
Narraville	5147	10,4	15,2
Town	7977	16,1	19,6
Arandis	4382	8,9	1,6
Henties Bay			
Omdel	1754	3,6	50,8
Town	1460	3,0	232,7
Swakopmund	15702	31,8	11,0
Walvis Bay	26098	52,8	66,2
Arandis	4382	8,9	1,6
Henties Bay	3214	6,5	100,6
Total	49395	100	38,1
Urban:			
Low income suburbs	21367	43,3	89,4
Middle income suburbs	12176	24,6	9,5
High income suburbs	15853	32,1	18,6

* = Non-comparable data

Estimates based on averages of assumptions regarding residential loading of all plots with houses.

Table H5. Estimated Residential Urban Population excluding Single Quarters, mid-1995

Town/suburb	No.	Distribution %
Mondesa:		
Central	3785	7,7
East	1656	3,4
Jabulani	1138	2,3
Mahetago	456	0,9
Tamariskia:		
North	818	1,7
South	1841	3,7
Swakopmund Town:		
Vineta west	1345	2,7
Vineta east	2465	5,0
Central	2004	4,1
Kramersdorf	563	1,1
CBD		
Kuisebmond:		
Central	2223	4,5
South	686	1,4
West	6753	13,7
North	3224	6,5
Narraville:		
Central	1508	3,1
East	1541	3,1
West	1889	3,8
Walvis Bay Town:		
Meersig	1237	2,5
South	1541	3,1
Central	1382	2,8
North	998	2,0
East	2370	4,8
Langstrand		
Arandis	4088	8,3
Henties Bay:		
Omdel	2923	5,9
Town		
North	369	0,7
South	617	1,2
Swakopmund		
Mondesa	7035	14,2
Tamariskia	2660	5,4
Town	6377	12,9
Walvis Bay		
Kuisebmond	12896	26,1
Narraville	4937	10,0
Town	7526	15,2
Arandis	4088	8,3
Henties Bay		
Omdel	2923	5,9
Town	986	2,0
Swakopmund	16071	32,5
Walvis Bay	25360	51,3
Arandis	4088	8,3
Henties Bay	3908	7,9
Total	49426	100
Urban:		
Low income suburbs	22853	46,2
Middle income suburbs	11685	23,6
High income suburbs	14888	30,1

Estimates based on mean household sizes and non-vacant houses.

Table H6. Main Language Spoken in Residential Households

Per cent	Indigenous languages					European languages				
Town/suburb	OW	KW	LO	HE	ND	AF	EN	GE	PS	OT
Mondesa:										
Central	35,5	0,0	0,0	16,1	30,6	17,7	0,0	0,0	0,0	0,0
East	42,1	0,0	0,0	26,3	26,3	5,3	0,0	0,0	0,0	0,0
Jabulani	18,2	0,0	0,0	9,1	27,3	36,4	9,1	0,0	0,0	0,0
Mahetago	0,0	0,0	0,0	20,0	30,0	50,0	0,0	0,0	0,0	0,0
Tamariskia:										
North	12,5	0,0	0,0	12,5	20,0	55,0	0,0	0,0	0,0	0,0
South	7,1	0,0	2,4	7,1	26,2	54,8	2,4	0,0	0,0	0,0
Swakopmund Town:										
Vineta west	0,0	0,0	0,0	0,0	5,0	55,0	20,0	20,0	0,0	0,0
Vineta east	5,3	0,0	0,0	2,6	5,3	60,5	26,3	0,0	0,0	0,0
Central	0,0	0,0	0,0	0,0	0,0	34,6	15,4	50,0	0,0	0,0
Kramersdorf	0,0	0,0	0,0	0,0	5,6	33,3	22,2	38,9	0,0	0,0
CBD										
Kuisebmond:										
Central	47,5	0,0	0,0	5,0	35,0	12,5	0,0	0,0	0,0	0,0
South	33,3	0,0	0,0	25,0	25,0	16,7	0,0	0,0	0,0	0,0
West	39,8	0,0	0,0	9,7	43,0	6,5	0,0	0,0	0,0	0,0
North	43,6	0,0	2,6	5,1	38,5	10,3	0,0	0,0	0,0	0,0
Narraville:										
Central	0,0	0,0	0,0	0,0	0,0	97,4	2,6	0,0	0,0	0,0
East	0,0	0,0	0,0	0,0	3,8	92,3	3,8	0,0	0,0	0,0
West	0,0	0,0	0,0	0,0	14,3	78,6	7,1	0,0	0,0	0,0
Walvis Bay Town:				0,0						
Meersig	0,0	0,0	0,0	0,0	0,0	62,5	20,8	16,7	0,0	0,0
South	0,0	0,0	0,0	0,0	0,0	78,9	15,8	5,3	0,0	0,0
Central	0,0	0,0	0,0	11,1	0,0	66,7	16,7	5,6	0,0	0,0
North	0,0	0,0	0,0	0,0	0,0	83,3	11,1	0,0	0,0	0,0
East	3,1	3,1	3,1	0,0	0,0	68,8	12,5	6,3	3,1	3,1
Langstrand										
Arandis	42,9	1,2	1,2	10,7	32,1	10,7	1,2	0,0	1,2	1,2
Henties Bay:										
Omdel	27,8	0,0	0,0	0,0	44,4	27,8	0,0	0,0	0,0	0,0
Town										
North	0,0	0,0	0,0	0,0	0,0	100,0	0,0	0,0	0,0	0,0
South	0,0	0,0	0,0	0,0	25,0	62,5	0,0	0,0	0,0	0,0
Swakopmund										
Mondesa	29,3	0,0	0,0	16,6	29,1	22,9	2,0	0,0	0,0	0,0
Tamariskia	8,8	0,0	1,6	8,8	24,2	54,8	1,6	0,0	0,0	0,0
Town	1,9	0,0	0,0	0,9	3,6	48,5	21,1	24,0	0,0	0,0
Walvis Bay										
Kuisebmond	41,8	0,0	0,7	8,7	38,8	9,5	0,0	0,0	0,0	0,5
Narraville	0,0	0,0	0,0	0,0	6,6	88,7	4,7	0,0	0,0	0,0
Town	0,9	0,9	0,0	1,8	0,0	71,5	15,2	6,9	1,8	0,0
Arandis	42,9	1,2	0,0	10,7	32,1	10,7	1,2	0,0	0,0	0,0
Henties Bay										
Omdel	27,8	0,0	0,0	0,0	44,4	27,8	0,0	0,0	0,0	0,0
Town	0,0	0,0	0,0	0,0	14,6	78,1	0,0	7,3	0,0	0,0
Swakopmund	10,9	0,0	0,2	6,7	14,1	41,9	12,7	13,5	0,0	0,0
Walvis Bay	16,6	0,4	0,3	4,1	16,4	50,8	7,2	2,9	0,7	0,2
Arandis	42,9	1,2	0,0	10,7	32,1	10,7	1,2	0,0	0,0	0,0
Henties Bay	17,4	0,0	0,0	0,0	33,3	46,5	0,0	2,7	0,0	0,0
Total	16,8	0,3	0,2	5,1	18,4	44,5	7,8	6,1	0,4	0,1
Low income suburbs	36,1	0,0	0,4	9,4	37,1	16,1	0,5	0,0	0,0	0,3
Middle income suburbs	16,2	0,4	0,3	5,5	18,9	55,4	2,9	0,0	0,0	0,0
High income suburbs	1,3	0,5	0,0	1,3	2,7	62,2	16,5	14,2	0,9	0,0

OW=OshiWambo; KW=RuKwangali; LO=SiLozi; HE=OtjiHerero; ND=Nama/Damara
AF=Afrikaans; EN=English; GE=German; PS=Portuguese/Spanish; OT=Other.

Table H7. Other Languages Sometimes Spoken in Residential Households

Indigenous languages (%)					European languages (%)				
OW	KW	LO	HE	ND	AF	EN	GE	PS	OT
3,1	0,4	0,2	4,0	5,2	53,4	68,1	8,3	0,7	0,0

Table H8. Number of Households Sometimes Using Other Languages (%)

None	One	Two	Three	Four
14,6	56,3	23,9	4,6	0,6

Table H9a. Age Distribution of Population, Main House and Other Structures, 1995

Town/suburb	Residents, main house						Residents, other structures					
	>65	18-64	14-17	<14	NS	Total	>65	18-64	14-17	<14	NS	Total
Mondesa:												
Central	0,35	3,32	0,60	1,74	0,03	6,05	0,08	1,90	0,06	0,50	0,06	2,61
East	0,32	3,42	1,05	2,21	0,00	7,00	0,00	3,21	0,26	1,11	0,00	4,58
Jabulani	0,00	3,00	0,18	1,45	0,00	4,64	0,00	0,91	0,00	0,45	0,00	1,36
Mahetago	0,00	2,60	0,60	1,90	0,00	5,10	0,00	0,40	0,00	0,10	0,00	0,50
Tamariskia:												
North	0,10	3,03	0,83	1,83	0,00	5,78	0,00	0,23	0,00	0,03	0,00	0,25
South	0,19	2,88	0,71	1,95	0,02	5,76	0,00	0,38	0,07	0,12	0,00	0,57
Town:												
Vineta west	0,25	2,10	0,25	0,65	0,05	3,30	0,00	0,25	0,00	0,00	0,05	0,30
Vineta east	0,05	2,37	0,50	1,11	0,00	4,03	0,00	0,13	0,00	0,03	0,00	0,16
Central	0,15	2,27	0,31	0,92	0,00	3,65	0,00	0,19	0,00	0,15	0,00	0,35
Kramersdorf	0,33	1,83	0,28	0,72	0,00	3,17	0,06	0,00	0,00	0,00	0,06	0,11
Kuisebmond:												
Central	0,05	3,03	0,25	1,85	0,00	5,18	0,00	1,08	0,03	0,35	0,00	1,45
South	0,00	2,92	0,67	1,50	0,00	5,08	0,00	0,00	0,00	0,00	0,00	0,00
West	0,27	3,80	0,71	1,62	0,00	6,40	0,01	1,75	0,19	0,06	0,03	2,05
North	0,08	3,05	0,33	1,44	0,00	4,90	0,03	1,15	0,08	0,15	0,08	1,49
Narraville:												
Central	0,21	3,05	0,50	1,92	0,00	5,68	0,00	0,03	0,00	0,00	0,00	0,03
East	0,08	2,38	0,54	1,65	0,04	4,69	0,00	0,08	0,00	0,15	0,00	0,23
West	0,07	3,50	0,29	1,00	0,07	4,93	0,00	0,29	0,07	0,00	0,29	0,64
Town:												
Meersig	0,21	1,88	0,58	0,71	0,00	3,38	0,00	0,17	0,00	0,00	0,00	0,17
South	0,16	2,42	0,21	1,00	0,00	3,79	0,00	0,32	0,00	0,00	0,00	0,32
Central	0,22	2,39	0,39	1,00	0,06	4,06	0,00	0,33	0,00	0,11	0,00	0,44
North	0,56	1,50	0,39	0,72	0,00	3,17	0,00	0,33	0,00	0,00	0,00	0,33
East	0,06	2,34	0,44	1,09	0,00	3,94	0,00	0,22	0,00	0,03	0,00	0,25
CBD	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Arandis	0,00	3,24	0,69	2,05	0,04	6,01	0,00	0,02	0,00	0,00	0,00	0,02
Henties Bay:												
Omdel/rural	0,06	3,39	0,39	1,56	0,00	5,39	0,00	0,17	0,00	0,00	0,00	0,17
Town												
North	0,00	2,00	0,33	0,33	0,00	2,67	0,00	0,17	0,00	0,00	0,00	0,17
South	0,88	1,25	0,25	0,38	0,00	2,75	0,00	0,38	0,00	0,25	0,00	0,63
By area												
Mondesa	0,24	3,20	0,58	1,77	0,02	5,80	0,04	1,76	0,08	0,55	0,03	2,46
Tamariskia	0,16	2,93	0,75	1,91	0,02	5,77	0,00	0,33	0,05	0,09	0,00	0,47
Swakopmund Town	0,16	2,22	0,36	0,91	0,01	3,66	0,01	0,16	0,00	0,06	0,02	0,24
Kuisebmond	0,15	3,37	0,51	1,60	0,00	5,64	0,01	1,32	0,11	0,14	0,04	1,62
Narraville	0,11	2,99	0,43	1,49	0,04	5,07	0,00	0,14	0,03	0,05	0,11	0,32
Walvis Bay Town	0,21	2,15	0,40	0,93	0,01	3,71	0,00	0,26	0,00	0,03	0,00	0,29
Arandis	0,00	3,24	0,69	2,05	0,04	6,01	0,00	0,02	0,00	0,00	0,00	0,02
Omdel	0,06	3,39	0,39	1,56	0,00	5,39	0,00	0,17	0,00	0,00	0,00	0,17
Henties Bay Town	0,51	1,56	0,28	0,36	0,00	2,72	0,00	0,29	0,00	0,15	0,00	0,43
By town												
Swakopmund	0,18	2,61	0,48	1,31	0,01	4,59	0,02	0,65	0,03	0,21	0,02	0,92
Walvis Bay	0,17	2,79	0,45	1,30	0,01	4,73	0,00	0,65	0,05	0,08	0,04	0,81
Arandis	0,00	3,24	0,69	2,05	0,04	6,01	0,00	0,02	0,00	0,00	0,00	0,02
Henties Bay	0,23	2,71	0,35	1,11	0,00	4,39	0,00	0,21	0,00	0,05	0,00	0,27
Total	0,16	2,76	0,47	1,34	0,01	4,75	0,01	0,56	0,03	0,11	0,02	0,74
Low income	0,16	3,33	0,51	1,64	0,00	5,64	0,02	1,25	0,08	0,23	0,03	1,61
Middle income	0,09	3,06	0,59	1,77	0,03	5,53	0,00	0,14	0,02	0,04	0,05	0,25
High income	0,21	2,13	0,38	0,87	0,01	3,60	0,00	0,22	0,00	0,05	0,01	0,28

NS = Not stated.

Table H9b. Age Distribution of Population, All Residents, 1995

Town/suburb	All residents						Distribution					
	>65	18-64	14-17	<14	NS	Total	>65	18-64	14-17	<14	NS	Total
Mondesa:												
Central	0,44	5,23	0,66	2,24	0,10	8,66	5,0%	60,3%	7,6%	25,9%	1,1%	100,0%
East	0,32	6,63	1,32	3,32	0,00	11,58	2,7%	57,3%	11,4%	28,6%	0,0%	100,0%
Jabulani	0,00	3,91	0,18	1,91	0,00	6,00	0,0%	65,2%	3,0%	31,8%	0,0%	100,0%
Mahetago	0,00	3,00	0,60	2,00	0,00	5,60	0,0%	53,6%	10,7%	35,7%	0,0%	100,0%
Tamariskia:												
North	0,10	3,25	0,83	1,85	0,00	6,03	1,7%	53,9%	13,7%	30,7%	0,0%	100,0%
South	0,19	3,26	0,79	2,07	0,02	6,33	3,0%	51,5%	12,4%	32,7%	0,4%	100,0%
Town:												
Vineta west	0,25	2,35	0,25	0,65	0,10	3,60	6,9%	65,3%	6,9%	18,1%	2,8%	100,0%
Vineta east	0,05	2,50	0,50	1,13	0,00	4,18	1,3%	59,7%	11,9%	27,0%	0,0%	100,0%
Central	0,15	2,46	0,31	1,08	0,00	4,00	3,8%	61,5%	7,7%	26,9%	0,0%	100,0%
Kramersdorf	0,39	1,83	0,28	0,72	0,06	3,28	11,9%	55,9%	8,5%	22,0%	1,7%	100,0%
Kuisebmond:												
Central	0,05	4,10	0,28	2,20	0,00	6,63	0,8%	61,9%	4,2%	33,2%	0,0%	100,0%
South	0,00	2,92	0,67	1,50	0,00	5,08	0,0%	57,4%	13,1%	29,5%	0,0%	100,0%
West	0,28	5,55	0,90	1,69	0,03	8,45	3,3%	65,6%	10,7%	20,0%	0,4%	100,0%
North	0,10	4,21	0,41	1,59	0,08	6,38	1,6%	65,9%	6,4%	24,9%	1,2%	100,0%
Narraville:												
Central	0,21	3,08	0,50	1,92	0,00	5,71	3,7%	53,9%	8,8%	33,6%	0,0%	100,0%
East	0,08	2,46	0,54	1,81	0,04	4,92	1,6%	50,0%	10,9%	36,7%	0,8%	100,0%
West	0,07	3,79	0,36	1,00	0,36	5,57	1,3%	67,9%	6,4%	17,9%	6,4%	100,0%
Town:												
Meersig	0,21	2,04	0,58	0,71	0,00	3,54	5,9%	57,6%	16,5%	20,0%	0,0%	100,0%
South	0,16	2,74	0,21	1,00	0,00	4,11	3,8%	66,7%	5,1%	24,4%	0,0%	100,0%
Central	0,22	2,72	0,39	1,11	0,06	4,50	4,9%	60,5%	8,6%	24,7%	1,2%	100,0%
North	0,56	1,83	0,39	0,72	0,00	3,50	15,9%	52,4%	11,1%	20,6%	0,0%	100,0%
East	0,06	2,56	0,44	1,13	0,00	4,19	1,5%	61,2%	10,4%	26,9%	0,0%	100,0%
Arandis:	0,00	3,26	0,69	2,05	0,04	6,04	0,0%	54,0%	11,4%	33,9%	0,6%	100,0%
Henties Bay:												
Omdel/rural	0,06	3,56	0,39	1,56	0,00	5,56	1,0%	64,0%	7,0%	28,0%	0,0%	100,0%
Town												
North	0,00	2,17	0,33	0,33	0,00	2,83	0,0%	76,5%	11,8%	11,8%	0,0%	100,0%
South	0,88	1,63	0,25	0,63	0,00	3,38	25,9%	48,1%	7,4%	18,5%	0,0%	100,0%
By area												
Mondesa	0,28	4,96	0,66	2,33	0,05	8,27	3,3%	60,0%	8,0%	28,1%	0,6%	100,0%
Tamariskia	0,16	3,26	0,80	2,00	0,02	6,24	2,6%	52,3%	12,8%	32,1%	0,3%	100,0%
Town	0,16	2,38	0,36	0,96	0,03	3,90	4,2%	61,1%	9,2%	24,7%	0,7%	100,0%
Kuisebmond	0,16	4,69	0,63	1,74	0,04	7,26	2,3%	64,6%	8,6%	24,0%	0,5%	100,0%
Narraville	0,11	3,13	0,46	1,54	0,15	5,39	2,1%	58,1%	8,5%	28,6%	2,7%	100,0%
Town	0,21	2,42	0,40	0,96	0,01	4,00	5,2%	60,4%	10,1%	24,0%	0,2%	100,0%
Arandis	0,00	3,26	0,69	2,05	0,04	6,04	0,0%	54,0%	11,4%	33,9%	0,6%	100,0%
Omdel	0,06	3,56	0,39	1,56	0,00	5,56	1,0%	64,0%	7,0%	28,0%	0,0%	100,0%
Town	0,51	1,85	0,28	0,50	0,00	3,15	16,2%	58,7%	9,0%	16,0%	0,0%	100,0%
By town												
Swakopmund	0,20	3,26	0,51	1,51	0,03	5,52	3,6%	59,2%	9,3%	27,4%	0,6%	100,0%
Walvis Bay	0,17	3,44	0,50	1,38	0,05	5,54	3,1%	62,1%	9,0%	24,9%	0,8%	100,0%
Arandis	0,00	3,26	0,69	2,05	0,04	6,04	0,0%	54,0%	11,4%	33,9%	0,6%	100,0%
Henties Bay	0,23	2,92	0,35	1,16	0,00	4,66	4,8%	62,7%	7,5%	25,0%	0,0%	100,0%
Total	0,17	3,32	0,50	1,45	0,04	5,49	3,1%	60,5%	9,2%	26,5%	0,7%	100,0%
Low income	0,18	4,57	0,60	1,87	0,03	7,25	2,4%	63,1%	8,2%	25,8%	0,5%	100,0%
Middle income	0,09	3,20	0,61	1,81	0,08	5,78	1,5%	55,3%	10,5%	31,3%	1,4%	100,0%
High income	0,21	2,36	0,38	0,92	0,02	3,89	5,5%	60,6%	9,7%	23,8%	0,4%	100,0%

NS = Not stated.

Table H10. Distribution of Employed, Unemployed and Dependents, 1991

Town/area	Proportion of male, female and total population (%):								
	Employed			Unemployed			Dependents		
	M	F	T	M	F	T	M	F	T
Swakopmund									
Mondesa	55	30	44	17	14	16	28	55	54
Tamariskia	37	26	31	11	5	8	52	69	61
Town	51	33	42	2	3	3	47	64	56
Walvis Bay									
Kuisebmond			70			3			27
Narraville			33			7			60
Town			49			2			49
Arandis	39	11	26	12	23	17	49	65	57
Henties Bay									
Omdel	74	24	56	11	6	9	16	70	35
Town	42	21	31	0	1	1	55	78	67
Swakopmund	51	31	41	12	9	10	37	61	48
Walvis Bay			55			4			41
Arandis	39	11	26	12	23	17	49	65	57
Henties Bay	67	23	49	9	4	7	24	73	44
Total			47			8			45
Excl. single quarters:									
Swakopmund	44	31	37	8	7	8	47	62	54
Walvis Bay			41			5			55
Arandis	39	11	26	12	23	17	49	65	57
Henties Bay	67	23	49	9	4	7	24	73	44
Total			38			7			54

Table H11. Estimated Seasonal Variations based on the 1995 Population

Town/area	Peak (January)	Low (September)	Net seasonal difference	
			No.	%
Swakopmund				
Mondesa	11644	12569	-925	-7,4
Tamariskia	2779	2647	132	5,0
Town	8680	5721	2959	51,7
Walvis Bay				
Kuisebmond	17785	19537	-1753	-9,0
Narraville	5404	5147	257	5,0
Town	10223	7706	2517	32,7
Arandis	3238	3858	-620	-16,1
Henties Bay				
Omdel	1929	1578	351	22,2
Town	5476	624	4853	778
Wlotzkas Baken	473	47	425	900
Swakopmund	23102	20936	2166	10,3
Walvis Bay	33412	32391	1021	3,2
Arandis	3238	3858	-620	-16,1
Henties Bay	7878	2202	5203	236
Rural	3300	1600	1700	106
Total	70931	61034	9896	16,2
Urban:				
Low income suburbs	31357	33684	-2327	-6,9
Middle income suburbs	11422	11652	-230	-1,0
High income suburbs	24379	14051	10328	73,5
Urban distribution (%):				
Swakopmund	34,4	35,3		
Walvis Bay	49,8	54,5		
Arandis	4,8	6,5		
Henties Bay	11,0	3,7		

Table H12. Age Distribution of the Urban Population, 1991

Town/area	Total 0-14	Total 15-64	Total 65+	All ages		
				Male	Female	Total
Swakopmund						
Mondesa	2302	6663	114	5185	3894	9079
Tamariskia	963	1352	25	1130	1210	2340
Town	1564	3946	654	3008	3243	6251
Walvis Bay						
Kuisebmond						10110
Narraville						4467
Town						6672
Arandis	1679	2611	9	2260	2053	4313
Henties Bay						
Omdel	219	939	5	740	423	1163
Town	35	285	119	211	228	439
Swakopmund	4829	11961	793	9323	8347	17670
Walvis Bay						
Arandis	1679	2611	9	2260	2053	4313
Henties Bay	254	1221	124	951	651	1602
Total						44834
Urban distribution (%):						
Swakopmund	27,3	67,7	4,5	52,8	47,2	100
Walvis Bay						
Arandis	38,9	60,5	0,2	52,3	47,6	100
Henties Bay	15,9	76,2	0,3	59,4	40,6	100

Table H13. Relationship of Outside Residents to the Main Household, 1995

Town/area	Persons per plot					Distribution (%)				
	Relative	Tenant	Servant	Other	Total	Relative	Tenant	Servant	Other	Total
Swakopmund										
Mondesa	1,34	0,92	0,01	0,04	2,32	57,9%	39,8%	0,4%	1,9%	100%
Tamariskia	0,05	0,38	0,02	0,00	0,45	10,7%	84,0%	5,3%	0,0%	100%
Town	0,03	0,05	0,11	0,00	0,20	14,8%	27,0%	58,2%	0,0%	100%
Walvis Bay										
Kuisebmond	0,72	0,59	0,02	0,00	1,33	53,8%	44,4%	1,8%	0,0%	100%
Narraville	0,11	0,12	0,03	0,00	0,26	43,8%	46,0%	10,2%	0,0%	100%
Town	0,05	0,08	0,09	0,00	0,22	20,7%	38,0%	41,3%	0,0%	100%
Arandis	0,02	0,00	0,00	0,00	0,02	100,0%	0,0%	0,0%	0,0%	100%
Henties Bay										
Omdel	0,06	0,11	0,00	0,00	0,17	33,3%	66,7%	0,0%	0,0%	100%
Town	0,00	0,07	0,29	0,00	0,36	0,0%	20,2%	79,8%	0,0%	100%
Swakopmund	0,42	0,36	0,07	0,01	0,85	48,6%	41,6%	8,2%	1,5%	100%
Walvis Bay	0,32	0,29	0,05	0,00	0,66	48,4%	43,6%	7,9%	0,0%	100%
Arandis	0,02	0,00	0,00	0,00	0,02	100,0%	0,0%	0,0%	0,0%	100%
Henties Bay	0,03	0,10	0,11	0,00	0,24	14,6%	40,5%	44,9%	0,0%	100%
Total	0,30	0,27	0,06	0,00	0,64	47,5%	42,5%	9,3%	0,7%	100%
Low income	0,78	0,60	0,02	0,01	1,41	55,2%	42,8%	1,1%	0,8%	100%
Middle income	0,07	0,13	0,02	0,00	0,22	31,5%	60,8%	7,7%	0,0%	100%
High income	0,04	0,07	0,12	0,00	0,22	15,7%	31,5%	52,8%	0,0%	100%

Table H14. Number of Sleeping Rooms and Persons per Room, 1995

Town/suburb	Sleeping rooms			Persons per room		
	Main house	Outside	Whole plot	Main house	Outside	Whole plot
Mondesa:						
Central	2,18	0,82	3,00	2,78	3,18	2,89
East	2,16	1,32	3,47	3,24	3,48	3,33
Jabulani	2,09	0,36	2,45	2,22	3,75	2,44
Mahetago	2,10	0,30	2,40	2,43	1,67	2,33
Tamariskia:						
North	3,05	0,08	3,13	1,89	3,33	1,93
South	2,88	0,24	3,12	2,00	2,40	2,03
Swakopmund Town:						
Vineta west	3,15	0,50	3,65	1,05	0,60	0,99
Vineta east	2,95	0,26	3,21	1,37	0,60	1,30
Central	3,15	0,65	3,81	1,16	0,53	1,05
Kramersdorf	2,78	0,33	3,11	1,14	0,33	1,05
Kuisebmond:						
Central	1,68	0,48	2,15	3,09	3,05	3,08
South	2,75		2,75	1,85		1,85
West	2,01	0,95	2,96	3,18	2,17	2,86
North	1,13	0,67	1,79	4,34	2,23	3,56
Narraville:						
Central	2,37	0,03	2,39	2,40	1,00	2,38
East	2,58	0,04	2,62	1,82	6,00	1,88
West	3,07	0,29	3,36	1,60	2,25	1,66
Walvis Bay Town:						
Meersig	3,58	0,17	3,75	0,94	1,00	0,94
South	3,68	0,79	4,47	1,03	0,40	0,92
Central	2,89	0,33	3,22	1,40	1,33	1,40
North	2,89	0,28	3,17	1,10	1,20	1,11
East	3,47	0,41	3,88	1,14	0,62	1,08
Arandis	3,52	0,01	3,54	1,71	2,00	1,71
Henties Bay:						
Omdel	2,17	0,17	2,33	2,49	1,00	2,38
Town						
North	4,00	0,33	4,33	0,67	0,50	0,65
South	3,13	0,50	3,63	0,88	1,25	0,93
Swakopmund						
Mondesa	2,15	0,75	2,90	2,70	3,27	2,85
Tamariskia	2,93	0,19	3,12	1,96	2,52	2,00
Town	3,04	0,44	3,48	1,20	0,55	1,12
Walvis Bay						
Kuisebmond	1,75	0,71	2,46	3,22	2,30	2,95
Narraville	2,70	0,13	2,83	1,88	2,56	1,91
Town	3,35	0,41	3,76	1,11	0,72	1,06
Arandis	3,52	0,01	3,54	1,71	2,00	1,71
Henties Bay						
Omdel	2,17	0,17	2,33	2,49	1,00	2,38
Town	3,49	0,43	3,92	0,78	1,01	0,80
Swakopmund	2,76	0,50	3,26	1,66	1,86	1,69
Walvis Bay	2,60	0,47	3,07	1,82	1,75	1,81
Arandis	3,52	0,01	3,54	1,71	2,00	1,71
Henties Bay	2,66	0,27	2,93	1,65	1,01	1,59
Total	2,73	0,42	3,15	1,74	1,75	1,74
Low income	1,93	0,63	2,56	2,93	2,56	2,84
Middle income	3,03	0,10	3,13	1,83	2,52	1,85
High income	3,23	0,42	3,65	1,12	0,67	1,06

Table H15. Distribution of Secondary Structures by Type

Per cent	Detached flat or outhouse	Flat in/ attached to main house	Garage	Shed, shelter	Mobile home	Other
Swakopmund	26,0	12,7	17,7	9,8	0,1	0,0
Walvis Bay	16,1	8,3	17,4	9,0	0,2	0,6
Arandis	0,0	1,2	3,6	0,0	0,0	0,0
Henties Bay	14,7	2,7	5,3	0,0	0,0	0,0
All towns	18,0	8,7	15,3	7,7	0,1	0,3
Low income suburbs	11,8	3,3	5,4	19,2	0,3	0,0
Middle income suburbs	4,1	4,3	10,4	2,7	0,2	0,3
High income suburbs	30,4	15,4	26,1	1,0	0,0	0,5

Table H16. Residential Accounts mid-1995 and Annual Water Consumption 1994/95

Town/area	Accounts	Consumption (000 m^3)	Monthly mean (m^3/account)
Swakopmund	3 301	1 104	27,9
Mondesa	928	186	16,7
Tamariskia	473	169	29,8
Town	1 900	750	32,9
Walvis Bay	4 825	1 849	31,9
Kuisebmond	1 799	429	19,9
Narraville	935	319	28,4
Town	2 091	1 101	43,9
Arandis	665	208	26,1
Sub-total	8 791	3 161	30,0
Henties Bay	2 000		
Omdel	700		
Town	1 300		
Total	10 791		

Table H17. Distribution of Accounts and Water Consumption, 1994/95

Town/area	Developed plots	Accounts	Distribution (per cent)				
			Plots		Accounts		Consumption
			All	3 towns	All	3 towns	3 towns
Swakopmund	3 066	3 301	30,2	35,0	30,6	37,5	34,9
Mondesa	851	928	8,4	9,7	8,6	10,6	5,9
Tamariskia	427	473	4,2	4,9	4,4	5,4	5,3
Town	1 788	1 900	17,6	20,4	17,6	21,6	23,7
Walvis Bay	4 796	4 825	47,2	54,7	44,7	54,9	58,5
Kuisebmond	1 776	1 799	17,5	20,3	16,7	20,5	13,6
Narraville	969	935	9,5	11,1	8,7	10,6	10,1
Town	2 051	2 091	20,2	23,4	19,4	23,8	34,8
Arandis	903	665	8,9	10,3	6,2	7,6	6,6
Sub-total	8 764	8 791	86,3	100	81,5	100	100
Henties Bay	1 394	2 000	13,7		18,5		
Omdel	351	700	3,5		6,5		
Town	1 043	1 300	10,3		12,0		
Total	10 158	10 791	100		100		

Table H18. Accounts and Water Consumption by Area, 1994/95

Area	Accounts		Consumption	Means (3 towns) per	
	All	3 towns	3 towns (000 m^3)	Account (m^3/month)	Person (litre/day)
Low income	3 427	2 727	615	18,8	86
Mondesa	928	928	186	16,7	77
Kuisebmond	1 799	1 799	429	19,9	91
Omdel	700				
Middle income	2 073	2 073	696	28,0	186
Tamariskia	473	473	169	29,8	175
Narraville	935	935	319	28,4	217
Arandis	665	665	208	26,1	156
High income	5 291	3 991	1 851	38,6	358
Swakopmund	1 900	1 900	750	32,9	320
Walvis Bay	2 091	2 091	1 101	43,9	378
Henties Bay	1 300				
Total	10 791	8 791	3 161	30,0	188

* = Excluding the single quarters, ie residential accounts only.

Table H19. Distribution of Accounts and Water Consumption by Area, 1994/95

Town/area	Developed plots	Accounts	Distribution (per cent)				
			Plots		Accounts		Consumption
			All	3 towns	All	3 towns	3 towns
Low income	2 978	3 427	29,4	30,0	31,8	31,0	19,4
Mondesa	851	928	8,4	9,7	8,6	10,6	5,9
Kuisebmond	1 776	1 799	17,5	20,3	16,7	20,5	13,6
Omdel	351	700	3,5		6,5		
Middle income	2 299	2 073	22,6	26,3	19,2	23,6	22,0
Tamariskia	427	473	4,2	4,9	4,4	5,4	5,3
Narraville	969	935	9,5	11,1	8,7	10,6	10,1
Arandis	903	665	8,9	10,3	6,2	7,6	6,6
High income	4 882	5 291	48,1	43,8	49,0	45,4	58,5
Swakopmund	1 788	1 900	17,6	20,4	17,6	21,6	23,7
Walvis Bay	2 051	2 091	20,2	23,4	19,4	23,8	34,8
Henties Bay	1 043	1 300	10,3		12,0		
Total	10 158	10 791	100	100	100	100	100

Table H20. Distribution of Accounts and Water Consumption at Differing Consumption Rates, 1994/95

Monthly consumption rates:	0-15 m^3	15-30 m^3	30-60 m^3	60-120 m^3	>120 m^3	All
Accounts (no.)	31,7%	28,6%	26,7%	12,2%	0,9%	100%
Consumption (m^3)	8,5%	20,1%	36,5%	30,7%	4,2%	100%
Mean (m^3 per month)	8,4	21,9	42,6	78,5	152,2	31,1
Share of consumption:						
Low income suburbs	50,9%	40,8%	14,7%	4,3%	3,1%	19,4%
Middle income suburbs	21,6%	29,7%	26,6%	13,2%	8,6%	22,0%
High income suburbs	27,4%	29,5%	58,7%	82,4%	88,3%	58,5%
Total	100%	100%	100%	100%	100%	100%

Excludes zero accounts in Swakopmund.

Table H21. Distribution of Toilets and Rooms with Baths and Showers

Area/suburb	Main house		Whole plot		Houses with:		Persons per:	
	Toilet	Bath/ shower	Toilet	Bath/ shower	Toilet	Bath/ shower	Toilet	Bath/ shower
	No.	No.	No.	No.	%	%	No.	No.
Mondesa:								
Central	0,71	0,37	0,71	0,39	66,2	35,5	12,2	22,4
East	0,84	0,95	0,84	0,95	68,4	79,0	13,8	12,2
Jabulani	1,18	1,27	1,18	1,36	90,9	100,0	5,1	4,4
Mahetago	1,10	1,00	1,10	1,00	100,0	100,0	5,1	5,6
Tamariskia:								
North	1,58	1,30	1,63	1,35	99,9	99,9	3,7	4,5
South	1,26	1,00	1,45	1,12	97,7	100,0	4,4	5,7
Swakopmund Town:								
Vineta west	2,30	1,75	2,85	2,15	100,0	95,0	1,3	1,7
Vineta east	1,82	1,76	2,00	1,82	100,0	100,0	2,1	2,3
Central	2,12	1,65	2,54	1,96	96,2	96,2	1,6	2,0
Kramersdorf	2,11	1,67	2,39	1,89	100,0	100,0	1,4	1,7
Kuisebmond:								
Central	1,15	0,88	1,15	0,88	97,5	82,5	5,8	7,6
South	1,17	1,33	1,17	1,33	100,0	100,0	4,4	3,8
West	0,56	0,29	0,77	0,32	52,7	32,3	10,9	26,2
North	1,26	1,00	1,28	1,03	100,0	100,0	5,0	6,2
Narraville:								
Central	1,05	0,55	1,08	0,58	94,7	55,3	5,3	9,9
East	1,42	0,92	1,46	0,96	100,0	84,6	3,4	5,1
West	1,14	1,50	1,14	1,50	92,8	100,0	4,9	3,7
Walvis Bay Town:								
Meersig	2,75	2,13	2,79	2,25	100,0	100,0	1,3	1,6
South	2,68	1,95	3,37	2,42	100,0	100,0	1,2	1,7
Central	1,67	1,00	2,50	1,56	100,0	100,0	1,8	2,9
North	1,39	1,06	1,67	1,17	94,5	94,5	2,1	3,0
East	2,16	1,66	2,41	1,78	100,0	100,0	1,7	2,4
Arandis	1,19	1,05	1,19	1,05	98,8	98,8	5,1	5,8
Henties Bay:								
Omdel	0,83	0,56	0,83	0,56	66,7	66,7	6,7	10,0
Town								
North	3,17	1,67	3,67	2,00	100,0	100,0	0,8	1,4
South	3,00	1,88	3,25	2,25	99,4	99,4	1,6	1,5
Swakopmund								
Mondesa	0,87	0,73	0,87	0,76	75,3	63,4	9,5	10,9
Tamariskia	1,36	1,10	1,51	1,19	100,0	100,0	4,1	5,2
Town	2,05	1,72	2,40	1,94	98,8	97,7	1,6	2,0
Walvis Bay								
Kuisebmond	0,92	0,68	1,02	0,70	87,9	66,2	7,1	10,3
Narraville	1,21	1,03	1,23	1,05	96,6	81,8	4,4	5,1
Town	2,18	1,60	2,57	1,87	100,0	99,1	1,6	2,1
Arandis	1,19	1,05	1,19	1,05	98,8	98,8	5,1	5,8
Henties Bay								
Omdel	0,83	0,56	0,83	0,56	66,7	55,6	6,7	10,0
Town	3,07	1,79	3,42	2,15	99,6	99,6	0,9	1,5
Swakopmund	1,61	1,34	1,82	1,49	92,1	88,0	3,0	3,7
Walvis Bay	1,49	1,13	1,70	1,25	94,6	82,9	3,3	4,4
Arandis	1,19	1,05	1,19	1,05	98,8	98,8	5,1	5,8
Henties Bay	1,67	1,02	1,80	1,15	79,0	72,0	2,6	4,1
Total	1,52	1,18	1,71	1,30	92,7	84,7	3,2	4,2
Low income suburbs	0,89	0,67	0,95	0,69	81,0	63,7	7,6	10,5
Middle income suburbs	1,24	1,05	1,28	1,08	98,1	91,4	4,5	5,4
High income suburbs	2,19	1,67	2,57	1,92	99,5	98,6	1,5	2,0

Table H22. Distribution of Taps

Area/suburb	Taps per:					Persons per tap:	
	House	Bldgs	Outside	Hot	Total	Hot	Total
	No.	No.	No.	No.	No.	No.	No.
Mondesa:							
Central	0,85	0,02	1,02	0,16	1,89	53,70	4,59
East	1,89	0,11	10,5	0,42	3,05	27,50	3,79
Jabulani	3,45	0,00	1,18	0,64	4,64	9,43	1,29
Mahetago	4,10	0,20	1,10	1,80	5,40	3,11	1,04
Tamariskia:							
North	6,28	0,08	1,78	3,20	8,13	1,88	0,74
South	4,86	0,24	1,83		6,93	2,40	0,91
Swakopmund Town:				2,64			
Vineta west	8,10	1,55	2,10	4,50	11,75	0,80	0,31
Vineta east	9,89	1,00	2,24	5,24	13,13	0,80	0,32
Central	10,62	2,27	2,69	6,23	15,58	0,64	0,26
Kramersdorf	8,11	1,11	2,06	4,50	11,28	0,73	0,29
Kuisebmond:							
Central	2,95	0,00	0,98	0,53	3,93	12,62	1,69
South	6,17	0,00	1,17	2,75	7,33	1,85	0,69
West	1,20	0,00	1,04	0,10	2,25	87,33	3,76
North	2,87	0,00	1,08	0,44	3,95	14,65	1,62
Narraville:							
Central	2,26	0,08	1,03	0,79	3,37	7,23	1,70
East	6,00	0,12	1,08	2,96	7,19	1,66	0,68
West	5,00	0,43	1,21	2,43	6,64	2,29	0,84
Walvis Bay Town:							
Meersig	9,13	0,42	2,58	4,63	12,13	0,77	0,29
South	9,00	1,16	2,32	4,84	12,47	0,85	0,33
Central	722	0,56	2,28	3,83	10,06	1,17	0,45
North	7,17	0,78	1,72	3,78	9,67	0,93	0,36
East	8,56	0,63	2,16	4,34	11,34	0,96	0,37
Arandis	6,80	0,00	1,06	3,27	7,86	1,84	0,77
Henties Bay:							
Omdel	1,33	0,00	0,72	0,28	2,06	20,00	2,70
Town							
North	8,33	1,33	1,83	4,83	11,50	0,59	0,25
South	6,75	1,75	2,50	4,13	11,00	0,82	0,31
Swakopmund							
Mondesa	1,92	0,05	1,07	0,47	3,03	17,67	2,73
Tamariskia	5,31	0,19	1,81	2,82	7,31	2,21	0,85
Town	9,52	1,53	2,33	5,30	13,37	0,74	0,29
Walvis Bay							
Kuisebmond	2,39	0,00	1,05	0,48	3,44	15,25	2,11
Narraville	4,55	0,22	1,11	2,14	5,89	2,52	0,92
Town	8,32	0,70	2,22	4,33	11,25	0,92	0,36
Arandis	6,80	0,00	1,06	3,27	7,86	1,84	0,77
Henties Bay							
Omdel	1,33	0,00	0,72	0,28	2,06	20,00	2,70
Town	7,41	1,58	2,22	4,42	11,21	0,71	0,28
Swakopmund	6,68	0,90	1,88	3,52	9,46	1,57	0,58
Walvis Bay	5,26	0,33	1,54	2,39	7,14	2,32	0,78
Arandis	6,80	0,00	1,06	3,27	7,86	1,84	0,77
Henties Bay	3,60	0,59	1,28	1,82	5,47	2,56	0,85
Total	5,68	0,51	1,59	2,77	7,79	1,98	0,70
Low income suburbs	2,08	0,01	1,00	0,44	3,10	16,44	2,34
Middle income suburbs	5,47	0,14	1,24	2,66	6,86	2,17	0,84
High income suburbs	8,76	1,13	2,27	4,75	12,15	0,82	0,32

Table H23. Household Water-using Fixtures and Equipment, Number per Household

Per cent	Bath	Shower	Handbasin	Moveable washbasin	Fixed laundry basin	Washing machine	Dish-washer
Swakopmund	0,99	0,98	1,52	0,91	0,44	0,73	0,12
Walvis Bay	0,87	0,81	1,18	0,65	0,27	0,65	0,06
Arandis	1,00	1,04	1,00	0,33	0,60	0,17	0,05
Henties Bay	0,64	0,80	0,79	1,48	0,14	0,35	0,00
All towns	0,90	0,88	1,24	0,79	0,34	0,61	0,07
Low income suburbs	0,31	0,56	0,67	1,42	0,11	0,22	0,01
Middle income suburbs	0,99	0,64	0,93	0,40	0,30	0,56	0,02
High income suburbs	1,33	1,27	1,86	0,47	0,55	0,97	0,15

Table H24. Household Water-using Fixtures and Equipment, Persons per Item

Per cent	Bath	Shower	Handbasin	Moveable washbasin	Fixed laundry basin	Washing machine	Dish-washer
Swakopmund	5,2	5,3	3,4	5,7	11,7	6,8	32,0
Walvis Bay	6,4	6,9	4,7	8,6	20,7	8,7	59,3
Arandis	6,0	5,8	6,0	18,1	10,1	10,8	42,3
Henties Bay	7,3	5,8	5,9	3,1	33,0	6,4	58,0
All towns	6,0	6,1	4,3	6,8	15,9	7,9	45,5
Low income suburbs	23,5	12,9	10,8	5,1	64,7	24,9	177,7
Middle income suburbs	5,8	9,1	6,2	14,3	19,5	10,0	56,4
High income suburbs	2,7	2,9	1,9	7,7	6,7	3,4	19,1

Table H25. Observed Water Leaks and Wasteful Practices

Per cent	Leaks inside	Leaks outside	Wasteful practices
Yes	4,2	4,7	2,0
No	94,4	93,0	93,3
Don't know	1,5	2,3	4,7

Table H26. Reported Water Leaks within Last Three Months

Per cent	All households	Low income suburbs	Middle income suburbs	High income suburbs
Leaks in last 3 months	22,8	25,5	30,6	16,6
Worst problem				
Leaking toilet	5,5			
Slow tap leak	6,7			
Fast tap leak	2,8			
Broken pipe	4,3			
Underground leakage	1,8			
Other	1,3			
Not yet fixed:	7,1	11,3	8,0	3,2
Temporary repair	0,6			
Awaiting action	5,6	9,6	5,9	2,2

Table H27. Household Water-using Fixtures and Equipment, Number per Household

Per cent	Bath	Shower	Handbasin	Moveable washbasin	Fixed laundry basin	Washing machine	Dish-washer
Swakopmund	0,99	0,98	1,52	0,91	0,44	0,73	0,12
Walvis Bay	0,87	0,81	1,18	0,65	0,27	0,65	0,06
Arandis	1,00	1,04	1,00	0,33	0,60	0,17	0,05
Henties Bay	0,64	0,80	0,79	1,48	0,14	0,35	0,00
All towns	0,90	0,88	1,24	0,79	0,34	0,61	0,07
Low income suburbs	0,31	0,56	0,67	1,42	0,11	0,22	0,01
Middle income suburbs	0,99	0,64	0,93	0,40	0,30	0,56	0,02
High income suburbs	1,33	1,27	1,86	0,47	0,55	0,97	0,15

Table H28. Density of Trees and Bushes above 2m, by Area and Category

Town/suburb	Mean plot size m^2	Trees & bushes per 1000 m^2	Persons per 1000 m^2
Swakopmund:			
Mondesa:			
Central	435	2,0	19,9
Jabulani	1175	1,3	17,7
Single quarters	105	0,0	66,7
Tamariskia	952	1,0	6,5
Town:			
Vineta west	1426	2,6	2,5
Kramersdorf	2035	3,1	1,6
Walvis Bay:			
Kuisebmond:			
Central	408	2,4	16,2
South	806	1,0	6,3
West	331	2,6	25,5
North	379	0,0	16,9
Single quarters	304	0,0	32,9
Compound			
Narraville:			
Central	631	0,7	9,0
West	1357	1,5	4,1
Town:			
Meersig	1813	1,9	1,9
South	877	5,7	4,7
Central	1400	3,9	3,2
North	1302	2,8	2,7
East	1242	3,5	3,4
Two towns	918	2,8	6,2
Swakopmund	1006	2,1	5,3
Walvis Bay	853	2,4	7,0
Excl. single quarters:			
Low income suburbs	494	1,4	14,1
Middle income suburbs	1028	1,2	5,1
High income suburbs	1466	2,9	2,5
Total	1046	2,4	4,9

Note: Based on the tree count.

Table H29. Distribution of Trees and Bushes above 2m, by Area and Category

Town/suburb	Trees & bushes per plot	Total trees & bushes	People per plot	Trees & bushes per person	Persons per tree/bush
Swakopmund:					
Mondesa:					
Central	0,9	379	8,7	0,10	10,0
Jabulani	0,9	124	6,0	0,15	6,7
Single quarters	0,0	0	7,0	0,00	-
Tamariskia	1,0	407	6,2	0,15	6,5
Town:					
Vineta west	2,9	1373	3,6	0,82	1,2
Vineta east	4,2	2471	4,2	1,00	1,0
Kramersdorf	5,7	1085	3,3	1,74	0,6
Walvis Bay:					
Kuisebmond:					
Central	1,0	330	6,6	0,15	6,8
South	0,8	111	5,1	0,16	6,2
West	0,9	684	8,5	0,10	9,9
North	0,0	0	6,4	0,00	-
Single quarters	0,0	0	10,0	0,00	-
Compound	0,0	0	21,6	0,00	-
Narraville:					
Central	0,4	108	5,7	0,07	13,9
West	2,1	705	5,6	0,37	2,7
Town:					
Meersig	3,1	1222	3,5	0,90	1,1
South	4,7	1870	4,1	1,15	0,9
Central	5,4	1668	4,5	1,21	0,8
North	3,6	1026	3,5	1,03	1,0
East	4,4	2471	4,2	1,04	1,0
Arandis:					
Houses	1,4	1278	6,0	0,23	4,3
Single quarters	7,0	70	19,2	0,37	2,7
Henties Bay:					
Omdel/rural	0,0	0	5,6	0,00	-
Town	2,9	3027	3,2	3,07	0,3
All towns	2,0	22613	6,2	0,35	2,8
Swakopmund	2,0	7639	5,9	0,35	2,9
Walvis Bay	2,0	10598	6,5	0,32	3,2
Arandis	1,5	1348	6,0	0,32	3,2
Henties Bay	2,2	3027	4,7	0,76	1,3
Excl. single quarters:					
Low income suburbs	0,6	1838	7,6	0,08	12,4
Middle income suburbs	1,3	2881	5,7	0,24	4,1
High income suburbs	3,7	17894	4,0	1,17	0,9

Note: Based on the tree count.

Table H30. Proportions of Households with Gardens and with Trees and Bushes

Town/area	Households with gardens %	Households with trees and bushes %
Swakopmund		
Mondesa	32,6	34,2
Tamariskia	50,1	53,7
Town	91,1	86,5
Walvis Bay		
Kuisebmond	22,3	20,0
Narraville	36,6	48,1
Town	77,9	77,5
Arandis	39,3	51,2
Henties Bay		
Omdel	16,7	22,2
Town	56,6	71,9
Swakopmund	68,0	66,4
Walvis Bay	48,0	49,3
Arandis	39,3	51,2
Henties Bay	31,5	40,7
Total	52,3	54,2
Low income suburbs	24,1	24,2
Middle income suburbs	40,2	50,3
High income suburbs	81,8	80,9

Table H31. Distribution of Households by Number of Trees and Bushes

Number of trees/bushes	Trees	Bushes	Both
None/no answer	51,3%	80,4%	49,4%
1	9,1%	2,0%	8,8%
2	10,5%	2,7%	8,0%
3	7,8%	2,8%	5,6%
4	4,3%	3,1%	3,1%
5	5,4%	1,9%	5,1%
6-10	10,0%	5,3%	12,1%
11-20	1,2%	1,3%	6,5%
More than 20	0,4%	0,6%	1,4%
Total with trees/bushes	48,7	19,6	50,6

Table H32. Distribution of Households having Trees and Bushes and of Household Means

Town/area	Households having trees/bushes (%):			Mean no. per household with trees/bushes (%):		
	Trees	Bushes	Both	Trees	Bushes	Both
Swakopmund						
Mondesa	32,4%	8,8%	37,3%	2,1	0,5	2,6
Tamariskia	46,3%	11,0%	47,6%	4,0	1,3	5,2
Town	80,4%	48,0%	83,3%	4,0	4,0	8,0
Walvis Bay						
Kuisebmond	16,3%	3,3%	17,9%	1,7	0,3	2,0
Narraville	41,0%	1,3%	41,0%	2,7	0,1	2,8
Town	67,6%	34,2%	70,3%	4,9	2,3	7,2
Arandis	36,9%	9,5%	39,3%	2,0	0,6	2,6
Henties Bay						
Town	71,4%	14,3%	71,4%	3,9	0,4	4,3
Swakopmund	53,5%	23,4%	56,6%	3,6	2,5	6,1
Walvis Bay	36,7%	12,1%	38,3%	3,6	1,4	5,0
Arandis	36,9%	9,5%	39,3%	2,0	0,6	2,6
Henties Bay	43,8%	9,4%	43,8%	3,6	0,5	4,1
Total	43,2%	15,9%	45,4%	3,4	1,7	5,2
Low income suburbs	22,0%	5,3%	24,7%	1,9	0,4	2,3
Middle income suburbs	41,4%	7,4%	42,6%	2,9	0,7	3,6
High income suburbs	73,6%	39,2%	76,2%	4,4	3,0	7,4

Table H33. Distribution of Households with Gardens and of Household Means

Town/area	Households with gardens having (%):			Mean size per household (m^2):		
	Lawns	Beds	Desert plants	Lawns	Beds	Desert plants
Swakopmund						
Mondesa	22,9	65,7	17,1	11,6	4,9	2,2
Tamariskia	74,4	53,8	10,3	38,8	32,7	1,8
Town	88,2	68,8	12,9	130,7	13,8	3,0
Walvis Bay						
Kuisebmond	45,0	52,5	10,0	10,1	11,6	1,3
Narraville	73,1	46,2	19,2	35,1	10,8	3,2
Town	81,4	45,3	19,8	154,0	24,6	8,8
Arandis	33,3	57,6	12,1	6,9	17,3	1,2
Henties Bay						
Omdel	33,3	33,3	66,7	3,0	6,0	13,7
Town	75,0	87,5		51,1	18,9	
Swakopmund	71,3	64,7	13,2	84,3	16,4	2,6
Walvis Bay	70,4	47,4	17,1	95,8	18,8	5,9
Arandis	33,3	57,6	12,1	6,9	17,3	1,2
Henties Bay	63,6	72,7	18,2	38,0	15,4	3,7
Total	67,2	57,0	14,9	80,7	17,4	3,9
Low income suburbs	34,6	57,7	15,4	10,5	8,4	2,2
Middle income suburbs	60,2	53,1	13,3	27,1	21,7	1,9
High income suburbs	84,5	58,8	15,5	138,0	19,0	5,6

Table H34. Distribution of Areas and Households with Lawn, Beds and Desert Plants

Town	Area of (%):			No. of households having (%):		
	Lawns	Beds	Desert plants	Lawns	Beds	Desert plants
Swakopmund	44,5	36,3	25,8	44,5	50,4	35,4
Walvis Bay	53,0	53,3	67,2	48,2	37,1	52,5
Arandis	0,4	5,7	1,4	2,6	5,7	4,3
Henties Bay	2,0	4,7	5,6	4,7	6,9	7,8
Total	100	100	100	100	100	100
Low income suburbs	1,7	7,4	11,3	8,0	14,9	21,0
Middle income suburbs	4,7	17,5	8,2	14,9	14,8	16,0
High income suburbs	93,6	75,1	80,4	77,1	70,2	63,1

Table H35. Distribution of Mean Household Cash Income by Town, Area and Income Band

Town & area	Distribution of monthly cash income (per cent across):							
	N$1-499	N$500-999	N$1000-1999	N$2000-2999	N$3000-3999	N$4000-4999	N$5000-9999	N$10 000+
Swakopmund								
Mondesa	3,0%	9,8%	29,4%	25,0%	2,1%	16,0%	14,8%	0,0%
Tamariskia	0,3%	1,6%	25,6%	31,2%	20,9%	11,2%	9,2%	0,0%
Town	0,1%	0,4%	1,8%	3,7%	4,1%	16,1%	49,0%	24,9%
Walvis Bay								
Kuisebmond	4,0%	15,1%	21,5%	14,6%	16,0%	8,2%	20,5%	0,0%
Narraville	2,1%	4,4%	9,8%	9,9%	30,0%	13,1%	27,2%	3,3%
Town	0,3%	1,0%	5,1%	7,6%	20,4%	14,3%	29,8%	21,4%
Arandis	1,8%	6,7%	23,4%	25,0%	16,7%	3,0%	15,9%	7,5%
Henties Bay								
Omdel	11,1%	41,1%	47,8%	0,0%	0,0%	0,0%	0,0%	0,0%
Town	0,9%	2,7%	16,2%	14,1%	28,9%	11,9%	25,1%	0,0%
Swakopmund	0,4%	1,6%	7,0%	8,4%	5,2%	15,7%	41,7%	20,0%
Walvis Bay	1,4%	4,5%	9,4%	9,5%	21,2%	12,8%	27,4%	13,8%
Arandis	1,8%	6,7%	23,4%	25,0%	16,7%	3,0%	15,9%	7,5%
Henties Bay	4,1%	14,8%	26,2%	9,7%	19,8%	8,2%	17,2%	0,0%
Total	1,1%	3,7%	9,7%	9,8%	13,9%	13,4%	32,7%	15,6%
Low income	4,3%	15,5%	26,1%	16,7%	10,3%	10,0%	17,1%	0,0%
Middle income	1,6%	4,5%	17,1%	18,8%	24,2%	9,8%	20,1%	3,8%
High income	0,2%	0,7%	3,8%	5,8%	12,2%	15,1%	39,7%	22,4%

Table H36. Mean Household Cash Income by Area and Suburb

Town	Distribution (%)		Mean cash income (N$):		
	Households	Total income	Monthly	Annual	Monthly per capita
Mondesa:					
Central	4,9	2,1	1272	15261	147
East	1,6	0,7	1250	14996	118
Jabulani	2,1	1,8	2505	30055	417
Mahetago	0,9	0,5	1926	23116	289
Tamariskia:					
North	1,5	1,2	2267	27205	378
South	3,2	2,4	2118	25411	333
Swakopmund Town:					
Vineta west	4,2	8,0	5589	67062	1552
Vineta east	6,5	12,3	5439	65266	1315
Central	5,6	12,3	6384	76603	1580
Kramersdorf	1,9	2,5	3826	45914	1249
Kuisebmond:					
Central	3,7	1,7	1314	15773	204
South	1,5	1,2	2238	26856	440
West	8,9	4,2	1379	16548	161
North	5,6	2,8	1455	17460	234
Narraville:					
Central	2,9	1,7	1663	19956	297
East	3,5	2,5	2040	24480	414
West	3,8	4,2	3200	38400	574
Walvis Bay Town:					
Meersig	3,9	6,2	4621	55452	1303
South	4,2	8,1	5617	67404	1366
Central	3,4	3,7	3100	37200	689
North	3,2	2,2	2007	24084	551
East	6,3	9,0	4132	49584	926
Arandis	7,5	4,7	1822	21864	300
Henties Bay:					
Omdel	5,8	1,3	634	7608	107
Town					
North	1,4	1,0	2083	24996	735
South	2,0	1,7	2493	29916	739
Swakopmund					
Mondesa	9,5	5,2	1576	18912	195
Tamariskia	4,7	3,5	2165	25982	346
Town	18,2	35,1	5593	67117	1445
Walvis Bay					
Kuisebmond	19,7	9,9	1454	17445	201
Narraville	10,2	8,3	2360	28326	441
Town	20,9	29,1	4029	48343	981
Arandis	7,5	4,7	1822	21866	300
Henties Bay					
Omdel	5,8	1,3	634	7613	107
Town	3,5	2,8	2322	27867	737
Swakopmund	32,4	43,8	3918	47010	719
Walvis Bay	50,8	47,4	2695	32339	484
Arandis	7,5	4,7	1822	21866	300
Henties Bay	9,3	4,1	1264	15167	258
Total	100	100	2891	34698	525
Low income suburbs	35,0	16,4	1350	16200	186
Middle income suburbs	22,4	16,6	2139	25665	369
High income suburbs	42,5	67,1	4557	54686	1160

Table H37. Distribution of Households by Town, Area and Income Band

Town & area	Distribution of households (per cent across):							
	N$1-499	N$500-999	N$1000-1999	N$2000-2999	N$3000-3999	N$4000-4999	N$5000-9999	N$10 000+
Swakopmund								
Mondesa	18,0	21,8	33,4	16,4	1,0	5,7	3,8	0,0
Tamariskia	2,5	4,2	40,8	29,2	14,2	5,8	3,3	0,0
Town	1,1	2,9	7,3	8,7	7,3	21,1	41,2	10,3
Walvis Bay								
Kuisebmond	20,9	33,4	22,7	9,1	6,7	2,8	4,5	0,0
Narraville	16,8	14,9	17,0	10,2	22,1	7,4	10,8	0,8
Town	3,2	5,4	14,6	13,0	25,5	13,4	18,7	6,3
Arandis	13,7	17,8	30,1	20,5	9,6	1,4	5,5	1,4
Henties Bay								
Omdel	37,5	37,5	25,0	0,0	0,0	0,0	0,0	0,0
Town	14,2	6,9	28,8	14,6	21,2	6,9	7,3	0,0
Swakopmund	6,3	8,6	19,9	14,0	6,4	14,4	24,7	5,8
Walvis Bay	12,8	18,2	18,2	10,9	17,5	8,1	11,6	2,8
Arandis	13,7	17,8	30,1	20,5	9,6	1,4	5,5	1,4
Henties Bay	28,8	26,1	26,4	5,4	7,9	2,6	2,7	0,0
Total	12,2	15,8	20,4	12,1	12,4	9,1	14,5	3,4
Low income	22,9	30,9	25,9	9,6	4,1	3,1	3,5	0,0
Middle income	12,7	13,6	26,4	17,7	16,2	5,0	7,4	0,8
High income	3,2	4,5	12,6	11,3	17,3	16,2	27,4	7,5

Table H38. Extrapolated Distribution of Household Cash Income by Town, Area and Income Band

Town & area	Distribution of monthly cash income (N$):								
	All	N$1-499	N$500-999	N$1000-1999	N$2000-2999	N$3000-3999	N$4000-4999	N$5000-9999	N$10K +
Swakopmund									
Mondesa	1341350	40017	130840	394728	335230	27710	214344	198481	0
Tamariskia	923554	2808	14961	236233	288152	192821	103876	84703	0
Town	9146992	8408	32369	165261	339143	373288	1470025	4480762	2277736
Walvis Bay									
Kuisebmond	2581795	103928	389768	554897	377184	412843	212780	530396	0
Narraville	2162204	45436	96157	212006	214979	648819	284261	589194	71351
Town	7583602	21925	72886	387479	577939	1546149	1085084	2259559	1626518
Arandis	1234050	22505	82569	288870	308696	205773	37110	195753	92774
Henties Bay									
Omdel	333713	37152	137102	159459					
Town	726630	6738	19530	117962	102769	210131	86800	182700	0
By town:									
Swakopmund	11411896	51233	178170	796222	962525	593819	1788246	4763945	2277736
Walvis Bay	12327601	171289	558811	1154381	1170102	2607811	1582125	3379149	1697869
Arandis	1234050	22505	82569	288870	308696	205773	37110	195753	92774
Henties Bay	1060343	43890	156632	277421	102769	210131	86800	182700	0
Total	26033890	288917	976182	2516895	2544092	3617534	3494280	8521547	4068379
Aggregates:									
Low income	4256858	181097	657710	1109083	712413	440553	427124	728877	0
Middle income	4319807	70749	193687	737109	811827	1047413	425247	869649	164125
High income	17457224	37070	124785	670702	1019851	2129569	2641909	6923020	3904254
Distribution:									
Low income	100,0%	4,3%	15,5%	26,1%	16,7%	10,3%	10,0%	17,1%	0,0%
Middle income	100,0%	1,6%	4,5%	17,1%	18,8%	24,2%	9,8%	20,1%	3,8%
High income	100,0%	0,2%	0,7%	3,8%	5,8%	12,2%	15,1%	39,7%	22,4%
Shares:									
Low income	16,4%	62,7%	67,4%	44,1%	28,0%	12,2%	12,2%	8,6%	0,0%
Middle income	16,6%	24,5%	19,8%	29,3%	31,9%	29,0%	12,2%	10,2%	4,0%
High income	67,1%	12,8%	12,8%	26,6%	40,1%	58,9%	75,6%	81,2%	96,0%

Table H39. Extrapolated Distribution of Households by Town, Area and Income Band

Town & area	Number of households in income band:								
	All	N$1-499	N$500-999	N$1000-1999	N$2000-2999	N$3000-3999	N$4000-4999	N$5000-9999	N$10K +
Swakopmund									
Mondesa	851	153	186	284	139	8	48	32	0
Tamariskia	427	11	18	174	124	60	25	14	0
Town	1635	19	48	120	143	119	345	674	168
Walvis Bay									
Kuisebmond	1776	371	593	402	162	120	49	79	0
Narraville	916	154	137	156	94	203	67	99	7
Town	1882	60	101	274	245	480	252	351	119
Arandis	677	93	121	204	139	65	9	37	9
Henties Bay									
Omdel	526	197	197	132	0	0	0	0	0
Town	313	45	22	90	46	66	22	23	0
By town:									
Swakopmund	2913	183	251	578	407	187	418	720	168
Walvis Bay	4574	585	830	832	501	802	369	529	126
Arandis	677	93	121	204	139	65	9	37	9
Henties Bay	839	242	219	222	46	66	22	23	0
Total	9004	1102	1421	1836	1092	1121	818	1310	303
Aggregates:									
Low income	3153	722	975	818	301	128	98	111	0
Middle income	2020	257	275	534	357	328	102	150	16
High income	3831	123	171	484	434	665	619	1048	287
Distribution:									
Low income	100,0%	22,9%	30,9%	25,9%	9,6%	4,1%	3,1%	3,5%	0,0%
Middle income	100,0%	12,7%	13,6%	26,4%	17,7%	16,2%	5,0%	7,4%	2,1%
High income	100,0%	3,2%	4,5%	12,6%	11,3%	17,3%	16,2%	27,4%	37,0%
Shares:									
Low income	35,0%	65,5%	68,6%	44,5%	27,6%	11,4%	11,9%	8,5%	0,0%
Middle income	22,4%	23,3%	19,3%	29,1%	32,7%	29,3%	12,4%	11,5%	5,4%
High income	42,5%	11,2%	12,0%	26,4%	39,7%	59,3%	75,6%	80,0%	94,6%

Table H40. Sources of Household Income Ranked by Assigned Importance

Rank	Salary/ wages	Busi-ness	Informal sector	Pen-sions	State benefit	Rent	Relatives/ friends	Church etc	Invest-ments	Other	All choices
Household rankings (n=775):											
None	123	701	735	680	768	743	739	772	749	773	14
First	624	41	19	59	2	7	7	1	2	0	575
Second	26	34	20	32	5	24	24	3	17	2	165
Third	2	0	2	3	1	1	5	0	7	0	22
All choices	652	74	41	95	7	32	36	3	26	2	775
Distribution (%):											
None	15,8	90,4	94,8	87,8	99,1	95,8	95,3	99,6	96,6	99,7	1,8
First	80,6	5,2	2,4	7,6	0,3	0,9	0,9	0,1	0,3	0,0	74,2
Second	3,3	4,4	2,5	4,2	0,6	3,1	3,1	0,3	2,2	0,3	21,3
Third	0,3	0,0	0,3	0,4	0,1	0,2	0,7	0,0	0,9	0,0	2,8

Table H41. Distribution of Second Income Sources

Second source	First income source		
	Salary/wages	Business	Pensions
Households making first choices	624 80,6%	41 5,2%	59 7,7%
No second source	494 63,7%	28 3,0%	38 4,9%
All second sources	130 16,7%	17 2,2%	22 2,8%
Second sources:			
Salary/wages	XX	59,2%	38,5%
Business	23,7%	XX	0,0%
Informal sector	14,6%	0,0%	2,8%
Pensions	21,0%	3,6%	XX
State benefit	2,1%	6,6%	0,0%
Rent	10,5%	12,4%	14,1%
Relatives	16,2%	0,0%	6,2%
Churches etc	0,0%	0,0%	9,7%
Investments	10,3%	18,1%	28,7%
Other	1,7%	0,0%	0,0%
Total	100%	100%	100%

Table H42. Mean Monthly Household Cash Incomes per Most Important Income Source

Income source	Salary/ wages	Busi- ness	Informal sector	Pen- sions	State benefit	Rent	Relatives / friends	Church etc	Invest- ments	Other
As sole source:										
- households	516	21	11	33	2	2	4	1	0	0
- income (N$)	2409	4464	922	976	2675	350	351	250	-	-
With second:										
- households	121	12	7	18	0	5	5	0	2	0
- income (N$)	2700	4970	1020	1621	-	1260	186	-	5300	-

Table H43. Responsibility for Paying Water Bills

Own household	Govt	Parastatal	Munici- pality	Employer	Relatives	Other	Don't know	Total
87,2%	0,4%	0,0%	0,7%	8,4%	1,1%	0,2%	1,9%	100%

Table H44. Households' Stated Reductions in Household Water Consumption at Last Increase in Charges

Reduced (%):	A lot	Moderately	A little	None	Increase	No reply
Swakopmund	38,1	34,1	8,8	10,5	0,9	7,6
Walvis Bay	26,2	38,4	15,4	13,0	1,3	5,7
Arandis	36,9	17,9	15,5	21,4	0,0	8,4
Henties Bay	29,1	34,2	9,6	12,3	0,0	16,9
All towns	31,1	35,1	12,7	12,7	0,9	7,5
Low income suburbs	32,1	32,3	14,7	13,6	0,8	6,5
Middle income suburbs	23,2	30,8	18,2	17,8	1,2	8,5
High income suburbs	34,5	39,5	8,2	9,4	0,9	7,4

Table H45. Reasons Given for Reducing Household Water Consumption over Last Year

Per cent	Water wasted	Overuse	Scarcity	Official encourage-ment	Restric-tions imposed	Cost	Increase in charges
Swakopmund	16,7	19,9	57,9	42,7	9,1	41,4	17,8
Walvis Bay	18,3	24,7	42,2	18,8	8,0	29,6	10,2
Arandis	14,3	6,0	36,9	20,2	6,0	33,3	15,5
Henties Bay	22,9	27,0	52,6	6,2	0,0	45,8	13,9
All towns	17,9	22,0	47,9	25,4	7,4	35,2	13,4
Low income suburbs	19,2	18,9	46,1	17,0	4,1	35,0	15,2
Middle income suburbs	19,7	21,8	33,8	20,7	10,1	35,9	13,3
High income suburbs	16,0	24,6	56,7	34,8	8,7	35,0	12,0

Table H46. Ability to Afford a Small Increase in Water Charges

Area (%)	Yes	No	No reply
Swakopmund	78,9%	19,9%	1,2
Walvis Bay	78,5%	19,8%	1,7
Arandis	65,5%	33,3%	1,2
Henties Bay	61,1%	38,9%	0,0
All towns	76,1%	22,6%	1,3
Low income suburbs	74,9%	24,5%	0,7
Middle income suburbs	72,8%	25,6%	1,6
High income suburbs	78,7%	19,5%	1,8

Table H47. Ability to Afford Additional Water Charges by Charge Increase Amounts

Increase steps (%):	N$5	N$10	N$25	N$50	N$100	N$200	N$200+
All households:							
Swakopmund	77,1%	52,6%	33,1%	20,8%	9,9%	3,2%	0,3%
Walvis Bay	77,4%	53,8%	32,6%	16,9%	6,4%	1,5%	0,3%
Arandis	64,3%	39,3%	28,6%	17,9%	6,0%	1,2%	0,0%
Henties Bay	61,1%	24,3%	10,3%	10,3%	5,2%	0,0%	0,0%
All towns	74,8%	49,6%	30,4%	17,6%	7,4%	1,9%	0,3%
Low income suburbs	74,7%	37,1%	18,2%	7,6%	3,0%	0,0%	0,0%
Middle income suburbs	71,9%	52,2%	33,0%	22,1%	6,2%	2,4%	0,0%
High income suburbs	76,5%	58,5%	39,1%	23,6%	11,6%	3,3%	0,7%
Able to afford:							
Swakopmund	97,7%	66,6%	42,0%	26,4%	12,5%	4,1%	0,4%
Walvis Bay	98,6%	68,5%	41,5%	21,5%	8,2%	1,9%	0,4%
Arandis	98,2%	60,0%	43,6%	27,3%	9,1%	1,8%	0,0%
Henties Bay	100,0%	39,8%	16,9%	16,9%	8,5%	0,0%	0,0%
All towns	98,4%	65,2%	40,0%	23,2%	9,7%	2,5%	0,4%
Low income suburbs	99,7%	49,5%	24,3%	10,2%	4,0%	0,0%	0,0%
Middle income suburbs	98,8%	71,6%	45,3%	30,3%	8,5%	3,2%	0,0%
High income suburbs	97,1%	74,3%	49,6%	29,9%	14,8%	4,1%	0,8%

Table H48. Payment of Last Water Bill

By household		Assisted by others				
Yes	No	Relatives	Friends	Employer	Loans	Other
93,4%	5,0%	2,4%	0,1%	1,1%	0,5%	0,3%

Table H49. Method of Payment of Last Water Bill

Cash	Cheque	Meter	Other pays	Don't know/ no reply
72,5%	15,2%	0,4%	9,5%	2,3%

Table H50. Reductions in Household Water Consumption at Increasing Bills, by Area/Type

Response (%) / category	Household water bill increases by:				
	50%	Double	Triple	5x	10x
Reduce water consumption a lot:					
Swakopmund	36,1	55,6	76,6	82,8	87,6
Walvis Bay	28,7	58,1	83,5	87,1	89,6
Arandis	32,1	70,2	85,7	86,9	86,9
Henties Bay	22,9	46,4	64,1	60,6	60,6
All towns	30,8	57,1	79,7	83,2	86,0
Low income suburbs	28,0	53,0	73,8	78,7	83,4
Middle income suburbs	34,1	65,0	86,6	88,0	89,2
High income suburbs	31,4	56,4	80,8	84,4	86,6
Reduce water consumption moderately:					
Swakopmund	26,4	26,7	13,0	11,2	8,8
Walvis Bay	37,7	29,1	9,3	8,9	7,5
Arandis	38,1	20,2	7,1	7,1	7,1
Henties Bay	35,9	30,9	13,2	13,2	16,7
All towns	33,9	27,8	10,7	9,9	8,8
Low income suburbs	29,6	25,6	12,3	11,0	8,6
Middle income suburbs	36,1	24,3	6,3	6,8	7,2
High income suburbs	36,3	31,5	11,7	10,7	9,7
Reduce water consumption a little:					
Swakopmund	27,5	11,3	5,4	5,5	3,4
Walvis Bay	23,5	7,9	3,0	2,6	1,5
Arandis	23,8	8,3	6,0	4,8	4,8
Henties Bay	21,1	13,0	13,0	13,0	12,3
All towns	24,6	9,5	4,7	4,7	3,4
Low income suburbs	29,5	15,1	7,8	6,1	4,0
Middle income suburbs	20,6	5,3	2,3	4,1	2,5
High income suburbs	22,6	7,1	3,9	3,8	3,2
No reduction in consumption:					
Swakopmund	9,8	6,2	4,8	0,2	0,0
Walvis Bay	9,7	4,5	3,7	1,0	1,0
Arandis	4,8	0,0	0,0	0,0	0,0
Henties Bay	13,2	2,7	2,7	6,2	0,0
All towns	9,7	4,5	3,7	1,1	0,5
Low income suburbs	10,5	3,8	3,5	1,7	0,5
Middle income suburbs	8,4	4,7	4,0	0,3	0,3
High income suburbs	9,7	5,1	3,7	1,1	0,3

Table H51. Reductions in Household Water Consumption at Increasing Bills, by Income Band

Response (%) / income band	Household water bill increases by:				
	50%	Double	Triple	5x	10x
Reduce water consumption a lot:					
N$1-499	28,7	53,5	72,3	81,6	83,1
N$500-999	28,9	57,5	81,2	81,3	85,2
N$1000-1999	36,6	66,1	87,6	89,9	91,1
N$2000-2999	24,4	55,6	84,1	88,2	90,9
N$3000-3999	27,8	57,6	80,7	82,6	87,0
N$4000-4999	20,6	44,3	78,5	84,0	85,2
N$5000-9999	40,5	57,2	74,6	78,6	83,9
N$10 000+	40,7	47,3	60,2	65,5	72,0
Total	31,9	59,7	81,3	85,8	88,8
Reduce water consumption moderately:					
N$1-499	26,5	24,9	13,0	5,9	5,2
N$500-999	37,1	26,3	8,9	9,8	8,6
N$1000-1999	30,3	24,9	6,9	5,9	5,3
N$2000-2999	44,6	30,6	11,2	9,6	6,9
N$3000-3999	39,5	26,1	7,9	11,4	11,2
N$4000-4999	38,5	37,3	11,3	6,8	5,5
N$5000-9999	25,5	28,7	14,4	17,2	13,4
N$10 000+	19,7	34,3	28,0	29,1	22,6
Total	33,9	25,0	9,9	8,5	6,8
Reduce water consumption a little:					
N$1-499	27,4	12,0	5,2	3,0	4,3
N$500-999	26,0	11,5	6,1	5,4	2,7
N$1000-1999	28,8	7,9	4,4	4,3	3,6
N$2000-2999	27,7	11,9	4,1	1,5	1,5
N$3000-3999	21,5	8,0	3,1	4,1	0,0
N$4000-4999	27,7	13,7	5,5	9,2	9,2
N$5000-9999	20,3	6,7	5,3	4,1	2,8
N$10 000+	27,8	6,5	11,9	5,4	5,4
Total	24,8	10,2	4,6	4,0	3,0
No reduction in consumption:					
N$1-499	10,6	2,8	2,8	2,8	0,7
N$500-999	8,0	4,7	3,9	3,5	1,3
N$1000-1999	4,2	1,1	1,1	0,0	0,0
N$2000-2999	2,6	1,2	0,0	0,0	0,0
N$3000-3999	11,3	8,3	8,3	1,9	1,9
N$4000-4999	13,1	4,7	4,7	0,0	0,0
N$5000-9999	13,8	7,4	5,8	0,0	0,0
N$10 000+	11,9	11,9	0,0	0,0	0,0
Total	8,6	4,3	3,4	0,9	0,5

Table H52. Payment of Last Water Bill in Cash

Per cent	Households
Swakopmund	66,4
Walvis Bay	82,6
Arandis	51,2
Henties Bay	65,6
All towns	72,5
Low income suburbs	93,8
Middle income suburbs	69,7
High income suburbs	47,1

Table H53. Mean Monthly Household Water Bills, by Area

Per cent	Response rate %	Households	Average water bill N$	Monthly cash income N$	Proportion of monthly income %
Swakopmund	83,6	2913	111	4209	2,6%
Walvis Bay	87,1	4574	58	2831	2,0%
Arandis	48,8	677	50	1977	2,5%
Henties Bay	93,8	839	80	1479	5,4%
All towns	81,9	9004	76	3087	2,5%
Low income suburbs	91,4	3153	54	1495	3,6%
Middle income suburbs	64,3	2020	57	2444	2,3%
High income suburbs	88,1	3831	105	4736	2,2%

Note: Sub-sample with water bills less than 15 per cent of household cash income.

Table H54. Distribution of Proportions of Water Bills in Household Income

Bill as proportion of income	Sample households	
	Weighted number	Per cent
0-3 per cent	311	57,2%
Above 3 per cent	233	42,8%
Above 5 per cent	127	23,4%
Above 10 per cent	27	5,0%
Total	543	100,0%

Note: Sub-sample with water bills less than 15 per cent of household cash income.

Table H55. Distribution of Aggregate Monthly Household Water Bills, by Area

Per cent	Aggregate Income	Households	Aggregate water bills
Swakopmund	44,1%	32,4%	46,9%
Walvis Bay	46,6%	50,8%	38,4%
Arandis *	4,8%	7,5%	4,9%
Henties Bay	4,5%	9,3%	9,8%
All towns	100%	100%	100%
Low income suburbs	17,0%	35,0%	25,0%
Middle income suburbs	17,8%	22,4%	16,7%
High income suburbs	65,3%	42,5%	58,3%

* = Under-represented in the sub-sample.

Note: Sub-sample with water bills less than 15 per cent of household cash income.

Table H56. Water Bills, by Income Band

Income band	Households	Per household:			Per capita:
		Average water bill N$	Monthly income N$	Bill/ income %	Bill N$
N$1-499	454	26	262	9,9	4,15
N$500-999	1565	42	687	6,1	6,10
N$1000-1999	1963	59	1371	4,3	10,14
N$2000-2999	1150	70	2329	3,0	14,02
N$3000-3999	1292	75	3228	2,3	16,08
N$4000-4999	920	86	4271	2,0	18,84
N$5000-9999	1353	135	6507	2,1	26,85
N$10 000+	307	177	13413	1,3	43,06
Total	9004	76	2891	2,6	13,85

Note: Sub-sample with water bills less than 15 per cent of household cash income. Mean monthly incomes are for the whole sample.

Table H57. Distribution of Water Bills, by Income Band

Income band	Households %	Total monthly income %	Total water payments %	Ratio water bill/ mean %	Affordability index * %
N$1-499	5,0	1,1	1,7	34	385
N$500-999	17,4	3,7	9,5	55	229
N$1000-1999	21,8	9,7	16,8	77	164
N$2000-2999	12,8	9,8	11,7	92	115
N$3000-3999	14,3	13,9	14,2	99	89
N$4000-4999	10,2	13,4	11,6	113	77
N$5000-9999	15,0	32,7	26,6	177	78
N$10 000+	3,4	15,6	7,9	231	50
Total	100	100	100	100	100

* = Ratio of monthly water payments per household cash income in each band to the overall mean (=100). Households above 100 pay proportionately more of their income than households in general and households below 100 pay proportionately less.

Note: Sub-sample with water bills less than 15 per cent of household cash income. Mean monthly incomes are for the whole sample.

Table H58. Stated Importance of Saving Water

Per cent	Not	A little	Quite	Very
Swakopmund	0,2	10,3	2,6	86,7
Walvis Bay	0,2	2,8	9,3	85,7
Arandis	0,0	1,2	9,5	89,3
Henties Bay	0,0	2,7	0,0	97,3
All towns	0,2	5,1	6,3	87,4
Low income suburbs	0,0	3,9	6,1	89,3
Middle income suburbs	0,7	0,7	13,3	84,0
High income suburbs	0,0	8,4	2,7	87,5

Table H59. Stated Opinions on Whether People Waste Water

Per cent	Yes	No
Swakopmund	45,9	52,8
Walvis Bay	32,3	59,8
Arandis	35,7	60,7
Henties Bay	24,6	75,4
All towns	36,3	59,1
Low income suburbs	34,0	61,3
Middle income suburbs	34,5	57,4
High income suburbs	39,0	58,1

Table H60. Opinions on Ways People Waste Water

Category/activity	%
Garden:	
excessive watering	20,7
yard spraying	3,8
swimming pool	2,6
hosepipes	1,7
gardening unnecessary	1,3
Vehicle: washing too often	20,1
House:	
taps left open	13,7
wasting by children	10,2
taps not closed properly	5,5
washing twice a day	4,9
washing clothes too often	3,8
washing dogs and cats	1,0
carelessness	1,0
flushing toilets too often	0,9
cooking too often	0,1
Commercial:	
use in building and construction	3,5
brewing tombo	1,3
Municipal:	
burst sewage pipes	2,2
watering public lawns	1,0
Other	0,6
Gardens	30,1
Car	20,1
House	41,1
Commercial	4,8
Municipal	3,2
Total	100,0
Share of all households	35,7

Table H61. Awareness of Water-saving Publicity by Agency

Per cent	Govt	Municipality	Employer	All responses	Households aware	Index	Don't know/ no reply
Swakopmund	53,9	39,4	5,9	99,2	83,9	1,18	16,1
Walvis Bay	48,6	50,5	3,0	102,1	85,9	1,19	14,1
Arandis	51,2	32,1	7,1	90,4	76,2	1,19	23,8
Henties Bay	46,7	38,6	13,9	99,2	68,6	1,45	31,4
All towns	50,4	44,4	5,3	100,1	82,9	1,21	17,1
Low income suburbs	44,7	46,8	6,8	98,2	81,4	1,21	18,6
Middle income suburbs	48,4	45,5	3,4	97,3	84,9	1,15	15,1
High income suburbs	56,0	41,9	5,0	102,9	83,1	1,24	16,9

Table H62. Impact of Publicity on Attitudes towards Water-saving

Per cent	More likely	Less likely	Same	Don't know/ no reply
Swakopmund	68,5	2,0	5,0	24,5
Walvis Bay	63,3	7,1	6,6	18,9
Arandis	63,1	4,8	4,8	23,8
Henties Bay	63,3	2,6	2,7	31,4
All towns	65,0	4,9	5,5	22,2
Low income suburbs	60,5	6,0	7,7	24,6
Middle income suburbs	64,1	3,8	5,9	18,3
High income suburbs	69,1	4,5	3,6	22,4

Table H63. Agency Identified as Water Supplier

Per cent	Govt	Municipality	DWA	Other	Don't know	No reply
Swakopmund	1,4	78,5	3,3	6,4	1,9	8,5
Walvis Bay	4,0	77,5	8,9	4,9	3,6	1,1
Arandis	8,3	38,1	13,1	20,2	20,2	0,0
Henties Bay	3,5	73,9	5,2	3,5	3,5	10,4
All towns	3,4	74,5	7,1	6,4	4,3	4,3
Low income suburbs	2,1	76,9	0,5	6,1	4,2	10,2
Middle income suburbs	4,5	64,6	8,7	10,9	9,1	2,2
High income suburbs	4,0	77,8	11,6	4,3	1,9	0,4

Table H64. Accuracy of Water Meters, by Area and Suburb

Area/suburb	Having water meters %	Meters working %	Give accurate readings %	
			Yes	No
Mondesa:				
Central	100	100	98,4	0,0
East	100	100	94,7	0,0
Jabulani	100	100	100	0,0
Mahetago	100	100	90,0	0,0
Tamariskia:				
North	100	100	97,5	2,5
South	100	97,6	97,6	0,0
Swakopmund Town:				
Vineta west	100	100	95,0	0,0
Vineta east	100	100	100	0,0
Central	100	100	100	0,0
Kramersdorf	100	100	83,3	16,7
Kuisebmond:				
Central	100	95,0	95,0	2,5
South	100	100	100	0,0
West	94,6	91,4	75,3	14,0
North	100	100	56,4	38,5
Narraville:				
Central	100	97,4	44,7	10,5
East	100	100	76,9	7,7
West	100	100	35,7	50,0
Walvis Bay Town:				
Meersig	100	100	100	0,0
South	100	100	100	0,0
Central	100	94,4	83,3	5,6
North	100	100	94,4	5,6
East	100	96,9	65,6	21,9
Arandis	89,3	85,7	60,7	16,7
Henties Bay:				
Omdel	88,9	88,9	77,8	0,0
Town				
North	100	100	100	0,0
South	100	100	100	0,0
Swakopmund				
Mondesa	100	100	97,1	0,0
Tamariskia	100	98,8	97,6	0,8
Town	100	100	96,1	1,8
Walvis Bay				
Kuisebmond	97,3	94,6	77,2	17,7
Narraville	100	98,7	53,8	24,2
Town	100	98,2	86,5	8,3
Arandis	89,3	85,7	60,7	16,7
Henties Bay				
Omdel	88,9	88,9	77,8	0,0
Town	100	100	100	0,0
Swakopmund	100	99,7	96,9	1,1
Walvis Bay	98,7	96,5	75,1	15,1
Arandis	89,3	85,7	60,7	16,7
Henties Bay	93,8	93,8	87,5	0,0
Total	97,9	96,4	82,1	9,3
Low income suburbs	97,7	96,1	83,9	10,0
Middle income suburbs	96,3	94,3	70,9	16,7
High income suburbs	100	99,1	91,6	4,8

Table H65. Ranking of Six Options for Reducing Household Water Consumption

Per cent	Bath to shower	Fewer baths/ showers	Garden watering	Car washing	Clothes washing	Hosing driveway	Other
Ranking order:							
first	18,9	9,5	13,3	11,9	13,2	33,4	0,1
second	13,4	14,2	20,8	24,3	11,3	9,1	0,4
third	11,8	15,1	22,4	14,0	9,0	7,3	0,3
fourth	13,4	18,3	13,5	11,5	10,3	3,4	0,0
fifth	15,2	17,2	9,7	8,5	8,6	5,0	0,2
sixth	8,1	7,8	1,8	2,0	29,7	11,3	0,0
All choices	80,9	82,0	81,5	72,2	82,1	69,6	1,1
Swakopmund	13,0	2,1	14,5	12,5	10,6	45,5	0,0
Walvis Bay	21,7	12,9	14,2	10,6	15,8	25,7	0,2
Arandis	26,2	13,1	14,3	11,9	10,7	31,0	0,0
Henties Bay	19,1	13,9	3,5	17,7	10,5	35,3	0,0
All towns	19,0	9,5	13,3	11,9	13,2	33,4	0,1
Low income suburbs	12,8	14,0	10,2	8,7	20,5	35,6	0,4
Middle income suburbs	25,0	16,4	15,4	10,7	12,8	22,2	0,0
High income suburbs	20,8	2,2	14,8	15,3	7,5	37,5	0,0

Table H66. Technology Preferences for Reducing Household Water Consumption

Per cent	Water-saving devices	Water-saving practices	Both	Neither	Don't know
Swakopmund	10,4	37,8	44,2	6,9	0,7
Walvis Bay	18,7	51,4	22,5	7,3	0,2
Arandis	14,3	71,4	9,5	3,6	1,2
Henties Bay	7,0	56,1	20,2	9,7	7,0
All towns	14,6	49,0	28,3	7,1	1,1
Low income suburbs	13,2	51,9	22,3	10,3	2,3
Middle income suburbs	21,8	66,6	7,7	2,8	1,1
High income suburbs	12,0	37,2	44,1	6,7	0,0

Table H67. Ranking of Water-saving Methods and Actions

Per cent	Households selecting		Difference: actions-methods
	Methods	Actions	
None	6,4	4,7	-1,7
Use less water	65,9	74,9	9,0
Water garden early/late	11,2	20,8	9,6
Reduce garden watering	21,2	28,8	7,6
Shorten hosepipe use	12,6	25,9	13,3
Targeted plant watering	2,5	6,4	3,9
Use dirty housewater in garden	14,8	17,5	2,9
Repair leaky hosepipe	14,0	28,1	14,1
Cover on pool	2,4	0,0	-2,4
Stop laying dust/hosing driveway	8,4	16,3	7,9
Shade nets in garden	1,3	2,6	1,3
Wash car with bucket	17,0	24,4	7,4
Wash car less often	14,9	24,4	9,5
Train children, stop them wasting	27,2	36,4	9,2
Fix leaking taps quickly	24,3	38,8	14,5
Stop dripping taps	31,8	47,3	15,5
Water-saving shower head	2,4	7,2	4,2
Shower instead of bath	12,3	14,4	2,1
Fewer showers/baths	13,4	20,5	7,1
Use bath water for more than one	11,9	18,3	6,4
Use less water in bath	12,4	23,0	10,6
Turn basin tap off when washing	9,8	22,3	12,5
Fit short/long flush toilets	3,3	8,9	5,6
Put brick in cistern	3,5	8,1	4,6
Stop tap running when dishwashing	14,0	27,9	13,9
Full loads in washing machine	10,2	20,9	10,7
Other	4,3	1,9	-2,4
Mean no. of choices	3,74	5,71	1,97

Table H68. Number of Choices of Water-saving Methods and Actions

Per cent	No. of choices		Actions: Methods	
	Methods	Actions	More	Fewer
0	0,4	0,2		
1	18,4	8,3	11,9	14,1
2	15,0	11,7	7,0	5,4
3	21,1	18,7	3,0	2,0
4	15,8	13,5	2,9	1,1
5	10,4	12,8	2,4	1,0
6	6,4	6,7	1,5	0,5
7	5,0	5,6	2,2	
8	2,4	3,2	2,4	
9	2,3	3,0	1,7	
10	1,1	2,0	1,5	
11-15	1,2	9,6	5,2	
16+	0,3	4,7	2,1	
Total	100	100	43,9	24,0
			Same=32,0%	

Table H69. Ranking of Fair Methods of Reducing Water Consumption in the Community

Per cent	Increase charges for all	Increase for heavy users	Restrict supply to households	Encourage savings	Other	Don't know
Swakopmund	12,4	26,8	26,3	33,7	0,7	0,1
Walvis Bay	16,7	42,1	23,2	16,5	0,6	0,8
Arandis	7,1	52,4	17,9	22,6	0,0	0,0
Henties Bay	22,9	55,1	6,2	15,8	0,0	0,0
All towns	15,2	39,1	22,3	22,5	0,5	0,4
Low income suburbs	19,2	35,0	21,4	23,6	0,5	0,3
Middle income suburbs	13,1	44,2	20,2	21,9	0,2	0,5
High income suburbs	12,9	39,9	24,1	21,8	0,8	0,5

Table H70. Who Should Pay for Additional Bulk Supply to One Town

	Within the town:			Nationally		Other	Don't know
Per cent	Higher charges	Higher rates	Local business	Higher charges	Higher taxes		
Swakopmund	48,9	10,0	6,2	22,9	9,7	2,1	0,2
Walvis Bay	49,2	16,4	10,3	15,4	5,3	2,8	0,6
Arandis	42,9	10,7	8,3	14,3	8,3	10,7	4,8
Henties Bay	48,2	15,6	0,0	16,1	3,5	13,1	3,5
All towns	48,5	13,9	7,8	17,8	6,8	4,1	1,1
Low income suburbs	47,4	14,5	10,0	12,6	9,6	4,4	1,5
Middle income suburbs	41,3	18,4	12,0	12,6	7,9	5,3	2,5
High income suburbs	53,3	11,0	3,8	24,9	3,8	3,2	0,0

Table H71. Income Elasticities of Water Demand

Income band (N$ per month)	Household income			All	Per capita income			All
	Low income suburbs	Middle income suburbs	High income suburbs		Low income suburbs	Middle income suburbs	High income suburbs	
500-999	0,64	0,61	0,51		0,68	0,57	1,34	0,67
1000-1999	0,75	0,71	0,65		0,71	0,73	0,49	0,60
2000-2999	0,58	0,74	0,85		0,48	0,76	0,85	0,60
3000-3999	0,79	0,49	0,87		0,90	0,46	0,92	0,72
4000-4999	0,89	1,31	0,71		0,88	1,47	0,73	0,85
5000-9999	0,96	0,84	1,04		1,27	1,11	1,09	1,13
10 000+		0,40	0,61			0,26	0,59	0,52

S. SINGLE QUARTERS

Table S1. Approximate Proportion of Walvis Bay Compound Accommodation Leased by Major Fishing Companies

Gendev	Consortium	UFE	Tunacor	Kuiseb	Total
14%	4%	15%	19%	4%	56%

Table S2. Single Quarters: Age Distribution of Population, 1995

Single quarters	65 & over	18-64	14-17	Below 14	Known	Unknown	Total
Numbers:							
Old	26	875	134	201	1215	41	1256
New	52	1471	15	111	1648	96	1744
Total	77	2346	149	312	2863	137	3000
Mean size:							
Old	0,18	6,07	0,93	1,39	8,43	0,29	8,71
New	0,37	10,47	0,11	0,79	11,74	0,68	12,42
Total	0,26	7,85	0,60	1,15	9,77	0,45	10,21
Distribution (%):							
Old	2,0	69,7	10,7	16,0	96,7	3,3	100
New	3,0	84,3	0,8	6,4	94,5	5,5	100
Total	2,5	76,9	5,8	11,3	95,6	4,4	100

Table S3. Single Quarters: Distribution of Adult Population by Sex, 1995

Single quarters	Men	Women	Total	%Women
Numbers:				
Old	782	501	1283	39
New	900	406	1306	31
Total	1682	907	2589	35
Mean size:				
Old	4,07	2,61	6,68	
New	5,95	2,68	8,63	
Total	4,83	2,64	7,47	
Distribution (%):				
Old	46,5	55,2	49,6	
New	53,5	44,8	50,4	

Note: Owing to differences in the data set the total adult population in this table is not comparable with the age distribution of the total population.

Table S4. Single Quarters: Sleeping Places

Single quarters	Bed	Couch	Chair	Floor	Total	Beds counted
Sample numbers:						
Old	101	2	19	46	168	106
New	86	28	12	40	166	99
Total	187	30	31	86	334	205
Mean size:						
Old	3,61	0,07	0,68	1,64	6,00	3,79
New	4,53	1,47	0,63	2,11	8,74	5,21
Total	3,98	0,64	0,66	1,83	7,11	4,36
Distribution %:						
Old	60,1	1,2	11,3	27,4	100	
New	51,8	16,9	7,2	24,1	100	
Total	56,0	9,0	9,3	25,7	100	

Table S5. Single Quarters: Persons per Sleeping Space

Single quarters	Persons per bed	Adults per bed	Persons per rated bed *	Persons per sleeping space #
Old	2,46	1,81	2,21	1,48
New	2,74	2,55	3,11	1,42
Total	2,59	2,15	2,57	1,45

* Assumed 4 beds per accommodation unit. # All identified spaces, including floor.

Table S6. Single Quarters: Languages Spoken in the Household

Single quarters	Main language		Second languages	
	Households	%	Households	%
OshiWambo	38	80,9	5	10,6
RuKwangali	2	4,3	1	2,1
SiLozi	0	0,0	0	0,0
OtjiHerero	1	2,1	6	12,8
Nama/Damara	4	8,5	2	4,3
Afrikaans	2	4,3	32	68,1
English	0	0,0	17	36,2
German	0	0,0	0	0,0
Portuguese	0	0,0	1	2,1
Other	0	0,0	0	0,0
Total	47	100	64	136,2

Table S7. Single Quarters: Number of Households Speaking One or More Second Languages

Single quarters	One	Two	Three	Four	Five
Households	5	24	15	2	1
Per cent	10,6%	51,1%	31,9%	4,3%	2,1%

Table S8. Single Quarters: Informal Sector Activity

Single quarters	Number	%
Households:		
Yes	25	53,2
No	21	44,7
Don't know	1	2,1
Activities:		
Making/selling tombo	17	50,0
Selling beer/liquor	8	23,5
Kapana	5	14,7
Selling cool drinks	2	5,9
Baking/selling bread	2	5,9
Total	34	100

Table S9. Single Quarters: Water Fetched from Outside the Area

Single quarters	Yes	No	Don't know	Yes: from where		
				Nearby houses	Outside public taps	Other sources
Households:						
Old	17	9	2	6	12	3
New	0	19	0			
Total	17	28	2			
Distribution (%):						
Old	60,7	32,1	7,1	21,4	42,9	10,7
New	0,0	100,0	0,0			
Total	36,2	59,6	4,3			

Table S10. Single Quarters: Reasons for Fetching Water from Outside

Old single quarters	Free	Broken taps	Overcrowded	Other	Total
Households	3	0	5	7	15
Per cent	11%	0%	18%	25%	54%

Table S11. Single Quarters: Regular Use of Outside Facilities, Old Section

Old single quarters	Bath/shower	Washing machine	Moveable basin for body washing	Moveable basin for clothes washing	Other	Total
Households	5	1	1	4	3	7
Per cent	17,9	3,6	3,6	14,3	10,7	25,0

Table S12. Single Quarters: Outsiders Using Communal Water Facilities, Old Section

Old single quarters	Yes	No	Don't know	Yes: what facilities				
				Toilets	Showers	Taps	Basins	Other
Households	17	10	2	15	16	14	13	2
Per cent	58,6	34,5	6,9	53,6	57,1	50,0	46,4	7,1

Table S13. Single Quarters: Use of Domestic Water Facilities

Single quarters	Inside shower		Outside shower		Hand	Washing basin		Laundry	Other
	hot/cold	cold	hot/cold	cold	basin	Body	Clothes	basin	
Households:									
Old	1	13	0	14	9	13	18	8	0
New	0	18	0	4	15	6	10	3	0
Total	1	31	0	18	24	19	28	11	0
Distribution (%):									
Old	3,6	46,4	0,0	50,0	32,1	46,4	65,3	28,6	0,0
New	0,0	94,7	0,0	21,1	78,9	31,6	52,6	15,8	0,0
Total	2,1	66,0	0,0	38,3	51,1	40,4	59,6	23,4	0,0

Table S14. Single Quarters: Going to the Toilet on Waste Ground

Single quarters	Often	Sometimes	Never	Don't know	Total
Households:					
Old	7	6	15	0	28
New	0	1	17	1	19
Total	7	7	32	1	47
Distribution (%):					
Old	25,0	21,4	53,6	0,0	100
New	0,0	5,3	89,5	5,3	100

Table S15. Single Quarters: Water-saving Methods Known and Actions Taken

Single quarters	Methods		Actions		Difference
	Households	%	Households	%	%
None	12	25,5	7	14,9	-10,6
Use less water	20	42,6	26	55,3	12,8
Wash car less often	0	0,0	6	12,8	12,8
Fix leaking taps quickly	6	12,8	13	27,7	14,9
Close taps/stop drips	13	27,7	19	40,4	12,8
Have fewer showers	1	2,1	7	14,9	12,8
Basin tap off while washing	10	21,3	19	40,4	19,1
Train children	6	12,8	12	25,5	12,8
Never leave tap running	9	19,1	12	25,5	6,4
Tap off when washing dishes	3	6,4	10	21,3	14,9
Other	5	10,6	1	2,1	-8,5

Table S16. Single Quarters: Reasons for Action Taken to Save Water

Single quarters	Households	%
Water being wasted	9	19,1
Too much water used	11	23,4
Water scarce	26	55,3
Restrictions imposed on use	4	8,5
Water-saving publicity	8	17,0
Other	11	23,4

Table S17. Single Quarters: Water Leaks and Repairs

Single quarters	Yes	No	% Yes	% No
Water leaks:				
Old	14	14	50,0	50,0
New	5	14	26,3	73,7
Total	19	28	40,4	59,6
Problem fixed:				
Old	8	6	57,1	42,9
New	1	4	20,0	80,0
Total	9	10	47,4	52,6

Table S18. Single Quarters: Observed Water Leaks and Wastage

Single quarters	Yes	No	% Yes	% No
Water leaks inside:				
Old	13	14	46,4	50,0
New	2	16	10,5	84,2
Total	15	30	31,9	63,8
Water leaks outside:				
Old	12	15	42,9	53,6
New	0	18	0,0	94,7
Total	12	33	25,5	70,2
Water wastage:				
Old	14	13	50,0	46,4
New	0	18	0,0	94,7
Total	14	31	29,8	66,0

Table S19. Single Quarters: Importance of Saving Water

Single quarters	Households	%
Makes no difference	0	0,0
May help a little	0	0,0
Quite important	1	2,1
Very important	45	95,7
Don't know	1	2,1

Table S20. Single Quarters: People Waste Water

Single quarters	Yes	No
Households	24	23
Per cent	51,1	48,9

Table S21. Single Quarters: Taps or Showers Found Running after Use, Old Section

Old single quarters	Households	%
Often	6	21,4
Sometimes	10	35,7
Never	10	35,7
Don't know	2	7,1

Table S22. Single Quarters: Water Supplier

Single quarters	Households	%
Government	0	0,0
Dept. of Water Affairs	1	2,1
Municipality	40	85,1
Other	5	10,6
Don't know	1	2,1

Table S23. Single Quarters: Awareness of Water-saving Publicity by Agency

Single quarters	Households	%
Government	10	21,3
Municipality	10	21,3
Your employer	5	10,6
TV/radio	42	89,4
None of these	5	10,6

Table S24. Single Quarters: Impact of Piped Water to Old Section Rooms

Old single quarters	Households	%
More likely to reduce wastage	17	60,7
Less likely to reduce wastage	0	0,0
No difference	6	21,4
Don't know	5	13,5

Table S25. Single Quarters: Preferred Methods of Reducing Water Consumption Equitably

Single quarters	Households	%
Increase charges for all consumers	20	42,6
Increase charges for heavy users	8	17,0
Impose restrictions on all households	2	4,3
Encourage people to save	17	36,2
Other	0	0,0

Table S26. Single Quarters: Who Should Pay Cost for New Bulk Supply to One Town

Single quarters	Households	%
Town's consumers through higher charges	20	42,6
Town's property owners through higher rates	12	25,5
Local employers	1	2,1
Namibian consumers through higher charges	8	17,0
Namibian taxpayers through higher taxes	2	4,3
Other	4	8,5

Table S27. Single Quarters: Improvements to Existing Communal Water Facilities, Old Section

Old single quarters	Yes	No	Don't know	No: what improvements				
				More	Better repair	Better quality	Keep cleaner	Other
Adequate?	6	21	1					
	21,4%	75,0%	3,6%					
No: improve?								
Toilets	67,9%	3,6%		17	1	0	1	2
Showers	64,3%	3,6%		13	2	3	0	2
Taps	60,7%	7,1%		13	1	1	1	3
Washbasins	57,1%	3,6%		14	1	1	1	1
Other	3,6%	3,6%		0	0	0	0	1

Table S28. Single Quarters: New Communal Facilities Wanted, Old Section

Old single quarters	Households	%
Improvements only	8	28,6
Baths	13	46,4
Fixed basins for washing clothes	14	50,0
Fixed basins for washing dishes	14	50,0
Other	3	10,7

Table S29. Single Quarters: New Facilities Wanted in Houses, Old Section

Old single quarters	Households	%
None	0	0,0
Not practicable	1	3,6
Water taps	19	67,9
Hand basins	16	57,1
Shower units	14	50,0
Toilets	17	60,7
Kitchen sinks	17	60,7
Other	1	3,6

Table S30. Single Quarters: Priorities for New Facilities

Single quarters	Old section		New section	
	Households	%	Households	%
Communal facilities:				
Baths	2	7,1	6	31,6
Washing clothes	3	10,7	6	31,6
Washing dishes	1	3,6	2	10,5
In houses:				
Taps	11	39,3	1	5,3
Hand basins	5	17,9	1	5,3
Shower units	12	42,9	5	26,3
Toilets	17	60,7	7	36,8
Kitchen sinks	12	42,9	8	42,1
Other	1	3,6	1	5,3
Don't know	0	0,0	3	15,8

Table S31. Single Quarters: Willingness to Pay Consumer Charges

Single Quarters	Yes	No	Yes: how much?					
			N$5	N$10	N$25	N$50	N$50+	DK
Households	46	1	26	9	5	1	1	4
Per cent	97,9%	2,1%	55,3%	19,1%	10,6%	2,1%	2,1%	8,5%

Table S32. Single Quarters: Intentions to Move to Other Housing Within Two Years

Single quarters	Households	%
Intention to move:		
Yes	24	51,1
No	23	48,9
Yes: to what type of housing:		
Backyard room	0	0,0
Room in a house	1	2,1
Rented house	2	4,3
Build Together plot	3	6,4
NHE house	7	14,9
Privately built house	4	8,5
Block of flats	0	0,0
Government house	5	10,6
Room/flat at employer's house	2	4,3

B. SMALL AND MEDIUM-SIZED BUSINESSES

Table B1. Businesses, Staff and Aggregate Water Bills by Town and Sector

	Businesses			Regular staff			Last monthly water bill (N$)		
	Swakop-mund	Walvis Bay	Both towns	Swakop-mund	Walvis Bay	Both towns	Swakop-mund	Walvis Bay	Both towns
Aggregates:									
industrial				699	425	1124	10155	4373	14528
commercial				665	773	1438	6222	7584	13806
total				1364	1198	2562	16377	11957	28334
Numbers:									
industrial	39	40	79	39	40	79	26	27	53
commercial	95	89	184	95	89	184	60	45	105
total	134	129	263	134	129	263	86	72	158
Means:									
industrial				17,9	10,6	14,2	391	162	274
commercial				7,0	8,7	7,8	104	169	132
total				10,2	9,3	9,7	190	166	179
Distribution (%):									
industrial	14,8	15,2	30,0	27,3	16,6	43,9	35,8	15,4	51,3
commercial	36,1	33,8	70,0	26,0	30,2	56,1	22,0	26,8	48,7
total	50,9	49,0	100,0	53,2	46,8	100,0	57,8	42,2	100,0

Table B2. Small and Medium Sized Businesses with Piped Water Supply

Businesses	With piped water:		
	Yes	No	Not known
263	250	13	0
100%	95,1%	4,9%	0,0%

Table B3. Businesses: Toilet/Washroom Facilities

Own facilities	No: outside facilities		
	Nearby private	Public in this building	Public outside
239	13	6	2
90,9%	4,9%	2,3%	0,8%

Table B4. Businesses: Payment Channel for Water Bills

Business direct	Indirect:			
	By landlord	By Head Office	By another route	Don't know
187	46	13	2	2
71,1%	17,5%	4,9%	0,8%	0,8%

Table B5. Businesses: Water Leaks over Last 3 Months

Total	Category				
	Toilet	Slow tap leak	Broken pipe	Other	Don't know
26	8	9	5	2	2
9,9%	3,0%	3,4%	1,9%	0,8%	0,8%

Table B6. Businesses: Regular Staff by Size Band

Staff per establishment	Businesses		Staff	
	No.	Per cent	No.	Per cent
All businesses:				
total	263	100,0	2562	100,0
1	13	4,9	13	0,5
2	31	11,8	62	2,4
3-5	82	31,2	325	12,7
6-10	64	24,3	503	19,6
11-20	50	19,0	738	28,8
21-50	19	7,2	618	24,1
51-100	4	1,5	303	11,8
Using process water:				
total	32	100,0	595	100,0
1	0	0,0	0	0,0
2	1	3,1	2	0,3
3-5	5	15,6	23	3,9
6-10	7	21,9	58	9,7
11-20	12	37,5	180	30,3
21-50	5	15,6	180	30,3
51-100	2	6,3	152	25,5
CBDs/shopping centres:				
total	184	100,0	1438	100,0
1	12	6,5	12	0,8
2	27	14,7	54	3,8
3-5	67	36,4	265	18,4
6-10	43	23,4	337	23,4
11-20	26	14,1	366	25,5
21-50	7	3,8	231	16,1
51-100	2	1,1	173	12,0
Industrial zones:				
total	79	100,0	1124	100,0
1	1	1,3	1	0,1
2	4	5,1	8	0,7
3-5	15	19,0	60	5,3
6-10	21	26,6	166	14,8
11-20	24	30,4	372	33,1
21-50	12	15,2	387	34,4
51-100	2	2,5	130	11,6

Table B7. Businesses: Water Bills by Size Band

Size of water bill	Businesses		Amount	
	No.	Per cent	No.	Per cent
All businesses:				
total	158	100,0	28334	100,0
N$0-49	60	38,0	1414	5,0
N$50-99	27	17,1	1916	6,8
N$100-199	27	17,1	3521	12,4
N$200-499	32	20,3	9046	31,9
N$500-999	8	5,1	5316	18,8
N$1000+	4	2,5	7121	25,1
Using process water:				
total	24	100,0	9763	100,0
N$0-49	4	16,7	119	1,2
N$50-99	1	4,2	60	0,6
N$100-199	5	20,8	675	6,9
N$200-499	8	33,3	2496	25,6
N$500-999	4	16,7	2682	27,6
N$1000+	2	8,3	3721	38,1
CBDs/shopping centres:				
total	105	100,0	13806	100,0
N$0-49	44	41,9	964	7,0
N$50-99	22	21,0	1575	11,4
N$100-199	16	15,2	2060	14,9
N$200-499	18	17,1	4929	35,7
N$500-999	4	3,8	2678	19,4
N$1000+	1	1,0	1600	11,6
Industrial zones:				
total	53	100,0	14528	100,0
N$0-49	16	30,2	450	3,1
N$50-99	5	9,4	341	2,3
N$100-199	11	20,8	1461	10,1
N$200-499	14	26,4	4117	28,3
N$500-999	4	7,5	2638	18,2
N$1000+	3	5,7	5521	38,0

Table B8. Businesses: Distribution of Water Bills and Staff by Size Band

Staff per establishment	Businesses		Total bills (N$)		Mean staff	Bill per staff
	No.	Per cent	N$	Per cent	No.	N$
All businesses:						
total	158	100,0	28334	100,0	9,7	18,41
1	8	5,1	683	2,4	1,0	85,38
2	14	8,9	1190	4,2	2,0	42,50
3-5	43	27,2	3226	11,4	4,0	18,93
6-10	40	25,3	5988	21,1	7,9	19,05
11-20	34	21,5	10756	38,0	14,8	21,43
21-50	16	10,1	4608	16,3	32,5	8,85
51-100	3	1,9	1883	6,6	75,8	8,29
Using process water:						
total	24	100,0	9763	100,0	18,6	21,88
1	0	0,0	0	0,0	0,0	0,00
2	0	0,0	0	0,0	0,0	0,00
3-5	5	20,8	710	7,3	4,6	30,87
6-10	5	20,8	889	9,1	8,3	21,46
11-20	8	33,3	4889	50,1	15,0	40,74
21-50	4	16,7	1443	14,8	36,0	10,02
51-100	2	8,3	1832	18,8	76,0	12,05
CBDs/shopping centres:						
total	105	100,0	13806	100,0	7,8	16,82
1	7	6,7	668	4,8	1,0	95,43
2	12	11,4	726	5,3	2,0	30,25
3-5	35	33,3	2621	19,0	4,0	18,93
6-10	24	22,9	4410	31,9	7,8	23,45
11-20	19	18,1	2965	21,5	14,1	11,09
21-50	6	5,7	1933	14,0	33,0	9,76
51-100	2	1,9	483	3,5	86,5	2,79
Industrial zones:						
total	53	100,0	14528	100,0	14,2	19,27
1	1	0,9	15	0,1	1,0	0,00
2	2	3,8	464	3,2	2,0	0,00
3-5	8	15,1	605	4,2	4,0	18,91
6-10	16	30,2	1578	10,9	7,9	12,48
11-20	15	28,3	7791	53,6	15,5	33,51
21-50	10	18,9	2675	18,4	32,3	8,29
51-100	1	1,9	1400	9,6	65,0	21,54

Table B9. Businesses: Importance of Saving Water

Total	Not important	A little	Quite	Very	Don't know
250	2	20	7	220	1
100,0%	0,8%	8,0%	2,8%	88,0%	0,4%

Table B10. Businesses: Wastage of Water in the Community

Total	Yes	No	Don't know
250	138	111	1
100,0%	55,2%	44,4%	0,4%

Table B11. Businesses: Awareness of Water-saving Publicity by Agency

Total	Government	Council	Employer	TV/Radio	None
250	55	64	9	172	30
100,0%	22,0%	25,6%	3,6%	68,8%	12,0%

Table B12. Businesses: Impact of Publicity on Propensity to Save Water

Total	More likely	Less likely	Same	Don't know	No reply
250	156	8	43	7	36
100,0%	62,4%	3,2%	17,2%	2,8%	14,4%

Table B13. Businesses: Preferred Fair Methods of Reducing Water Consumption

Total	Increase all charges	Increase for heavy users	Restrict all households	Persuasion	Other	Don't know
250	44	97	40	59	6	4
100,0%	17,6%	38,8%	16,0%	23,6%	2,4%	1,6%

Table B14. Businesses: Who Should Pay Cost of Increased Bulk Supply

Total	Town's consumers	Town's ratepayers	Local employers	Consumers nationwide	All taxpayers	Other	Don't know
250	129	30	2	51	10	25	3
100,0%	51,6%	12,0%	0,8%	20,4%	4,0%	10,0%	1,2%

Table B15. Businesses: Able to Afford Increased Water Charges

Total	Yes	No	Don't know
250	195	49	6
100,0%	78,0%	19,6%	2,4%

Table B16. Businesses: Level of Affordable Increases in Water Charges

Total	<N$25	N$25	N$50	N$100	N$200	>N$200	Don't know
195	76	54	22	18	6	5	14
100,0%	30,4%	21,6%	8,8%	7,2%	2,4%	2,0%	5,6%

Table B17. Businesses: Consumption Reduction at Last Increase in Charges

Total	A lot	Moderate	A little	Same	Increase	Don't know	No reply
250	67	59	11	65	0	33	15
100,0%	26,8%	23,6%	4,4%	26,0%	0,0%	13,2%	6,0%

Table B18. Businesses: Consumption Responses to Step Increases in Water Bills

Total	x half (50%)	x double (100%)	x triple (200%)	x fivefold (400%)	x tenfold (900%)
Reduce:					
a lot	73	97	134	142	145
moderately	69	64	34	24	21
a little	26	22	15	12	13
none	58	44	44	47	44
no reply	24	23	23	25	27
Reduce:					
a lot	29,2%	38,8%	53,6%	56,8%	58,0%
moderately	27,6%	25,6%	13,6%	9,6%	8,4%
a little	10,4%	8,8%	6,0%	4,8%	5,2%
none	23,2%	17,6%	17,6%	18,8%	17,6%
no reply	9,6%	9,2%	9,2%	10,0%	10,8%

Table B19. Businesses Using Process Water: Visitor Access to Toilets

Total	Yes	No	Don't know
33	19	13	1
100,0%	57,6%	39,4%	3,0%

Table B20. Businesses Using Process Water: Re-Use of Process Water

Total	Yes	No	Don't know
33	1	31	1
100,0%	3,0%	93,9%	3,0%

Table B21. Businesses Using Process Water: Quality or Chemical Problems

Total	Yes	No	Don't know
33	4	28	1
100,0%	12,1%	84,8%	3,0%

Table B22. Businesses Using Process Water: Reasons for Past Action to Save Water

Waste	Over-use	Scarcity	Cost	Increase in charges	Restric-tions	Publicity	Other
6	13	14	10	5	1	15	1
18,2%	39,4%	42,4%	30,3%	15,2%	3,0%	45,5%	3,0%

Table B23. Businesses Using Process Water: Water-Using Equipment

Washing machine	Bath	Shower	Cleaning with water:		Fixed basin	Canteen	Yard hose
			machine	by hand			
1	0	5	5	22	16	6	16
3,0%	0,0%	15,2%	15,2%	66,7%	48,5%	18,2%	48,5%

Table B24. Businesses Using Process Water: Water-saving Measures for Staff

Action	None	Not yet planned	Persua-sion	Written instructions	Publicity	Training	Stop wasteful habits
Taken	2 6,1%	6 18,2%	23 69,7%	2 6,1%	2 6,1%	10 30,3%	4 12,1%
Planned	1 3,0%	3 9,1%	1 3,0%	2 6,1%	1 3,0%	3 9,1%	1 3,0%
Action	Fix taps	Repair hosepipe	Close taps	Water-saving shower heads	Short flush cisterns	Urinals	Brick in cistern
Taken	15 45,5%	8 24,2%	23 69,7%	2 6,1%	8 24,2%	5 15,2%	3 9,1%
Planned	4 12,1%	4 12,1%	1 3,0%	1 3,0%	3 9,1%	2 6,1%	2 6,1%
Action	Reduce car washing	Reduce yard hosing	Smaller gardens	Desert plants	Reduce garden watering	Other	
Taken	8 24,2%	5 15,2%	3 9,1%	2 6,1%	3 9,1%	1 3,0%	
Planned	1 3,0%	1 3,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	

Table B25. Businesses Using Process Water: Response to Future Increases in Charges

Total	Water-saving equipment	Water-saving practices	Both	Neither
33	5	12	9	7
100,0%	15,2%	36,4%	27,3%	21,2%

Table B26. Businesses Using Process Water: Level of Present Water Charges

Total	Too low	OK	Too high	Excessive	Don't know
33	1	22	5	1	4
100,0%	3,0%	66,7%	15,2%	3,0%	12,1%

Table B27. Businesses Using Process Water: Serious Impact on Profitability of Step Increases in Charges

	Total	Fifth (20%)	Half (50%)	Double (100%)	Triple (200%)	Fivefold (400%)	Don't know
Yes	33	14	11	4	1	0	3
Increment	100,0%	42,4%	75,8%	87,9%	90,9%	90,9%	9,1%

QUESTIONNAIRES

QUESTIONNAIRE NO. H____ CONFIDENTIAL

West Coast Water Use Survey: Households

June 1995

Administered by the Social Sciences Division, University of Namibia for the Department of Water Affairs, Ministry of Agriculture, Water & Rural Development

Name of interviewer: _____ Supervisor: _____ Revisit? _____

Day_____ Date: _____June 1995 Start: _____ Finish: _____ Completed? _____

Guidelines for the interviewer

Identify the main house. Introduce yourself. Say that you are from the Social Sciences Division of the University of Namibia. If asked, show your SSD card. Then explain that you are conducting the water survey for the Ministry of Agriculture, Water and Rural Development in Windhoek. Make it clear that you are not from the town council/municipality. Stress that all information supplied belongs solely to SSD and will be kept strictly confidential - it will not be handed over to any public authority.

Explain the purpose of your visit. The population in the coastal towns and Arandis is growing. Water is scarce. The government is looking at its plans for the future water supply to the coastal towns. But providing water in a desert environment is expensive. The government wishes to know the views of the people to help improve its water planning.

Ask to speak to the head of the household. If she or he is not at home, ask to speak to the spouse (husband or wife) of the head. If neither is in, end the interview.

Ask how long the household head/spouse has stayed at this house. If less than three months, end the interview. If three months or more, continue the interview.

Invite the household head/spouse to include other members of the household to participate in the interview. Try to ensure that women as well as men participate in giving answers, since they will often have the most detailed knowledge.

Bear in mind the following points:

* Enter answers to all the questions.
* Write them in the underlined spaces (_____) or the tables.
* If the answer to a question is none, write 'none' in the answer space.
* If the question does not apply to this household, write 'na' (=not applicable) in the answer space.
* In the questionnaire, notes in **[bold and square brackets]** are for your guidance.

1. Address visited

House no. : _____ Erf no.:_____

Building : _____

Street : _____

Suburb : _____

Town : _____

Suburb	
Area	
Town	

HOUSEHOLD PROFILE

2. How many people sleep in this house most nights? **[Main household only]**

a. Adults aged 65 and over	
b. Adults aged 18 to 64	
c. Young aged 14 to 17	
d. Young aged under 14	
e. Total number	

3a. Does anyone else usually sleep outside this house elsewhere on the plot (e.g. in a backyard room, a servant's quarters or an outside flat)? **[Circle]**

Yes	1	No	2

3b. If 'Yes', how many sleep there most nights?

a. Adults aged 65 and over	
b. Adults aged 18 to 64	
c. Young aged 14 to 17	
d. Young aged under 14	
e. Total number	
f. Don't know **[Mark with 'X']**	

3c. If 'Yes', how many of them are: **[Answer all that apply]**

a. Relative or friends of the main household	
b. Tenants	
c. Servants	
d. Other **[Relationship]** _____ **[Relationship]** _____	

4a. What language is most frequently spoken in this household? **[Circle only one. Main household only]**

a. OshiWambo	1	f. Afrikaans	6
b. RuKwangali	2	g. English	7
c. SiLozi	3	h. German	8
d. OtjiHerero	4	i. Portuguese/Spanish	9
e. Nama/Damara	5	j. Other **[Specify]**	10

4b. What other languages are sometimes spoken in this household? **[Circle all that apply]**

a. OshiWambo	1	f. Afrikaans	6
b. RuKwangali	2	g. English	7
c. SiLozi	3	h. German	8
d. OtjiHerero	4	i. Portuguese/Spanish	9
e. Nama/Damara	5	j. Other **[Specify]**	10

5. Please give the following information for all **adult members of the main household** (i.e. 18 years and over)

Person	**Sex**	**Education (highest)**	**Employment status**	**Occupation if employed**	**If not employed, other sources of income**
HHead					
Spouse					
P3					
P4					
P5					
P6					
P7					
P8					
P9					
P10					

1=Male	1=None	1=Paid job
2=Female	2=Grade 1-4	2=Business
	3=Grade 5-7	3=Informal sector
	4=Grade 8-10	4=Student
	5=Grade 11-12	5=Homemaker
	6=Certificate	6=Retired
	7=Diploma	7=Chronically ill or disabled
	8=First degree	8=Unemployed
	9=Postgrad	9=Don't know
	10=Don't know	

6a. Is any productive activity undertaken on this plot (e.g. beer brewing, car repairs, food for sale)? **[Circle]**

Yes	1	No	2

6b. If 'Yes', what activity and by whom? **[Specify as many as possible]**

Who?	Type of activity

1=By member(s) of main household
2=By people sleeping elsewhere on the plot
3=By people not sleeping on the plot
4=Don't know

HOUSING

7. How many rooms are there in the main house? How many rooms are there in any other buildings or shelters on the plot in which people live? **['Other buildings' includes structures joined to or part of the main house but physically separated from it for living purposes]**

Type of room	Main house	Other buildings
a. Bedrooms		
b. Sitting room/other common rooms		
c. Kitchen/cooking areas		
d. Bath/shower with toilet: **[Circle]** bath shower both		
e. Bath/shower without toilet: **[Circle]** bath shower both		
f. Flush toilets in separate rooms		
g. Non-flush toilets in separate rooms		
h. Separate washing/laundry rooms		
i. Bed/sitting rooms		
j. Other rooms		

WATER CONSUMPTION

8a. How much was your most recent water bill? If you do not know the exact amount, give an estimate.

Amount (N$)	Don't know

X=Don't know

8b. Do you have electricity in your house? **[Circle]**

Yes	1	No	2

8c. How do you pay your water/electricity bill? **[Circle one only]**

In cash to the municipality	1
By cheque	2
By pre-paid meter	3
Someone else pays	4
Don't know	5

9a. Do you often fetch water from outside your plot to the main house? **[Circle]**

Yes	1	No	2

9b. If 'Yes', from where do you get it and do you pay anyone for it? **[Circle all that apply]**

From where?		**Pay?**
a. From neighbours	1	
b. From public taps	2	
c. From your employer	3	
d. From your business at another address	4	
e. From the single quarters	5	
f. From other sources **[Specify]**	6	

1=Yes 2=No
3=Don't know

9c. If 'Yes', why do you use these sources? **[Circle all that apply]**

a. The water is free or low cost	1
b. No piped supply to the house	2
c. Disconnected	3
d. For particular purposes **[Specify]**	4

9d. Do you regularly use any facilities outside the main plot and if so, where? **[Circle all that apply]**

Facility		**Where**
a. Bath/shower	1	
b. Washing machine	2	
c. Other **[Specify]**	3	

10. How many water taps do you have on the plot?

Where	Cold	Hot	Total
a. Inside the main house			
b. In any other buildings on the plot			
c. Outside			

11a. Do you have a swimming pool? **[Circle]**

Yes	1	No	2

11b. If 'Yes', what is the surface area? **[Record in metres. If uncertain, pace it out]**

Area (Sq. metres)	**Width (paces)**	**Width (metres)**	**Length (paces)**	**Length (metres)**	**If round, the border (paces)**

12a. Do you have a garden which you water? **[Circle]**

Yes	1	No	2

12b. If yes, give the approximate area: **[If uncertain, pace it out]**

Garden under	**Area (Sq. metres)**	**Width (paces)**	**Length (paces)**
a. Lawn			
b. Flower and vegetable beds			
c. Plants adapted to desert conditions			

13a. Do you have any trees, large bushes, hedges or large climbing plants on your plot? **[Circle]**

Yes	1	No	2

13b. If 'Yes', what is the total length of any hedges or rows of climbing plants?
[If uncertain, pace out each row and add up the total]

Type	**Number**	**Length (metres)**	**Length (paces)**
a. Trees			
b. Large bushes			
c. Hedges			
d. Rows of large climbing plants			

14a. Do you have a water meter? **[Circle]**

Yes	1	No	2

14b. If 'Yes':

Is it working or not?	
Does it give accurate readings of your water use?	

1=Yes 2=No 3=Don't know

15. What equipment do you have that uses tapwater, how often is each one used in an average week, and for how long each time (in minutes)?
[Include the main house and any other buildings and count uses by all household members]

Equipment	**Number**	**How many times per week (total)?**	**How long each time (average)?**
a. Washing machine			
b. Dishwasher			
d. Bath			
e. Inside shower (hot & cold water)			
f. Inside shower (cold water only)			
g. Shower in yard (hot & cold water)			
h. Shower in yard (cold water only)			
i. Fixed hand basin			
j. Moveable basin or tub for washing			
k. Fixed laundry basin			
l. Garden hose			
m. Garden irrigation system			
n. Other **[Specify]**			

16a. Do you have a hot water boiler/tank in the main house? **[Circle]**

Yes	1	No	2

16b. If 'Yes', does it also supply other buildings on the plot? **[Circle]**

Yes	1	No	2

16c. If 'No', how many other buildings on the plot have their own hot water boiler/tank?

Number	

17a. Excluding equipment, what else do you use tapwater for in the main house and how often in an average week? **[Estimate for each person and total up]**

Water uses	**Used?**	**How often?**
a. Washing dishes by hand		
b. Washing clothes by hand		
c. Washing the floor		
d. Washing the car/other vehicle		
e. Watering indoor plants		
f. Watering garden plants by hand		
g. Productive activities		
h. Other purposes **[Specify]**		

1=Yes 2=No

17b. Are there any non-flush toilets on your plot? **[Enter the type and number]**

Type	Main household	Other buildings

18a. If any productive activity is carried out at your plot, does any activity use water? **[Specify]**

1. _____
2. _____
3. _____
4. _____

18b. For what specific purposes is water used in these activities? **[Specify the use, not the activity]**

1. _____
2. _____
3. _____
4. _____

WATER SAVING

19. What methods do you know that save water in the house and outside?
[Do not read out the choices below. Help the respondent to reply in their own words and then tick the item which best matches their words. Encourage as many answers as possible]

a. None	1
b. Use less water	2
c. Water the garden only at the beginning or end of day	3
d. Reduce the amount of garden watering	4
e. Take care not to let the hosepipe run for a long time	5
f. Build up channels and plant soil to direct water to plants	6
g. Use dirty housewater in the garden	7
h. Repair leaky hosepipe	8
i. Wash the car with a bucket rather than the hosepipe	9
j. Wash the car less often	10
k. Stop laying dust or hosing the driveway	18
l. Fit a cover to the swimming pool	11
m. Fix leaking taps quickly	12
n. Close taps tightly and stop drips	13
o. Fit a water-saving shower head	14
p. Use the shower instead of the bath	15
q. Have fewer showers/baths	16
r. Use the bath water for more than one person	17
s. Run less water into the bath	19
t. Turn the tap off while washing at the hand basin	20
u. Train children and stop them wasting	21
v. Use short and long flush toilets	22
w. Put a brick in the toilet cistern	23
x. Do not run the tap while washing dishes	24
y. Run the washing machine with full loads	25
z. Use shade nets in the garden	26
aa. Other **[Specify]**	27

20. Which of the following actions, if any, have you done in this house?
[Read out and circle all that apply]

a. None	1
b. Use less water	2
c. Water the garden only at the beginning or end of day	3
d. Reduce the amount of garden watering	4
e. Take care not to let the hosepipe run for a long time	5
f. Build up channels and plant soil to direct water to plants	6
g. Use dirty housewater in the garden	7
h. Repair leaky hosepipe	8
i. Wash the car with a bucket rather than the hosepipe	9
j. Wash the car less often	10
k. Stop laying dust or hosing the driveway	18
l. Fit a cover to the swimming pool	11
m. Fix leaking taps quickly	12
n. Close taps tightly and stop drips	13
o. Fit a water-saving shower head	14
p. Use the shower instead of the bath	15
q. Have fewer showers/baths	16
r. Use the bath water for more than one person	17
s. Run less water into the bath	19
t. Turn the tap off while washing at the hand basin	20
u. Train children and stop them wasting	21
v. Use short and long flush toilets	22
w. Put a brick in the toilet cistern	23
x. Do not run the tap while washing dishes	24
y. Run the washing machine with full loads	25
z. Use shade nets in the garden	26
aa. Other **[Specify]**	27

21. If you took action during the past year to save water, what were your reasons for doing so? **[Tick all that apply]**

a. Water was being wasted	1
b. Too much water was being used	2
c. Water is scarce, there is not enough water	3
d. Water is expensive, we cannot afford the bill	4
e. Our bill rose too high, we could not afford the increase	5
f. Restrictions were imposed on the use of water	6
g. The municipality/government encouraged us to save water	7
h. Other **[Specify]**	8

22a. Have you had any water leaks in the past three months? **[Circle]**

Yes	1	No	2

22b. If 'Yes', what was the worst problem? **[Circle only one]**

Leaking toilet	1
Slow tap leak	2
Fast tap leak	3
Broken pipe	4
Underground leakage	5
Other **[Specify]**	6

22c. Is the problem now fixed? **[Circle]**

Yes	1	No	2

22d. If 'Yes', how long did it take to fix the problem? _____ days

22e. If 'No', how does the matter lie now? **[Circle only one]**

Temporary repair	1
Not yet fixed	2
Other **[Specify]**	3

ATTITUDES TOWARDS WATER USE AND SAVING

23a. Do you think it is important for people to save water? **[Circle only one]**

Not important/makes no difference	1
May help a little	2
Quite important	3
Very important	4
Don't know	5

23b. Do you think people in the community waste water? **[Circle]**

Yes	1	No	2

23c. If 'Yes', what are the main ways in which people waste water?

1. _____

2. _____

3. _____

4. _____

24a. If you have tapwater in your house, who supplies it? **[Circle only one]**

The government	1
Dept of Water Affairs	2
The municipality	3
Don't know	4
Other	5

24b. Have you been aware of any recent water saving publicity put out by: **[Circle all that apply]**

a. The government	1
b. The municipality	2
c. Your employer	3
d. None of these	4

24c. If 'Yes' to any of these, has the publicity made you: **[Circle only one]**

More likely to save water	1
Less likely to save water	2
No difference	3
Don't know	4

25. If you had to use less water in your household, which of the following would you reduce first, which second, and so on?
[Enter ranking number for each choice - 1st, 2nd etc. Use the cutouts for selection]

a. Switch from bath to shower	
b. Fewer baths/showers	
c. Watering the garden	
d. Washing the car	
e. Washing clothes	
f. Laying dust and hosing the driveway	
g. Other **[Specify]**	

26a. Can your household afford to pay its water bill every month? **[Circle]**

Yes	1	No	2

26b. If 'No', where do you look for help to pay the bill or to reduce the arrears? **[Circle all that apply]**

a. Family and relatives	1
b. Friends	2
c. Employer	3
d. Personal loans	4
e. Other **[Specify]**	5

27. If water charges rose, would you prefer to: **[Circle only one]**

Buy water-saving devices (e.g. shower head, short flush cistern)	1
Use water-saving practices without buying new devices	2
Do both	3
Do neither	4

28. If water usage had to be reduced in the community, how do you think this should be done fairly? **[Circle only one]**

By increasing water charges for all consumers	1
By increasing water charges for heavy users	2
By imposing water restrictions on all households	3
By doing none of these, but encourage people to save water	4
Other **[Specify]**	5

29. If the bulk water supply to one town must be increased, who should pay most of the extra cost? **[Circle only one]**

The water consumers in that town through higher water charges	1
The town's ratepayers through higher property taxes	2
Local employers through higher charges or rates	3
All Namibian consumers through higher water charges nationwide	4
Namibian taxpayers through higher taxes	5
Other **[Specify]**	6

30a. If water charges were raised by even a small amount, could you afford to pay the higher bill? **[Circle]**

Yes	1	No	2

30b. If 'Yes', how much more could your household afford to pay without hardship? **[Circle only one]**

N$ 5 per month	1
N$ 10 per month	2
N$ 25 per month	3
N$ 50 per month	4
N$ 100 per month	5
N$ 200 per month	6
More than N$ 200 per month	7

31. When water charges were last raised, by how much did you reduce your water usage? **[Circle only one]**

A lot	1
Moderately	2
A little	3
No difference	4
Increase	5
Don't know	6

32. If water charges were raised, by how much would you expect to reduce your water usage? **[Circle only one per row]**

Water charges up by	Reduce water usage			
	A lot	Moderately	A little	Not at all
a. Half your present bill	1	2	3	4
b. Double	1	2	3	4
c. Triple	1	2	3	4
d. Five times	1	2	3	4
e. Ten times	1	2	3	4

33. Who usually pays your water and electricity bill? **[Circle only one]**

The government	1
A parastatal/public authority	2
The municipality	3
The employer	4
Your own household	5
Relatives, friends etc outside your household	6
Other **[Specify]**	7

34. What is the approximate total cash income of your household each month? Include all earners living in the household and all sources of income (pay, pensions, sales of goods, rent, etc.)

N$ _____

35. What are the most important sources of income for your household at present?
[Enter ranking number for each choice - 1st, 2nd etc. Use the cutouts for selection]

a. Salary/wages	
b. Business	
c. Informal sector	
d. Pension	
e. Other state benefit	
f. Rent from property you own or lease	
g. Assistance from friends or relatives	
h. Churches or welfare organisations (not government)	
i. Investment income or savings	
j. Other **[Specify]**	

To be completed by the interviewer after leaving the premises **QUESTIONNAIRE NO. H_____**

36. Was there any visible evidence of water leakage: **[Circle all that apply]**

a. Inside the house	
b. Outside the house	

1=Yes
2=No

37a. Were there any obvious signs of water wastage (pools of lying water etc)? **[Circle]**

Yes	1	No	2

37b. If 'Yes', give a brief description:

_____

_____

_____

38. Type of structure in which the main household is living: **[Circle only one. Exclude other structures]**

Detached (standing by itself)	1
Joined to its neighbour	2
Town house in a walled or fenced compound	3
Flat in a block	4
Single quarters	5
Mobile home/caravan	6
Shanty	7
Other **[Specify]**	8

39. Type and number of structures in which other people appear to be living: **[Exclude the main household but include separate units inside a house if within the plot, eg a flat or maid's room]**

Type of structure	**Number**
Detached flat or outhouse	
Flat in or attached to the main house	
Garage	
Shed, shelter	
Mobile home/caravan	
Other **[Specify]**	

Number of visits before starting the interview: ____

Number of revisits to complete the interview: ____

Level of cooperation from the respondent: **[Circle]** good moderate poor

In your opinion, were any of the questions not answered correctly? If so, give your reasons below with the question number(s):

_____

_____

_____

_____

_____

Now go back to page 1 and make sure that all details there are filled in.

[Write below any additional notes you need to make]

QUESTIONNAIRE NO.H_____

Do people live in this house all or most of the time (ie 10 months or more in the year)? **[Circle]**

Yes	1	No	2

If 'No', for how many months in the past year (July 1994 to June 1995) has the main house been occupied by: **[Enter the number of months in each applicable box]**

You	Relatives	Paying guests	Others	Total

Occupied during which months by: **[Circle only one answer for each row]**

Month	You	Relatives	Paying guests	Others
July 1994	1	13	25	37
August 1994	2	14	26	38
September 1994	3	15	27	39
October 1994	4	16	28	40
November 1994	5	17	29	41
December 1994	6	18	30	42
January 1995	7	19	31	43
February 1995	8	20	32	44
March 1995	9	21	33	45
April 1995	10	22	34	46
May 1995	11	23	35	47
June 1995	12	24	36	48

QUESTIONNAIRE NO. S_____ CONFIDENTIAL

West Coast Water Use Survey: Single Quarters/Hostel

June 1995

Administered by the Social Sciences Division, University of Namibia for the Department of Water Affairs, Ministry of Agriculture, Water & Rural Development

Name of interviewer: _____ Supervisor: _____ Revisit? _____

Day_____ Date: _____June 1995 Start: _____ Finish: _____ Completed? _____

Guidelines for the interviewer

This questionnaire is for use in blocks in the single quarters or hostels where the residents do not pay separately for the water they use.

Introduce yourself. Say that you are from the Social Sciences Division of the University of Namibia. If asked, show your SSD card. Then explain that you are conducting the water survey for the Ministry of Agriculture, Water and Rural Development in Windhoek. Make it clear that you are not from the town council/municipality. Stress that all information supplied belongs solely to SSD and will be kept strictly confidential - it will not be handed over to any public authority.

Explain the purpose of your visit. The population in the coastal towns is growing. Water is scarce. The government is looking at its plans for the future water supply to the coastal towns. But providing water in a desert environment is expensive. The government wishes to know the views of the people to help improve its water planning.

Ask if there is a household head and if there is, ask to speak to that person or his/her spouse. If she or he is not at home but you find other occupants whose seniority or authority is apparent, continue the interview with them. If there is no household head, ask to speak to any one of the tenants in the room.

Invite the main respondent to include other residents to participate in the interview, as many as possible. Try to ensure that women residents, if any, participate in giving answers, but exclude people not sleeping in that room.

In the questionnaire, 'house' means the room shared by the residents plus any facilities which they alone use. 'Household' means all the people sleeping in that room. 'Communal' usually means facilities outside the room which are shared by the residents of several rooms.

Bear in mind the following points:

* Enter answers to all the questions.
* Write them in the underlined spaces (_____) or the tables.
* If the answer to a question is none, write 'none' in the answer space.
* If the question does not apply to this household, write 'na' (=not applicable) in the answer space.
* In the questionnaire, notes in **[bold and square brackets]** are for your guidance.

1. Address visited

Flat/block : _____

Section : _____

Suburb : _____

Town : _____

Suburb	
Area	
Town	

HOUSEHOLD PROFILE

2a. How many people sleep in this house most days? **[Allow for 'shift' sleeping - a bed may be regularly used by two or more people sleeping at different times of day]**

a. Adults aged 65 and over	
b. Adults aged 18 to 64	
c. Young aged 14 to 17	
d. Young aged under 14	
e. Total number	

2b. How many beds or sleeping places are there in this house? **[Include couches, chairs and bedrolls on the floor]**

Beds	Couches	Chairs	Floor space

4a. What language is most frequently spoken in this household? **[Circle only one. Main household only]**

a. OshiWambo	1	f. Afrikaans	6
b. RuKwangali	2	g. English	7
c. SiLozi	3	h. German	8
d. OtjiHerero	4	i. Portuguese/Spanish	9
e. Nama/Damara	5	j. Other **[Specify]**	10

4b. What other languages are sometimes spoken in this household? **[Circle all that apply]**

a. OshiWambo	1	f. Afrikaans	6
b. RuKwangali	2	g. English	7
c. SiLozi	3	h. German	8
d. OtjiHerero	4	i. Portuguese/Spanish	9
e. Nama/Damara	5	j. Other **[Specify]**	10

5. Please give the following information for all **adult members of the main household** (i.e. 18 years and over) **[Include all those counted under 2a]**

Person	Sex	Education (highest)	Employment status	Occupation if employed	If not employed, other sources of income
HHead					
Spouse					
P3					
P4					
P5					
P6					
P7					
P8					
P9					
P10					
P11					
P12					
P13					
P14					
P15					
P16					
P17					
P18					
P19					
P20					

1=Male
2=Female

1=None
2=Grade 1-4
3=Grade 5-7
4=Grade 8-10
5=Grade 11-12
6=Certificate
7=Diploma
8=First degree
9=Postgrad
10=Don't know

1=Paid job
2=Business
3=Informal sector
4=Student
5=Homemaker
6=Retired
7=Chronically ill or disabled
8=Unemployed
9=Don't know

6a. Does any resident of this household undertake any productive activity within or near the single quarters/hostel area (e.g. beer brewing, wood carving, food for sale)? **[Circle]**

Yes	1	No	2

6b. If 'Yes', what activities? **[Specify as many as possible]**

Type of activity
1.
2.
3.
4.
5.
6.
7.

WATER CONSUMPTION

9a. Does your household often fetch water into the house from outside the single quarters/hostel? **[Circle]**

Yes	1	No	2

9b. If 'Yes', from where do you get it and do you pay anyone for it? **[Circle all that apply]**

From where?		**Pay?**
a. From nearby houses	1	
b. From public taps outside the single quarters/hostel	2	
f. From other sources **[Specify]**	6	

1=Yes 2=No
3=Don't know

9c. If 'Yes', why do you use these sources? **[Circle all that apply]**

a. The water is free or low cost	1
f. The communal taps are often broken	6
e. The communal taps are often crowded	5
d. For particular purposes **[Specify]**	4

9d. Do you regularly use any facilities outside the single quarters/hostel and if so, where? **[Circle all that apply]**

Facility		**Where**
a. Bath/shower	1	
b. Washing machine	2	
d. Fixed laundry basin with tap	4	
e. Moveable basin for body washing	5	
f. Moveable basin for washing clothes	6	
c. Other **[Specify]**	3	

9e. Do people from outside the single quarters/hostel often use the communal water facilities? **[Circle]**

Yes	1	No	2

9f. If 'Yes', what facilities do they commonly use? **[Circle all that apply]**

Toilets	Showers	Taps	Washbasins	Other **[Specify]**	
1	2	3	4	5	

10b. How far must you walk from the house to get to the nearest tap? **[Circle]**

Distance	Cold tap	Hot tap
d. 10 metres/paces	1	4
e. 30 metres/paces	2	5
f. More than 30 metres/paces	3	6

X=None

17a. What do you and other residents use tapwater for and how often in an average week? **[Estimate for each resident and total up]**

Water uses	**Used?**	**How often?**
a. Washing dishes by hand		
b. Washing clothes by hand		
c. Washing the floor		
d. Washing the car/other vehicle		
g. Productive activities		
h. Other purposes **[Specify]**		

1=Yes 2=No

15. Which of the following do you yourself use, how often in one week and for how long each time (in minutes)? **[Applies only to the main respondent]**

Uses	How many times per week (total)?	How long each time (average)?
e. Inside shower (hot & cold water)		
f. Inside shower (cold water only)		
g. Shower in the open (hot & cold water)		
h. Shower in the open (cold water only)		
i. Fixed hand basin		
o. Moveable basin for body washing		
j. Moveable basin for washing clothes		
k. Fixed laundry basin		
n. Other **[Specify]**		

17c. Do you yourself go to the toilet on waste ground: **[Circle]**

Often	Occasionally	Never
1	2	3

18a. If you or anyone living in your house engages in any productive activity in the single quarters/hostel area, does any activity use water? **[Specify]**

1. _____
2. _____
3. _____
4. _____

18b. For what specific purposes is water used in these activities? **[Specify the use, not the activity]**

1. _____
2. _____
3. _____
4. _____

WATER SAVING

19. What methods do you know that save water in the house and outside?
[Do not read out the choices below. Help the respondent to reply in their own words and then tick the item which best matches their words. Encourage as many answers as possible]

a. None	1
b. Use less water	2
j. Wash the car less often	10
m. Fix leaking taps quickly	12
n. Close taps tightly and stop drips	13
q. Have fewer showers	16
t. Turn the tap off while washing at the hand basin	20
u. Train children and stop them wasting	21
ab. Always turn the tap off after finishing/never leave the tap running	28
x. Do not run the tap while washing dishes	24
aa. Other **[Specify]**	27

20. Which of the following actions, if any, have you done in this house?
[Read out and circle all that apply]

a. None	1
b. Use less water	2
j. Wash the car less often	10
m. Fix leaking taps quickly	12
n. Close taps tightly and stop drips	13
q. Have fewer showers	16
t. Turn the tap off while washing at the hand basin	20
u. Train children and stop them wasting	21
ab. Always turn the tap off after finishing/never leave the tap running	28
x. Do not run the tap while washing dishes	24
aa. Other **[Specify]**	27

21. If you took action during the past year to save water, what were your reasons for doing so? **[Tick all that apply]**

a. Water was being wasted	1
b. Too much water was being used	2
c. Water is scarce, there is not enough water	3
f. Restrictions were imposed on the use of water	6
g. The municipality/government encouraged us to save water	7
h. Other **[Specify]**	8

22a. Have any water leaks occurred in the past three months in facilities that you commonly use? **[Circle]**

Yes	1	No	2

22b. If 'Yes', what was the worst problem? **[Circle only one]**

a. Leaking toilet	1
b. Slow tap leak	2
c. Fast tap leak	3
d. Broken pipe	4
e. Underground leakage	5
f. Other **[Specify]**	6

22c. Is the problem now fixed? **[Circle]**

Yes	1	No	2

22d. If 'Yes', how long did it take to fix the problem? Days _____ Weeks _____

22e. If 'No', how does the matter lie now? **[Circle only one]**

a. Temporary repair	1
b. Not yet fixed	2
c. Other **[Specify]**	3

ATTITUDES TOWARDS WATER USE AND SAVING
[Main respondent(s) only, although others may contribute]

23a. Do you think it is important for people to save water? **[Circle only one]**

a. Not important/makes no difference	1
b. May help a little	2
c. Quite important	3
d. Very important	4
e. Don't know	5

23b. Do you think people in the community waste water? **[Circle]**

Yes	1	No	2

23c. If 'Yes', what are the main ways in which people waste water?

1. _____

2. _____

3. _____

4. _____

23d. Do you find taps or showers left running after use? **[Circle]**

Often	1
Sometimes	2
Never	3
Don't know	4

23e. If 'Yes', why do you think people do not close the taps or showers after use?

_____

_____

24a. Who supplies the tapwater that you use? **[Circle only one]**

The government	1
Dept of Water Affairs	2
The municipality	3
Don't know	4
Other **[Specify]**	5

24b. Have you been aware of any recent water saving publicity put out by: **[Circle all that apply]**

a. The government	1
b. The municipality	2
c. Your employer	3
d. None of these	4
e. NBC TV/radio	5

24c. If 'Yes' to any of these, has the publicity made you: **[Circle only one]**

More likely to save water	1
Less likely to save water	2
No difference	3
Don't know	4

40. If people in the single quarters/hostel had piped water at their rooms, do you think it would reduce or increase water wastage in the single quarters?

More likely to reduce wastage	1
More likely to increase wastage	2
No difference	3
Don't know	4

28. If water usage had to be reduced in the town as a whole, how do you think this should be done fairly? **[Circle only one]**

By increasing water charges for all consumers	1
By increasing water charges for heavy users	2
By imposing water restrictions on all households	3
By doing none of these, but encourage people to save water	4
Other **[Specify]**	5

29. If the bulk water supply to one town must be increased, who should pay most of the extra cost? **[Circle only one]**

The water consumers in that town through higher water charges	1
The town's ratepayers through higher property taxes	2
Local employers through higher charges or rates	3
All Namibian consumers through higher water charges nationwide	4
Namibian taxpayers through higher taxes	5
Other **[Specify]**	6

41a. Do you think that the water facilities in the single quarters/hostel are adequate for your needs? **[Circle]**

Yes	1	No	2

41b. If 'No', which of the existing communal facilities do you think could be improved and how? **[Circle all that apply]**

Facility	Improve?	How?
Toilets		
Showers		
Taps		
Washbasins		
Other **[Specify]**		

1=Yes 2=No
3=No access
4=Don't know

1=Increase the number of them
2=Keep them in better repair
3=Provide better quality fixtures
4=Keep the facilities clean
5=Other **[Specify]**

41c. If 'No', what new communal facilities would you like to see provided? **[Circle all that apply]**

a. Improvements are needed, not new facilities	1
b. Baths	2
c. Fixed basins with taps for washing clothes	3
d. Fixed basins with taps for washing dishes	4
e. Other **[Specify]**	5

41d. If 'No', what new facilities would you like to see provided at the rooms/houses? **[Circle all that apply]**

a. None are needed	1
b. It would not be practicable to provide	2
c. Water taps	3
d. Hand basins	4
e. Shower units	5
f. Flush toilets	6
g. Kitchen sinks	7
h. Other **[Specify]**	8

41e. Which of the new facilities do you think should be provided first, which second and which third? **[Mark three only]**

a. Don't know	
b. Baths in the communal blocks	
c. Communal facilities for washing clothes	
d. Communal facilities for washing dishes	
e Water taps at the houses	
f. Hand basins at the houses	
g. Shower unit for each house	
h. Flush toilet for each house	
i. Kitchen sink for each house	
j. Other **[Specify]**	

X = Don't know

42a. If you had piped water at your room/house, would you be prepared to pay a water bill every month in order to get it? **[Circle]**

Yes	1	No	2

42b. If 'Yes', how much could your household afford to pay without hardship? **[Circle only one]**

N$ 5 per month	1
N$ 10 per month	2
N$ 25 per month	3
N$ 50 per month	4
More than N$ 50 per month	6

43a. Do you intend to try to move to another kind of housing in this town within the next two years? **[Circle]**

Yes	1	No	2

43b. If 'Yes', to what kind of housing are you likely to move? **[Circle one only]**

a. Backyard room	1
b. Room in a house	2
c. Rented house	3
d. Build Together plot	4
e. NHE house	5
f. Privately built house	6
g. Block of flats	7
h. Government house	8
i. Room/flat at employer's house	9
j. Other **[Specify]**	10

HOUSEHOLD INCOME

34. What is the approximate total cash income of your household each month? Include all earners living in the household and all sources of income (pay, pensions, sales of goods, rent, etc.)

N$ _____

35. What are the most important sources of income for your household at present?
[Enter ranking number for each choice - 1st, 2nd etc. Use the cutouts for selection]

a. Salary/wages	
b. Business	
c. Informal sector	
d. Pension	
e. Other state benefit	
g. Assistance from friends or relatives	
h. Churches or welfare organisations (not government)	
j. Other **[Specify]**	

To be completed by the interviewer after leaving the premises **QUESTIONNAIRE NO. S_____**

36. Was there any visible evidence of water leakage at the communal facilities used by the household: **[Mark all that apply]**

c. Toilets	
d. Washing facilities	
e. Other **[Specify]**	

1=Yes
2=No

37a. Were there any obvious signs of water wastage (pools of lying water etc) near the communal facilities? **[Circle]**

Yes	1	No	2

37b. If 'Yes', give a brief description:

_____

_____

_____

44. How many beds did you yourself count in the room? _____

Number of visits before starting the interview: ____

Number of revisits to complete the interview: ____

Level of cooperation from the respondent: **[Circle]** good moderate poor

In your opinion, were any of the questions not answered correctly? If so, give your reasons below with the question number(s):

_____

_____

_____

_____

_____

Now go back to page 1 and make sure that all details there are filled in.

[Write below any additional notes you need to make]

QUESTIONNAIRE NO. B_____ CONFIDENTIAL

West Coast Water Use Survey: Businesses

June 1995

Administered by the Social Sciences Division, University of Namibia for the Department of Water Affairs, Ministry of Agriculture, Water & Rural Development

Name of interviewer: _____ Supervisor: _____ Revisit? _____

Day_____ Date: _____June 1995 Start: _____ Finish: _____ Completed? _____

Guidelines for the interviewer

Before entering, identify the name of the business. If it is on your list, use both parts of the questionnaire. If it is not on your list, use only part 1.

Ask to speak to the owner or the manager and introduce yourself. Say that you are from the Social Sciences Division of the University of Namibia. If asked, show your SSD card. Then explain that you are conducting the water survey for the Ministry of Agriculture, Water and Rural Development in Windhoek. Make it clear that you are not from the town council/municipality. Stress that all information supplied belongs solely to SSD and will be kept strictly confidential - it will not be handed over to any public authority.

If the manager is busy or not available, try to make an appointment at their convenience. If not possible, ask if someone else can speak in their place.

Bear in mind the following points:
* Enter answers to all the questions.
* Write them in the underlined spaces (_____) or the tables.
* If the answer to a question is none, write 'none' in the answer space.
* If the question does not apply to this business, write 'na' (=not applicable) in the answer space.
* In the questionnaire, notes in **[bold and square brackets]** are for your guidance.

1. Address visited

P.O. Box : _____ Tel.: _____ Fax: _____

Street no. : _____ Erf no.:_____

Building : _____

Street : _____

Suburb : _____

Town : _____

Suburb	
Area	
Town	

PART 1

WATER USAGE

2b. What is the total number of people working regularly at this premises? _____

15b. Do you have piped water on this premises? **[Circle]**

Yes	1	No	2

9g. If 'Yes', do you have toilet/washroom facilities on your own premises for the use of yourself/your staff? **[Circle]**

Yes	1	No	2

9h. If none on the premises, which facilities do you/your employees regularly use outside your premises? **[Circle all that apply]**

Private facilities elsewhere in this or a nearby building	1
Public facilities in this building	2
Public facilities outside this building	3

[If the answer to 15b is 'No', close the interview at this point]

18a. Does your business use water for commercial purposes (production, services etc)? **[Circle]**

Yes	1	No	2

8d Do you pay directly for the water used on this premises? **[Circle]**

Yes	1	No	2

8e. If 'No', how is your water bill paid? **[Circle one only]**

By your landlord, as part of your rent	1
By your head office	2
Other **[Specify]**	3

If 'No', give the name, address and phone number of the agency responsible for paying your water bill:

_____

_____

_____

Tel.: _____ Fax: _____

8a. If 'Yes', how much was your most recent water bill? **[Ask the respondent to consult his/her latest bill and to add together the basic and consumption charges for water only. If he/she does not have the bill to hand, ask for an estimate and mark the answer with 'E']**

Amount (N$)	Don't know

X=Don't know

22a. Have you had any water leaks in the past three months? **[Circle]**

Yes	1	No	2

22b. If 'Yes', what was the worst problem? **[Circle only one]**

Leaking toilet	1
Slow tap leak	2
Fast tap leak	3
Broken pipe	4
Underground leakage	5
Other **[Specify]**	6

22c. Is the problem now fixed? **[Circle]**

Yes	1	No	2

22d. If 'Yes', how long did it take to fix the problem? _____ days

22e. If 'No', how does the matter lie now? **[Circle only one]**

Temporary repair	1
Not yet fixed	2
Other **[Specify]**	3

ATTITUDES TOWARDS WATER USE AND SAVING

23a. Do you think it is important for people to save water? **[Circle only one]**

Not important/makes no difference	1
May help a little	2
Quite important	3
Very important	4
Don't know	5

23b. Do you think people in the community waste water? **[Circle]**

Yes	1	No	2

23c. If 'Yes', what are the main ways in which people waste water?

1. _____

2. _____

24b. Have you been aware of any recent water saving publicity put out by: **[Circle all that apply]**

a. The government	1
b. The municipality	2
c. Your employer	3
d. None of these	4
e. NBC TV/radio	5

24c. If 'Yes' to any of these, has the publicity made your business: **[Circle only one]**

More likely to save water	1
Less likely to save water	2
No difference	3
Don't know	4

28. If water usage had to be reduced in the community, how do you think this should be done fairly? **[Circle only one]**

By increasing water charges for all consumers	1
By increasing water charges for heavy users	2
By imposing water restrictions on all households	3
By doing none of these, but encourage people to save water	4
Other **[Specify]**	5

29. If the bulk water supply to one town must be increased, who should pay most of the extra cost? **[Circle only one]**

The water consumers in that town through higher water charges	1
The town's ratepayers through higher property taxes	2
Local employers through higher charges or rates	3
All Namibian consumers through higher water charges nationwide	4
Namibian taxpayers through higher taxes	5
Other **[Specify]**	6

30a. If water charges were raised by even a small amount, could you afford to pay the higher bill? **[Circle]**

Yes	1	No	2

30b. If 'Yes', how much more could your business afford to pay without hardship? **[Circle only one]**

Less than N$ 25 per month	8
N$ 25 per month	3
N$ 50 per month	4
N$ 100 per month	5
N$ 200 per month	6
More than N$ 200 per month	7

31. When water charges were last raised, by how much did your business reduce your water usage? **[Circle only one]**

A lot	1
Moderately	2
A little	3
No difference	4
Increase	5
Don't know	6

32. If water charges were raised, by how much would you expect to reduce your business's water usage? **[Circle only one per row]**

Water charges up by	Reduce water usage			
	A lot	Moderately	A little	Not at all
a. Half your present bill	1	2	3	4
b. Double	1	2	3	4
c. Triple	1	2	3	4
d. Five times	1	2	3	4
e. Ten times	1	2	3	4

PART 2 **QUESTIONNAIRE NO. B_____**

Position of respondent (job title): _____

WORKFORCE AND VISITORS

2c. Please give a brief breakdown of the number of people working at this premises during a normal day. If you work shifts, include all shift workers.

Category	Regular	Casual (daily average for the last full week)
a. Full-time (30 hours per week or more)		
b. Part-time (less than 30 hours per week)		

2d. If your workforce varies significantly over the year, give an estimate of the maximum and minimum total number working at this premises over the last year.

Category	Full-time	Part-time	Month
Maximum (peak season)			
Minimum (low season)			

2e. Do customers or visitors have access to toilets/washrooms on your premises? **[Circle]**

Yes	1	No	2

WATER USED FOR PROCESSING
[Water used only for production, eg manufacturing, food preparation, cooling of machinery)]

6b. Give brief descriptions of your principal production or service operations:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

18b. For what processes do you use water and how is it used? If powered equipment or machinery is used, name the principal units that use water. Estimate the proportion of your total water consumption that each process uses.

Process	Type of use	Powered machinery	Percent of total water used
1.			
2.			
3.			
4.			
5.			
6.			

1=Goes into products (eg prepared foods such as bread)
2=Cleaning the products (eg washing food ingredients, laundry)
3=Washing away product waste (eg fish offcuts)
4=Cooling the machinery
5=Boilers supplying hot water or steam

18c. Do you re-use any water from your processing operations? **[Circle]**

Yes	1	No	2

18d. If 'Yes', how much of it is re-used and for what purpose? Is additional equipment used for this purpose? **['Additional' means either extensions to existing equipment or equipment installed separately]**

From which process?	Used for?	Type of use	Any additional equipment/machinery used for recovering the water?	Percent of process water re-used

1=Processing
2=Non-processing (eg cleaning the premises)
3=Other uses

18e. If you purchased additional equipment or machinery to re-use process water, what was its original capital cost?

Equipment/machinery	Capital cost	Year bought

18f. If within the last 5 years your business bought powered equipment that uses water, was saving water considered in deciding what equipment to select?

a. Not considered	1
b. Considered, but the technology was not available	2
c. Considered, but not regarded as important for this business	3
d. Considered, but too expensive	4
e. Considered, but would not have saved much water	5
f. Considered, but postponed for later decision	6
g. Other **[Specify]**	7

21. If you took action during the past year to save water, what were your reasons for doing so? **[Tick all that apply]**

a. Water was being wasted	1
b. Too much water was being used	2
c. Water is scarce, there is not enough water	3
d. Water is expensive, we cannot afford the bill	4
e. Our bill rose too high, we could not afford the increase	5
f. Restrictions were imposed on the use of water	6
g. The municipality/government encouraged us to save water	7
h. Other **[Specify]**	8

14c. Does the quality of the water or its chemical properties pose any problems for your production process? **[Circle]**

Yes	1	No	2

If 'Yes', give brief details:

GENERAL WATER CONSUMPTION

15. Excluding processing, what equipment do you have that uses tapwater, how often is each one used in an average day or week, and for how long each time (in minutes)?
[Count uses by all staff]

Equipment	Number	How many times (total)?		How long each time (average)?
		per day	per week	
a. Washing machine				
d. Bath				
e. Inside shower (hot & cold water)				
f. Inside shower (cold water only)				
g. Shower in yard (hot & cold water)				
h. Shower in yard (cold water only)				
o. Indoor cleaning machine using water				
p. Indoor cleaning by hand using water				
q. Fixed basin for cleaning tools etc				
r. Canteen meals cooked on-site				
l. Yard hose				
m. Garden irrigation system				
n. Other **[Specify]**				

20b. Excluding purchases of production equipment, what measures have you taken or are you planning to take on this premises to save water used by your staff? **[Circle all that apply]**

Measures	Taken	Planned
a. None		
b. Measures will be taken but not yet planned		
c. Staff are encouraged to use less water		
d. Written instructions to staff on saving water		
e. Publicity material distributed or displayed		
f. Training staff on water-saving methods		
g. Staff stopped from particular water-wasting habits **[Specify]**		
h. Fix leaking taps, pipes etc quickly		
i. Repair leaky hosepipe		
j. Ensure that staff close taps after use and tightly		
k. Fit water-saving shower heads		
l. Fit short and long flush toilets		
m. Install urinals in men's toilet		
n. Put brick in cisterns in staff toilets		
o. Reduce car washing		
p. Stop laying dust or hosing the driveway		
q. Remove or reduce the size of any planted gardens		
r. Plant only indigenous or desert-adapted plants		
s. Reduce garden watering		
t. Other **[Specify]**		

27. If water charges rose, would you prefer to: **[Circle only one]**

Buy water-saving devices or equipment	1
Use water-saving practices without buying new devices or equipment	2
Do both	3
Do neither	4

14b. Are you satisfied that your water meter gives accurate readings of your water consumption? **[Circle]**

Yes	1	No	2

If 'No', give brief details:

_____

_____

_____

32b. Do you consider the present level of water consumption charges to be: **[Circle only one]**

a. Too low	1
b. About right	2
c. Too high	3
d. Much too high	4
e. Don't know	5

32c. Would the profitability of your business be seriously affected if water charges were to rise by: **[Circle only one]**

a. 20 per cent of your present bill	1
b. 50 per cent of your present bill	2
c. Double	3
d. Triple	4
e. Five times	5

8f. If you do not pay your water bill directly, is it itemised in the rental for this premises? **[Circle]**

Yes	1	No	2

To be completed by the interviewer after leaving the premises **QUESTIONNAIRE NO. B_____**

36. Was there any visible evidence of water leakage: **[Circle all that apply]**

a. Inside the premises	
b. Outside the premises	

1=Yes
2=No

37a. Were there any obvious signs of water wastage (pools of lying water etc)? **[Circle]**

Yes	1	No	2

37b. If 'Yes', give a brief description:

_____

_____

_____

38. Type of structure in which the business is located: **[Circle only one. Exclude other structures]**

Detached (standing by itself)	1
Joined to its neighbour, with street entrance	2
In a shopping mall	9
Unit in an office block	10
Mobile vehicle on wheels	11
Other **[Specify]**	8

Number of visits before starting the interview: ____

Number of revisits to complete the interview: ____

Level of cooperation from the respondent: **[Circle]** good moderate poor

In your opinion, were any of the questions not answered correctly? If so, give your reasons below with the question number(s):

_____

_____

_____

_____

_____

Now go back to page 1 and make sure that all details there are filled in.

[Write below any additional notes you need to make]